



# **mineral resources**

Department:

Mineral Resources

**REPUBLIC OF SOUTH AFRICA**

## **BASIC ASSESSMENT REPORT**

**And**

## **ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

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

NAME OF APPLICANT: **THUNDERFLEX 78 (PTY) LTD**

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FILE REFERENCE NUMBER SAMRAD: **(NC) 30/5/1/1/2/12433 PR**

## 1. IMPORTANT NOTICE

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

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

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

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

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

## 2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

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

## PART A SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

### Contact Person and Correspondence Address

#### a) Details of

##### i) Details of the EAP

Name of the Practitioner: ROELIEN OOSTHUIZEN  
 Tel No.: 084 208 9088  
 Fax No.: 086 510 7120  
 E-mail address: [roosthuizen950@gmail.com](mailto:roosthuizen950@gmail.com)

##### ii) Expertise of the EAP

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

(with evidence)

MEM (MASTERS IN ENVIRONMENTAL MANAGEMENT (UFS))

B-Comm in Human and Industrial- Psychology (NWU)

Registered Environmental Assessment Practitioner: 2019/1467 at EAPASA

please see attached resume and MEM certificate. (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

<b>Farm Name:</b>	REMAINING EXTENT OF THE FARM MESNARD 38 AND FARM ROOIPAN 43 AND FARM LA PROVENCE 51 AND REMAINING EXTENT AND PORTION 1 (TURKSVYPAN) OF THE FARM 52 AND PORTION 1 OF THE FARM HOPEFIELD ESTATE 552 AND REMAINING EXTENT OF THE FARM 565, HAY
<b>Application area (Ha):</b>	15 358. 8792 ha
<b>Magisterial district:</b>	Hay
<b>Distance and direction from nearest town:</b>	Approximately 30km South of Lime Acres and approximately 10km north of Griekwastad in the Northern Cape.

<b>21 digit Surveyor General Code for each farm portion:</b>	Farm no: 38 C03100000000003800000 Farm no: 43 C03100000000004300000 Farm no: 51 C03100000000005100000 Farm no: 52 C03100000000005200000 Farm no: 52 C03100000000005200001 Farm no: 552 C031000000000055200001 Farm no: 565 C031000000000056500000
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c) **Locality map**

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

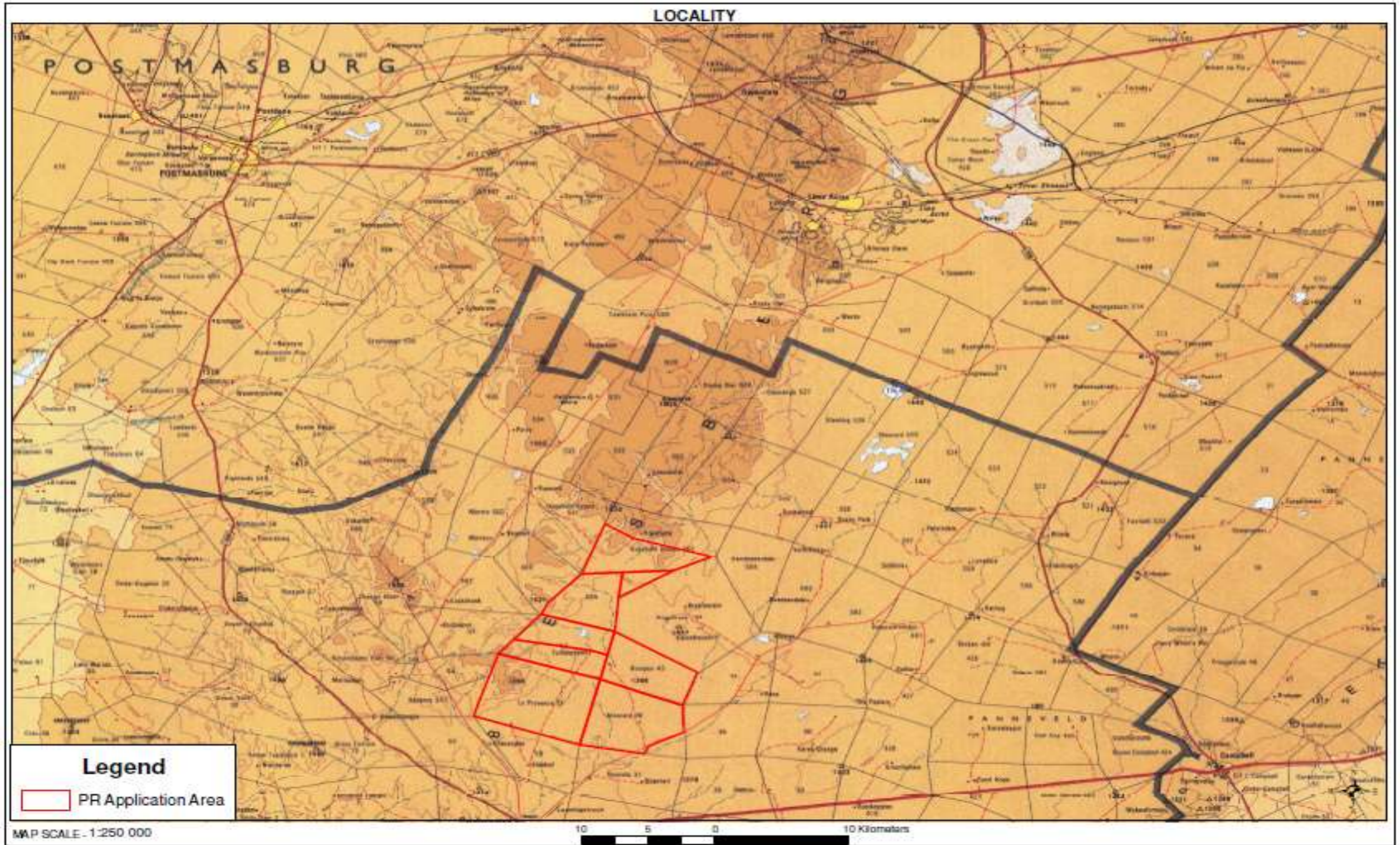


Figure 1: Properties situated in the magisterial district of Hay. Locality indicated in red. (2823 1:250 000 Map)



- 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.** The proposed core footprint of prospecting activities on Turksvypan is indicated in white taken out of the ecological study by Boscia Ecological Consulting March 2020. The location of drilling sites is dependent on the first phases of the prospecting work programme.

**(i) DESCRIPTION OF PLANNED ACTIVITIES:**

The prospecting operation is primarily based on gravel deposits that are believed to have derived from eroded diamondiferous Finsch kimberlite material. These gravels are mainly associated with quaternary deposits confined to the Daniel Alluvial Channel. The presence of diamondiferous gravels on Turksvypan will be evaluated by means of a standard phased approach. Initially, non-invasive desktop studies will be conducted to delineate and define areas underlain by alluvial gravels.

Thereafter, a drilling programme will be performed over anomalous target areas using predefined grids. At least 700 boreholes of  $\pm 5$  m in depth are expected to be drilled over 5 years.

Prospecting activities will primarily make use of existing roads where possible, but reconnaissance tracks will be created in order to access the drilling grid. Minor bush clearing will also be done to establish the drill pads. A mobile container office with mobile toilets might be positioned in the vicinity of the drill grid, but no permanent infrastructure will be established on site. Review of Past Exploration Results.

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



**i) Listed and specified activities**

<p><b>NAME OF ACTIVITY</b></p> <p>(E.g. for prospecting – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route, etc. ... etc. ... etc.)</p> <p>E.g. for prospecting – excavations, blasing, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc. ... etc. ... etc.)</p>	<p><b>Aerial extent of the Activity Ha or m<sup>2</sup></b></p>	<p><b>LISTED ACTIVITY</b></p> <p>(Mark with an <b>X</b> where applicable or affected).</p>	<p><b>APPLICABLE LISTING NOTICE</b></p> <p>(GNR 544, GNR 545 or GNR 546)</p>	<p><b>WASTE MANAGEMENT AUTHORISATION</b></p> <p>(Indicate whether an authorisation is required in terms of the Waste Management Act).</p> <p>(Mark with an <b>X</b>)</p>
<p><b>Activity 20 of Listing Notice 1</b></p> <p>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 associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p>	<p>15358.8792ha application lodged for the surveyed portion ONLY DRILLING INVASIVE WILL BE DONE WHICH WILL BE 7 HA IN EXTENT (700 HOLES)</p>	<p>X</p>	<p>NEMA LN 1 (GNR 327)</p>	
<p><b>Activity 24 of Listing Notice 1</b></p> <p>The development of a road-</p> <p>(i) For which an environmental authorization was obtained for the route determination in</p>	<p>Tracs for the drill rig</p>	<p>X</p>	<p>NEMA LN 1 (GNR 327)</p>	

<p>terms of activity 5 in Government Notice 545 of 2010; or <b>(ii)</b> With a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters</p>				
<p><b>Activity 27 of Listing Notice 1</b> The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— <b>(i)</b> the undertaking of a linear activity; or <b>(ii)</b> maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>15358.8792ha on the total hectares of the area a total of 7 ha will be disturbed with the drill pads, drill holes.</p>	<p>X</p>	<p>NEMA LN1 (GNR 327)</p>	
<p><b>OTHER ACTIVITIES (Associated infrastructure not considered to be listed activities)</b>  Ablution Facilities</p>	<p>±25m<sup>2</sup></p>		<p>NOT LISTED</p>	

**ii) Description of the activities to be undertaken**

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

**(i) DESCRIPTION OF PLANNED NON-INVASIVE ACTIVITIES:**

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

**Non-Invasive Activities****Review of Past Exploration Results**

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

**Imagery Analysis & Geological Mapping**

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

Ground and/or airborne magnetic survey over prospecting area. The area will be flown with an airborne gradient magnetic survey in conjunction with other adjacent prospecting rights applied for. If the survey area is too small for a cost-effective airborne survey then ground magnetics will be carried out on parallel lines spaced at 100m across the prospecting area. Minimal disturbance of vegetation and wildlife is envisaged.

Target-specific ground geophysics (magnetics, electromagnetics and gravity). This will entail detailed ground geophysical surveys being carried out using hand held equipment on parallel lines spaced at an appropriate interval based on the dimensions of the target being investigated. Minimal disturbance of vegetation and wildlife is envisaged.

Target specific loam sampling. Soil samples of up to 200 litres in volume will be taken in the topmost soil layer (up to 20cm deep) and sieved on site to remove very fine (<425 micron) material. Minimal disturbance of vegetation and wildlife is envisaged.

**Invasive Activities**

RC-drilling – Drilling is done in phases, over anomalous target areas, using reconnaissance lines or a grid of 200m X 200m or 100m X 50m depending on the level of confidence in the targets and the level of information required. The holes will be approximately 5 metres deep depending on local depth to bedrock (It is envisaged that at least 700 holes will be drilled). If initial drilling proves that only Rooikoppie gravels exist on the property and gravels only go 1m or less deep, drilling will cease, and pitting will continue with a section 102 application to add pitting.

Scout and delineation drilling. If carried out, drilling may necessitate the establishment of access tracks and minor bush clearing for establishment of drill pads. The need for



drilling can only be established once phase 1 and 2 of the Prospecting Works Program have been completed.

### **Rehabilitation**

Rehabilitation of drill-sites will be done concurrently as each hole is completed. Access road rehabilitation is carried out when all prospecting phases are completed at the end of the diamond drilling activity. Rehabilitated sites will be monitored after drilling has been completed to ensure vegetation growth re-occurs.

On completion of the prospecting operation, the various surfaces, including the access road, will finally be rehabilitated as follows: Any compacted area will be ripped to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.

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

### **Rehabilitation of the secured storage areas**

On completion of the prospecting operation, the above areas will be cleared of any remaining contaminated soil which will be placed in acceptable containers and removed with the industrial waste to a recognized disposing facility or by a waste removal company.

All buildings, structures or objects in the secured storage areas shall be dealt with in accordance with regulation 44 of the Minerals and Petroleum Resources Development Act, 2002.

The surface will be ripped or ploughed to a depth of at least 300 mm, where possible, and the topsoil, previously stored adjacent the site, distributed evenly to its original depth over the whole area. The area will then be fertilized if necessary (based on a soil analysis).

The site will be seeded with a vegetation seed mix adapted to reflect the local indigenous flora if necessary.

Any other disturbed areas will be rehabilitated as described under the relevant activities.

## e) Policy and Legislative Context

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

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	- Rights and obligations to be adhered to.
National Environmental Management Act (Act 107 of 1998) and Regulations as amended	<ul style="list-style-type: none"> <li>- Section 2: Strategic environmental management principles, goals and objectives.</li> <li>- Section 24: Foundation for Environmental Management frameworks.</li> <li>- Section 24N:</li> <li>- Section 24O:</li> <li>- Section 28: The developer has a general duty to care for the environment and to institute such measures to demonstrate such care.</li> <li>- 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)</li> <li>- Regulations GN R982 to R985, published on 4 December 2014 in terms of NEMA (Listed Activities)</li> <li>- Regulations GN R993, published on 8 December 2014 in terms of NEMA (Appeal)</li> <li>- Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption)</li> <li>- Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations)</li> </ul>	- The document is being compiled in order to fulfil the requirements thereof.



	<ul style="list-style-type: none"> <li>- Regulations GN R1147, published on 20 November 2015 in terms of NEMA (Financial Provision)</li> </ul>	
National Environmental Management: Air Quality Act (Act 39 of 2004)	<ul style="list-style-type: none"> <li>- Section 32: Control of dust</li> <li>- Section 34: Control of noise</li> <li>- Section 35: Control of offensive odours</li> <li>- 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)</li> <li>- Regulation GN R283, published on 2 April 2015 in terms of NEM:AQA (National Atmospheric Emissions Reporting Regulations) (Group C-Mines)</li> </ul>	<ul style="list-style-type: none"> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> <li>- This is also legislated by Mine Health and Safety from DMR and is to be adhered to.</li> </ul>
National Environmental Management: Biodiversity Act (Act 10 of 2004)	<ul style="list-style-type: none"> <li>- 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.</li> <li>- Section 53 states that the Minister may identify any process or activity in such a listed ecosystem as a threatening process.</li> <li>- 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.</li> </ul> <p>Commencement of Threatened or Protected Species Regulations 2007 : 1 June 2007 GNR 150/GG 29657/23-02-2007</p>	<ul style="list-style-type: none"> <li>- A permit application regarding protected plant species need to be lodged with DENC if necessary.</li> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> </ul>

	<p>Publication of lists of critically endangered, vulnerable and protected species GNR 151/GG 29657/23-02-2007 *</p> <p>Threatened or Protected Species Regulations GNR 152/GG 296547/23-02-2007 *</p> <ul style="list-style-type: none"> <li>- 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.</li> <li>- Sections 71 and 73: These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species.</li> <li>- Regulation GN R151, published on 23 February 2007 (List fo Critically Endangered, Vulnerable and Protected Species, 2007) in terms of NEM: BA</li> <li>- Regulation GN R152, published on 23 February 2007 (TOPS) in terms of NEM:BA</li> <li>- Regulations GN R507 to 509 of 2013 and GN 599 of 2014 in terms of NEM:BA (Alien Species)</li> </ul>	
<p>The National Environmental Management Act: Protected Areas Act (NEMPAA) (Act 57 of 2003) provides for the protection of ecologically viable areas that are representative of South Africa’s natural biodiversity and its landscapes and seascapes.</p>	<ul style="list-style-type: none"> <li>- Chapter 2 lists all protected areas.</li> </ul>	<ul style="list-style-type: none"> <li>- Not applicable. The prospecting operation does not fall within any protected area.</li> </ul>
<p>National Environmental Management: Waste Management Act (Act 59 of 2008)</p>	<ul style="list-style-type: none"> <li>- Chapter 4: Waste management activities</li> <li>- Regulations GN R634 published on 23 August 2013 in terms of NEM:WA (Waste Classification and Management Regulations)</li> </ul>	<ul style="list-style-type: none"> <li>- To be implemented upon the approval of the EMPR.</li> </ul>

	<ul style="list-style-type: none"> <li>- Regulations GN R921 published on 29 November 2013 in terms of NEM:WA (Categories A to C – Listed activities)</li> <li>- 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)</li> <li>- Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations)</li> <li>- Regulations GN R632 published on 24 July 2015 in terms of NEM: WA (Planning and Management of Mineral Residue Deposits and Mineral Residue Stockpiles)</li> <li>- Regulations GN R633 published on 24 July 2015 in terms of NEM: WA (Amendments to the waste management activities list published under GN921)</li> </ul>	
<p>National Forest Act (Act 84 of 1998) and Regulations</p>	<ul style="list-style-type: none"> <li>- 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.</li> </ul>	<ul style="list-style-type: none"> <li>- A permit application regarding protected tree species need to be lodged with DAFF if any protected trees is encountered.</li> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> </ul>
<p>National Heritage Resources Act (Act 25 of 1999) and Regulations</p>	<ul style="list-style-type: none"> <li>- 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.</li> <li>- 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.</li> </ul>	<ul style="list-style-type: none"> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> </ul>



	<ul style="list-style-type: none"> <li>- 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.</li> <li>- 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.</li> <li>- Regulation GN R548 published on 2 June 2000 in terms of NHRA</li> </ul>	
<p>National Water Act (Act 36 of 1998) and regulations as amended, <i>inter alia</i> Government Notice No. 704 of 1999</p>	<ul style="list-style-type: none"> <li>- Section 4: Use of water and licensing.</li> <li>- Section 19: Prevention and remedying the effects of pollution.</li> <li>- Section 20: Control of emergency incidents.</li> <li>- Section 21: Water uses In terms of Section 21 a licence is required for:               <ul style="list-style-type: none"> <li>(a) taking water from a water resource;</li> <li>(b) storing water;</li> <li>(c) impeding or diverting the flow of water in a watercourse;</li> <li>(f) Waste discharge related water use;</li> <li>(g) disposing of waste in a manner which may detrimentally impact on a water resource;</li> <li>(i) altering the bed, banks, course or characteristics of a watercourse;</li> <li>(j) removing, discharging or disposing of water found underground if it is necessary for the</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- A water use application will not be submitted at this stage until there is a water requirement later in the prospecting operation (DWS).</li> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> </ul>

	<p>efficient continuation of an activity or for the safety of people; and;</p> <ul style="list-style-type: none"> <li>- Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities)</li> <li>- Regulation GN R1352, published on 12 November 1999 in terms of the National Water Act (Water use to be registered)</li> <li>- Regulation GN R139, published on 24 February 2012 in terms of the National Water Act (Safety of Dams)</li> <li>- Regulation GN R398, published on 26 March 2004 in terms of the National Water Act (Section 21 (j))</li> <li>- Regulation GN R399, published on 26 March 2004 in terms of the National Water Act (Section 21 (a) and (b) )</li> <li>- Regulation GN R1198, published on 18 December 2009 in terms of the National Water Act (Section 21 ( c ) and (i) – rehabilitation of wetlands)</li> <li>- Regulations GN R1199, published on 18 December 2009 in terms of the National Water Act (Section 21 ( c ) and (i) )</li> <li>- 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))</li> </ul>	
<p>Nature Conservation Ordinance (Ord 19 of 1974)</p>	<ul style="list-style-type: none"> <li>- Chapters 2, 3, 4 and 6: Nature reserves, miscellaneous conservation measures, protection of wild animals other than fish, protection of Flora.</li> </ul>	<ul style="list-style-type: none"> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> </ul>
<p>Northern Cape Nature Conservation Act (Act 9 of 2009)</p>	<ul style="list-style-type: none"> <li>- Addresses protected species in the Northern Cape and the permit application process related thereto.</li> </ul>	<ul style="list-style-type: none"> <li>- A permit application regarding provincially protected plant species as well as for large-scale harvesting of indigenous flora need to be lodged with DENC if applicable.</li> </ul>

		- Control measures are to be implemented upon the approval of the EMPR.
Occupational Health and Safety Act (Act 85 of 1993) and Regulations	<ul style="list-style-type: none"> <li>- Section 8: General duties of employers to their employees.</li> <li>- Section 9: General duties of employers and self-employed persons to persons other than their employees.</li> </ul>	- Control measures are to be implemented upon the approval of the EMPR.
Road Traffic Act (Act 93 of 1997) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Water Services Amendment Act (Act 30 of 2007)	- It serves to provide the right to basic water and sanitation to the citizens of South Africa (giving effect to section 27 of the Constitution).	- Control measures are to be implemented upon the approval of the EMPR.
National Land Transport Act, (Act 5 of 1998)		- To take note.
Northern Cape Planning and Development Act (Act 7 of 1998)	- To control planning and development	- To be implemented upon the approval of the EMPR.
Spatial Planning and Land Use Management (Act 16 of 2013 (SPLUMA) and regulations	<ul style="list-style-type: none"> <li>- To provide a framework for spatial planning and land use management in the Republic;</li> <li>- To specify the relationship between the spatial planning and the land use management, amongst others</li> <li>- Regulations GN R239 published on 23 March 2015 in terms of SPLUMA</li> </ul>	- To be implemented upon the approval of the EMPR.
Subdivision of Agricultural Land Act, 70 of 1970 and regulations	- Regulations GN R373 published on 9 March 1979 in terms of Subdivision of Agricultural Land	- To take note.
Basic Conditions of Employment Act (Act 3 of 1997) as amended	- To regulate employment aspects	- To be implemented upon the approval of the EMPR
Community Development (Act 3 of 1966)	- To promote community development	- To be implemented upon the approval of the EMPR

Development Facilitation (Act 67 of 1995) and regulations	- To provide for planning and development	- To take note.
Development Facilitation (GN24, PG329, 24/07/1998)	- Regulations re Northern Cape LDO's	- To take note.
Development Facilitation (GNR1, GG20775, 07/01/2000)	- Regulations re application rules S26, S46, S59	- To take note.
Development Facilitation (GN732, GG14765, 30/04/2004)	- Determines amount, see S7(b)(ii)	- To take note.
Land Survey Act (Act 8 of 1997) ) and regulations, more specifically GN R1130	- To control land surveying, beacons etc. and the like; - Agriculture, land survey S10	- To take note.
National Veld and Forest Fire Act (Act 101 of 1998) ) and regulations, more specifically GN R1775	- To regulate law on veld and forest fires - (Draft regulations s21)	- To be implemented upon approval of the EMPR
Municipal Ordinance, 20/1974	- To control pollution, sewers etc.	- To be implemented upon approval of the EMPR
Municipal Ordinance, PN955, 29/08/1975	- Nature conservation Regulations	- To be implemented upon approval of the EMPR
Cape Land Use Planning Ordinance, 15/85	- To control land use planning	- To take note.
Cape Land Use Planning Ordinance, PN1050, 05/12/1988	- Land use planning Regulations	- To take note.



**f) Need and desirability of the proposed activities**

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

Currently, the major land uses in the area are mining and agriculture. According to AGIS, the land capability for the majority of the study site is non-arable with low to moderate potential grazing land, while the hills in the north and west are classified as wilderness. The grazing capacity is between 14 and 21 ha/AU, with the agricultural region being demarcated for cattle farming. The area is categorised to have no suitability for crop production.

Turksvypan is mainly used for agriculture. The natural pastures are used for grazing camps and evidence of cultivated land is visible on the topographical maps and satellite images.

Existing infrastructure includes homesteads and farm roads and tracks. Historically, the hills in the north were mined and apart from the current Thunderflex prospecting application for diamonds, the farm has also been subject to applications for the prospecting of limestone.

Only a small portion of the grazing land will be impacted on ( $\pm 7$  ha at any given time which represents the footprints of all activities on the farm combined) the rest of the areas can proceed normally. The area applied for is over the entire portions but the main prospecting focus area will be on the grazing land. After prospecting the land will be utilized for grazing again.

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

A Prospecting Right application was lodged to identify the preferred areas on the property. The prospecting will be done with drilling which will indicate if there are areas on the property that can be viably mined or if there is a diamond resource to prospect even further.

The prospecting method of drilling is the only economic viable method currently being used by the diamond fraternity; it is also the only cost effective method. An application for a bulk sample can also be done but it is not cost effective if drilling did not prove a reserve to bulk sample. There is no alternative prospecting method.

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

There are no alternatives, as the application area applied for is the area where the applicant has identified a potential for an alluvial diamond prospecting operation. The farm is also situated in an area known for Alluvial Diamond deposits.

A Prospecting Right application was lodged and accepted by the Department of Mineral Resources to do drilling whereby the presence of a resource will be determined.

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

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

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

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

The registered description of the land to which the prospecting right application relates:

<b>Farm Name</b>	<b>Title Deed</b>	<b>In Extent</b>
Farm 38, Hay	T235/1972	15 358.8792 Ha
Farm 43, Hay	T790/2002	
Farm 51, Hay	T3234/2001	
Farm 52, Hay (Remaining extend and portion 1)	T3423/2015	
Farm 552, Hay	T1683/2010	
Farm 565, Hay	T2310/2001	

The property on which the Prospecting Right was accepted is determined by the geological location of the mineral resource. Therefore, there are no alternatives for the location of the activity, except for not proceeding with the operation. This will however cause the underutilisation of a national economic resource.

The property is accessible via good roads from different directions.

Infrastructure in the area is developed with gravel roads, electricity grid and underground water. Experienced labour is available in the area as is an extensive network of secondary industries geared towards small and large-scale mining.

**Alternatives considered: -**

As the Prospecting Right has been accepted over the said area, it would not be viable to consider an alternative site for the prospecting.

Therefore there are no alternatives to the area.

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

Scout and delineation drilling for Diamonds (Alluvial) - Code-DA - Type-D, Diamonds (General) - Code-D - Type-D and Diamonds (DIA) – Code-D – Type -D.

**Alternatives considered: -**

Currently, the major land uses in the area are mining and agriculture. According to AGIS, the land capability for the majority of the study site is non-arable with low to moderate potential grazing land, while the hills in the north and west are classified as wilderness. The grazing capacity is between 14 and 21 ha/AU, with the agricultural region being demarcated for cattle farming. The area is categorised to have no suitability for crop production.

Turksvypan is mainly used for agriculture. The natural pastures are used for grazing camps and evidence of cultivated land is visible on the topographical maps and satellite images.

Existing infrastructure includes homesteads and farm roads and tracks. Historically, the hills in the north were mined and apart from the current Thunderflex prospecting application for diamonds, the farm has also been subject to applications for the prospecting of limestone.

The only alternative land use is agriculture; however, because of the drilling programme agriculture would be able to proceed without much disturbance.

Further, since a prospecting right has been accepted the option of amending the prospecting area or the type of activity is neither available nor considerable.

**(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 access roads, proximity to the areas earmarked for prospecting as well as limited additional impact on the environmental (non-perennial drainage lines and wind direction), heritage resources.

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

Scout and delineation drilling. If carried out, drilling may necessitate the establishment of access tracks and minor bush clearing for establishment of drill pads. The need for drilling can only be established once phase 1 of the Prospecting Works Program have been completed

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

- Technique

**Prospecting Work**

The prospecting work programme will be designed in phases, each phase conditional on the success of the previous phase.

**Phase 1: Review of Past Exploration Results**

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

### **Imagery Analysis & Geological Mapping**

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

#### **Phase 2:**

Should the initial results of the desktop study be encouraging, further data will be generated through ground geophysics. Targets generated by geophysics and/or historical information will be investigated on the ground and subject to more detailed target-specific ground geophysics. If any of the exploration targets give a positive result, a drilling program will be undertaken in order to identify the causative body for the geophysical/geochemical targets.

#### **Phase 3: Scout Drilling and Delineation drilling:**

RC-drilling – Drilling is done in phases, over anomalous target areas, using reconnaissance lines or a grid of 200m X 200m or 100m X 50m depending on the level of confidence in the targets and the level of information required. The holes will be approximately 5 metres deep depending on local depth to bedrock (It is envisaged that at least 700 holes will be drilled). If initial drilling proves that only Rooikoppie gravels exist on the property and gravels only go 1m or less deep, drilling will cease and pitting will continue with a section 102 application to add pitting and bulk sampling.

#### **Alternatives considered: -**

The planned prospecting activities, Scout Drilling and Delineation drilling if possible. These are the most economic viable method currently being used by the diamond fraternity. There is no other feasible, alternative prospecting method for the prospecting and drilling for diamonds.

### **(e) The operational aspects of the activity:**

Please refer to d) for a complete description of the prospecting methods.

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

#### **Alternatives considered: -**

The planned prospecting activities include, Scout Drilling and Delineation drilling if possible. 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 prospecting and drilling for diamonds.

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

Currently, the major land uses in the area are mining and agriculture. According to AGIS, the land capability for the majority of the study site is non-arable with low to moderate potential grazing land, while the hills in the north and west are classified as wilderness. The grazing capacity is between 14 and 21 ha/AU, with the agricultural region being demarcated for cattle farming. The area is categorized to have no suitability for crop production.

The Thunderflex project aims to uplift the local community. If the operation does not continue it would hold back any potential employment for the region and the families who are likely to benefit from the positive employment opportunities. Simultaneously, it may have a stagnant effect on the economy of South Africa and the diamond industry as a whole. Substantial tax benefits to the State and Local Government will also be inhibited.

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

**Alternative Prospecting Methods**

The prospecting method of drilling is the only economic viable method currently being used by the diamond fraternity; it is also the only cost-effective method prospect for alluvial diamonds. There is no alternative prospecting method.

**Consequence if not proceeding with the Operation**

The operation will make provision for 5 - 10 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. The property will not be potentially prospected for diamonds that naturally occur in this area and the relevant job opportunities and positive impacts that can be made in the surrounding communities will not be happening.

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

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

The consultation process with interested and affected parties is ongoing (Appendix 3).

The process as described by NEMA for Environmental Authorisation was followed. See table below for the identification of Interested and Affected Parties to be consulted with. The landowners are various private persons, Companies and Trusts.

**An advert was placed in the DFA on 22 January 2020.**

**Site notices was also placed at the entrance to the farms on the fence of the Farms, at the Griekwastad Police Station and at the Griekwastad library to inform the public that a Prospecting Right was accepted for Thunderflex 78 (Pty) Ltd and that any interested or affected parties must register (copy attached).**

With this site notice all passers-by are requested to register and submit any written comments to be forwarded to the consultant.

**A copy of the Background Information Document with a cover letter and comments form to invite their comments was sent by registered post to the farm owner and government departments on 22 January 2020**

**A notification letter was send out on 15 September 2020 with the BAR document to all I & APs.**

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

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

Table 1: Summary of issues raised by I &amp; APs

Interested and Affected Parties		Date Comments Received	Issues Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted					
<b>AFFECTED PARTIES</b>					
<b>Landowner/s</b>	<b>X</b>				
Mr P.J. Ludwick PO Box 319 Postmasburg 8420	Registered letter				
P.J.S. Ludwick PO Box 88 Griekwastad 8365	Registered letter				
Anphan Plase (Pty) Ltd PO Box 91 Griekwastad 8365	Registered letter	25 February 2020	Duncan and Rothman Attorneys for Anphan Plase (Pty) Ltd  Attached hereto is a notice which was attached to the fence line of a property owned by our client.  The notice is incomplete for the following reasons:  There is no indication that the application lodged by Thunderflex 78 has been accepted	Dear Pam,  Attached, please find correspondence with regard to the Application with reference NC30/5/1/1/2/12433PR by Thunderflex 78 (Pty) Ltd.	

			<p>by the Regional Manager of the Department of Mineral Resources in Welkom.</p> <p>The notice contains no information of any nature whatsoever in order to enable the person or persons whom you intend to notify of the application for consideration and comments.</p> <p>We represent Anphan Plase (Edms) Bp kinits capacity as the registered owner of the farm La Provence No 51, District of Hay.</p> <p>This letter serves as our written instruction to you to register the Anphan Plase as an interested and affected party.</p> <p>We are unable to provide you with any comments since we have no information available in order to consider the application lodged by Thunderflex 78. In this regard we record that:</p> <p>The mere giving of a notice does under no circumstances constitute consultation with the relevant land owner;</p> <p>The notice calls on the public to participate in order to ensure compliance with the requirements of the legislation referred to in your notice under discussion which our client is unable to do since you have provided no</p>	<p>Kindly take note that as per DMR letter and process, consultation only commences after acceptance of the application and the placement of notices and the letter to the farm owner therefore confirms acceptance of the application by DMR.</p> <p>A copy of the documents sent through registered post to the farm owner are attached as follows:</p> <ol style="list-style-type: none"> <li>1. Registered letter sent to the Property owner Anphan Plase (Pty) Ltd.</li> <li>2. Comment and Registration Form as an Interested and or affected Party</li> <li>3. Background document on the envisaged prospecting activities.</li> </ol>	
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			<p>information of any nature whatsoever for consideration and comments; and</p> <p>The obligation to consult with our client is that of Thunderflex 78 and not that of our client.</p> <p>All the rights of our client remain reserved.</p> <p>Letter to Regional Manager Kimberley</p> <p>We represent the Anphan Plase (Pty) Ltd in its capacity as the registered owner of the Farm La Provence 51, Hay</p> <p>Attached hereto please find a copy of our letter addressed to Mr. WJ Oosthuizen in response to a notice which was attached to the fence line of our clients property.</p> <p>As will be noted from our attached letter, we are unable to in any way whatsoever comment on the application lodged by Thunderflex 78 since the applicant has provided no information of any nature whatsoever for consideration. In addition, the applicant has only issued a notice which in itself does under no circumstances constitute consultation as is required in terms of the relevant legislation.</p> <p>This letter serves as our clients preliminary objection against the application for the issue of a prospecting right. In this regard we</p>	<p>As indicated in the letter, a Basic Assessment Report will be prepared for the envisaged prospecting activities. We would furthermore then also request that we set up a meeting after 31 March 2020 for all parties to be present, where the details of the envisaged prospecting and the concerns of the land owner can be discussed.</p> <p>We would then also include yourself in all correspondence but also ask that you provide us with the correct postal address of the property owner as it appears that the letter did not reach them.</p>	
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			<p>reserve the right to supplement this preliminary objection in the event of the applicant providing suitable information for consideration by our client.</p> <p>We also record that the applicant has not consulted with our client.</p> <p>All rights of our client are specifically reserved.</p>		
B.J. Esterhuizen PO Box 708 Postmasburg 8420	Registered letter				
Koumas Boerdery CC PO Box 33 Postmasburg 8420	Registered letter				
J.F. Jacobs PO Box 121 Griekwastad 8365	Registered letter	04 March 2020	Registered letter returned as unclaimed.		
<b>Lawful Occupiers</b>	<b>X</b>				
There are no lawful occupiers of which are known.					
<b>Landowners or lawful occupiers on adjacent properties</b>	<b>X</b>				
<b>Municipal Councillor</b>	<b>X</b>				
<b>Municipality</b>	<b>X</b>				

Siyancuma Municipality PO Box 27 Douglas 8730	X Registered letter				
Pixley Ka Seme District Municipality Private Bag X1012 De Aar 7000	X Registered letter				
<b>Organs of State (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS</b>					
SANRAL P.O. Box 415 Pretoria 0001	X Registered letter				
Department of Public Works National and provincial P.O. Box 1931 Kimberley 8300	X Registered letter				
National Dept. of Public Works Private Bag X5002 Kimberley 8300	X Registered letter				

Department of Agriculture, Forestry & Fisheries Directorate: Forestry Management P.O. Box 2782 Upington 8800	X Registered letter				
Dept. of Agriculture, Land Reform & Rural Development Private Bag X5108 Kimberley 8300	X Registered letter	26 February 2020	Good Morning Kindly receive attached registration form for your consideration. EMF land claims and other departmental projects within the vicinity of the proposed mining area. Detailed comments to be sent in due course.		
Department of Rural Development and Land Reform Private Bag X5007 Kimberley 8300	X Registered letter				
ESKOM Holdings SOC Limited Northern Cape Operating Unit: Land Development P.O. Box 606 Kimberley 8300	X Registered letter	10 February 2020	To whom it may concern RE: NOTIFICATION OF THE PUBLIC PARTICIPATION PROCESS FOR AN APPLICATION FOR A PROSPECTING RIGHT FOR DIAMONDS (GENERAL, ALLUVIAL AND IN KIMBERLITE) This notice affects the existing Eskom Distribution's power lines, Silverstreams/Hay 1 66kV Overhead Line and Hay/Lockhoek 1 22kV Overhead Line which traverses the proposed mining area. The approximate positions of these services are indicated on the attached locality Map.		

			<p>Eskom Distribution will raise no objection to the proposed Mining operations on the above mentioned properties provided Eskom’s rights and services are acknowledged and respected at all times.</p> <p>Eskom’s rights are protected by Wayleave Agreements and Servitudes. The approximate positions of these services are indicated on the attached sketches. Further to the above the following conditions must be adhered to and accepted in writing before any development and or construction:</p> <p>A.1 Access and egress Eskom shall at all times retain unobstructed access to and egress from its servitudes and services.</p> <p>A.2 Approvals A.2.1 Eskom’s consent doesn’t relieve the applicant from obtaining the necessary statutory, land owner or municipal approvals. A.2.2 The applicant will adhere to all relevant environmental legislation. Any cost incurred by Eskom as a result of non-compliance will be charged to the applicant.</p> <p>A.3 Eskom Cables Eskom’s underground cables affected must be placed in sleeves encased in concrete across the width of the servitude, at the applicant’s expense. Materials to be used</p>		
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			<p>and relevant dimensions shall be determined as required.</p> <p><b>A.4 Dimensions</b> No construction or excavation work shall be executed within 11 metres from any Eskom power line structure, and/or within 11 metres from any stay wire.</p> <p>All work within Eskom’s servitude areas shall comply with the relevant Eskom standards in force at the time.</p> <p><b>A.6 Expenditure</b> If Eskom has to incur any expenditure in order to comply with statutory clearances or other regulations as a result of the applicant’s activities or because of the presence of his equipment or installation within the servitude or wayleave area, the applicant shall pay such costs to Eskom on demand.</p> <p><b>A.7 Ground level variations</b> Changes in ground level may not infringe statutory ground to conductor clearances or statutory visibility clearances. After any changes in ground level, the surface shall be rehabilitated and stabilised so as to prevent erosion. The measures taken shall be to Eskom’s requirements.</p> <p><b>A.8 Indemnity</b> Eskom shall not be liable for the death of or injury to any person or for the loss of or damage to any property whether as a result of the encroachment or of the use of the servitude area by the applicant, his/her</p>		
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		<p>agent, contractors, employees, successors in title, and assigns. The applicant indemnifies Eskom against loss, claims or damages including claims pertaining to consequential damages by third parties and whether as a result of damage to or interruption of or interference with Eskom’s services or apparatus or otherwise. Eskom will not be held responsible for damage to the applicant’s equipment. The applicant’s attention is drawn to the Electricity Act, 1987, (Act 41 of 1987, as amended in 1994), Section 27(3), which stipulates that the applicant can be fined and/or imprisoned as a result of damage to Eskom’s apparatus.</p> <p>A.9 Machinery          No mechanical equipment, including mechanical excavators or high lifting machinery, shall be used in the vicinity of Eskom’s apparatus and/or services, without prior written permission having been granted by Eskom. If such permission is granted the applicant must give at least seven working days prior notice of the commencement of work The Eskom’s authorised area representative for the Douglas CNC: Billy Jantjies 053 298 5713/072 313 0711 email address: JantjiHB@eskom.co.za. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued.</p> <p>A.10 Permission to do work</p>		
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		<p>A.10.1 No work shall commence unless Eskom has received the applicant’s written acceptance of the conditions specified in the letter of consent and/or permit.</p> <p>A.10.2 Eskom’s rights and duties in the servitude shall be accepted as having prior right at all times and shall not be obstructed or interfered with.</p> <p>Note: Where an electrical outage is required, at least fourteen work days is required to arrange same.</p> <p>A.11 Remedial action Under no circumstances shall rubble, earth or other material be dumped within the servitude or Way Leave restriction area. The applicant shall maintain the area concerned to Eskom’s satisfaction. The applicant shall be liable to Eskom for the cost of any remedial action which has to be carried out by Eskom.</p> <p>A.12 Safety</p> <p>A.12.1 The clearances between Eskom’s live electrical equipment and the proposed construction work shall be observed as stipulated by Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993).</p> <p>A.12.2 Equipment shall be regarded electrically live and therefore dangerous at all times.</p> <p>A. 12.3 In spite of the restrictions stipulated by Regulation 15 of the Electrical Machinery</p>		
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			<p>Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), as additional safety precaution, Eskom will not approve the erection of Houses, or structures occupied or frequented by human beings under the power lines and only after consideration of all alternatives, within the servitude area.</p> <p>A. 12.4 Eskom may stipulate any additional requirements to illuminate any possible exposure to Customers or Public to coming into contact or be exposed to any dangers of Eskom plant.</p> <p>A. 12.5 It is required of the applicant to familiarize him/herself with all safety hazards related to Electrical plant.</p> <p>B.1 Blasting, opencast mining and undermining</p> <p>B.1.1 A specific document of permission in respect of the blasting or mining activity as issued by the Inspector of Mines must be submitted to Eskom before commencement of operations. [refer to the Minerals Act, 1991 (Act 50 of 1991) Regulation 9.33.5 – Permission to fire more than one shot hole at a time within 500m from surface structures]</p> <p>B.1.2 Blasting in close proximity to Eskom’s overhead power lines or substations is prohibited unless the following precautions are met [refer to the Mine Health and Safety Act, 1996 (Act 29 of 1996) Regulation 17.6(a) - 100m and above</p>		
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			<p>☒ a blasting plan submitted with the document of permission referred to in B.1.1 above,</p> <p>☒ a Peak Particle Velocity (PPV) to be kept below 75 mm/s, for lines and 50 mm/s for buildings,</p> <p>☒ a seismic control device is set up to record the readings, ensure fly rock and air blast control by means of adequate matting, in the interest of air blast control, only single shot blasting shall be allowed.</p> <p>☒ Permission for blasting will be strictly as stipulated in the Blasting Design by the Blasting Consultants and blasting should be done away from the power lines.</p> <p>B.1.3 The applicant will be held liable for damage to Eskom’s towers or substation equipment, as a result of blasting activities.</p> <p>B.1.4 Costs incurred by Eskom to comply with statutory requirements in terms of an applicant’s (or his contractors) works, equipment or plant in the servitude area, shall be paid to Eskom on demand.</p> <p>B.1.5 Eskom may charge the applicant appropriately for time on site during blasting operations.</p> <p>B.1.6 Eskom reserves the right to withdraw its consent if the blasting process becomes hazardous and likely to result in power interruptions.</p> <p>B.1.7 If and whenever the applicant apply and if permission for the blasting process is granted the applicant must give at least</p>		
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			<p>fourteen work days prior notice of the commencement of blasting to The Eskom’s authorised area representative for Douglas CNC: Billy Jantjies 053 298 5713/072313 0711 email address: JantjiHB@eskom.co.za. This allows time for arrangements to be made for supervision of and/or precautionary instructions to be issued in terms of the blasting operation.</p> <p>B.1.8 General Conditions</p> <p>B.1.8.1 Firing near the power lines should be along a free face, facing away from the power lines, as the Mine has suggested.</p> <p>B.1.8.2 The Mine should prepare a proper analysis of the rock structure and any geological anomalies prior to blasting.</p> <p>B.1.8.3 The “safe distance of 25m” from Eskom pylons should be indicated on the blasting plan.</p> <p>Existing geological faults, decomposed zones and fractured rock structures could have destabilising effects on founding material as a result of the firing, especially when developing an open face next foundation and below founding level. These conditions should be taken into account when deciding on the method and plan of blasting near the Eskom power line pylons.</p> <p>B.1.8.4 Eskom retains the right to appoint any specialist at any time on behalf of the Mine, to inspect Eskom structures for deformation.</p>		
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			<p>B.1.8.5 The mining depth near Eskom pylons should carefully be controlled for stability and adjustments being made when so instructed by Eskom.</p> <p>B.1.8.6 Upon receiving the letter of consent from the inspector of the mine to blast below 100m, the applicant must present to Eskom Technical Evaluation Forum L3 the blasting philosophy for final approval. Should the applicant or his contractor damage any of Eskom services during commencement of any work whatsoever, then Eskom’s 24 hour Contact Centre Tel: 08600 37566 must be dialled immediately to report the incident.</p> <p>Any relocation of Eskom’s services, due to this undermining, will be for the account of the Applicant. The Applicant will also be responsible for granting Eskom an alternative route for the power line. The Eskom Customer Contact Centre at 08600 37566 must be contacted in connection with any line deviation and costs.</p>		
Eskom Environmental Division PO Box 356 Bloemfontein 9300	X Registered letter				
Department of Water & Sanitation Private Bag X6101 Kimberley 8300	X Registered letter				

<p>SAHRA P.O. Box 4637 Cape Town 8000</p>	<p>X Registered letter</p>	<p>5 March 2020 13 March 2020 23 September 2020</p>	<p>Drilling Thank you for notifying SAHRA of the Environmental Authorisation (EA) application in support of a Prospecting Rights (PR) Application for proposed prospecting activities on various properties near Griekwastad, Northern Cape Province (NC 30/5/1/1/2/12433 PR). As the proposed development is undergoing an EA Application process in terms of the National Environmental Management Act, 107 of 1998 (NEMA), NEMA Environmental Impact Assessment (EIA) Regulations as amended, it is incumbent on the developer to ensure that a Heritage Impact Assessment (HIA) is done as per section 38(3) and 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA) as required by section 24(4)b(iii) of NEMA. This must include an archaeological component, palaeontological component and any other applicable heritage components. The HIA must be conducted as part of the EA Application in terms of NEMA and the NEMA EIA Regulations. SAHRA requests that an assessment of the impacts to heritage resources that complies with section 38(3) of the NHRA as required by section 38(8) of the NHRA and section 24(4)b(iii) of NEMA be conducted as part of the EA process.</p>		
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			<p>The assessment must include an assessment of the impact to archaeological and palaeontological resources.</p> <p>The assessment of archaeological resources must be conducted by a qualified archaeologist and the report comply with the SAHRA 2007 Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports (see <a href="http://www.asapa.co.za">www.asapa.co.za</a> or <a href="http://www.aphp.org.za">www.aphp.org.za</a> for a list of qualified archaeologists).</p> <p>The proposed development is located within an area of moderate to very high Palaeontological Sensitivity as per the SAHRIS PalaeoSensitivity map. As such, a Palaeontological Impact Assessment (PIA) inclusive of a field visit must be undertaken by a qualified palaeontologist. The report must comply with the 2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessments.</p> <p>Any other heritage resources as defined in section 3 of the NHRA structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes must also be assessed.</p> <p>Further comments will be issued upon receipt of the NEMA EA documents inclusive</p>		
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			<p>of appendices.that may be impacted, such as built.</p> <p>SAHRA notes the pending HIA and requests that the assessment of heritage resources includes a field based Palaeontological Impact Assessment conducted by a qualified palaeontologist as the development footprint is located within areas of low to very high sensitivity as per the SAHRIS Palaeosensitivity map. The assessment of archaeological resources must comply with the SAHRA 2007 minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports. The PIA report must comply with the 2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessments.</p> <p>Any other heritage resources as defined in section 3 of the NHRA that may be impacted, such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes must also be assessed.</p> <p>The applicant is advised to extend the EA application process in terms of section 19(1)b of the NEMA EIA regulations to comply with this comment and allow for the relevant</p>		
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			public participation for the HIA, and to provide SAHRA an opportunity to provide comments in terms of section 38(8) of the NHRA, that can be included in the Final BAR for decision making to the competent authority.		
Northern Cape Department of Roads and Public works PO Box 3132 Squarehill Park Kimberley 8300	X Registered letter	19 March 2020	The office hereby acknowledges receipt of your notice NC 30/5//1/1/2/12433PR dated 20 January 2020.  Please be informed that the Department has no objections regarding the proposed application for a prospecting right for diamonds or the public participation process for an application for a prospecting rights for diamonds (general alluvial and kimberlite)		
<b>Communities</b>					
<b>Dept. Land Affairs</b>					
Department of Land Affairs and Rural Development Private Bag X5018 Kimberley 8300	X Registered letter				
<b>Traditional Leaders</b>					
No Traditional Leaders					
<b>Dept. Environmental Affairs</b>					
Dept. of Environment & Nature Conservation	X				

Private Bag X6102 Kimberley 8300	Registered letter				
<b>Other Competent Authorities affected</b>					
<b><u>OTHER AFFECTED PARTIES</u></b>					
<b><u>INTERESTED PARTIES</u></b>					
Raymond Mzwandile Mene  maxed2day@yahoo.com		22 January 2020 in response to advert registered as interested party.			

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)

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Thunderflex 78 to provide an Ecological Assessment report in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the application area. Geology was described and included in this report as part of the Ecological Assessment.

According to Hornsvelt (1977) the geological features on Turksvypan comprise Quaternary and Vaalian deposits (Figure 3). The areas in the vicinity of the hills in the west and north as well as large parts in the south-east comprise rocks from the Griqualand West Sequence. The hills itself is associated with Kuruman banded ironstone of the Asbestos Hills Formations from

the Griquatown Group; while a large section in the south-east of the property consist of Lime Acres dolomitic limestone of the Ghaaplatto Formation from the Campbell Group.

Diamondiferous gravels are mainly associated with the quaternary deposits, which are confined to the Daniel Alluvial Channel and include those areas associated with wind-blown sand, surface rubble, alluvium, river-terrace gravel and surface limestone (Figure 3).

**Regional Geology**

“Alluvial diamondiferous gravels are found as remnants of ancient Finsch kimberlite. The Finsch pipe was emplaced ~118 Ma in the Kuruman Member of the Asbesheuwels Subgroup on the northeastern edge of the syncline. Thickness of the BIF is estimated at approximately 140 m from the present day erosion surface. The kimberlite modern surface area of 18ha and is roughly circular. Considerable erosion has taken place and its original surface area is estimated at 100ha.

It is generally accepted that the source of the diamonds is mainly from the weathering and erosion of the 60 to 100-year-old kimberlite bodies that were emplaced in the stable Kaapvaal craton. However, some evidence indicates that a possible additional source could be the tillites of the Dwyka Formation. These

diamonds would have been derived from the weathering of much older kimberlite intrusions.

It has been suggested that the diamond content of the higher or older terraces is usually greater than that of the lower or younger terraces. However, recent findings suggest that higher diamond grades are more associated with geological environments that are favourable for the deposition of diamonds.

The erosion and reworking of the older terraces resulted in the formation of younger terraces. On average these younger terraces contain lower diamond grades but with an increased value due to the re-working and destruction of the poorer quality stones”.

The simplified picture in terms of generally decreasing grades from high terrace to lower terraces in reality is much more complex and local catchments can occur as a result of combination of favourable section of palaeo channel and bedrock type”.

#### Local Geology and Historic Information

The Daniel Alluvial Channel lies on the Ghaap Plateau adjacent to the Asbesberge. Much of the Ghaap Plateau comprises Dolomite of the Campbell Rand Subgroup (2.56-2.47Ga, Ghaap Group, Griqualand West Supergroup), which in many places overlain by Quaternary sediments. The Asberge rise from the Plateau and trend roughly northeast-southwest of the Kuruman and Danielskuil.

The Asbesberge are outcrops of the much dissected Asbesheuwels Subgroup (2.47-2.43Ga, Ghaap Group) which here comprises BIF of the Kruman Member and asbestiform BIF (crocidolite), jaspillite and shales of the Danielskuil Member. The Asbesberge in some areas are underlain by ‘Passage Beds’ comprising ‘siliceous’ dolomitic, and ferruginous sediments said to extend to depths of 30m. To the west of the Daniel Alluvial Channel the Asbesheuwels Subgroup forms the rim of a syncline in which the younger andesitic lava of the Ongeluk Formation (2.41Ga, Postmasburg Group) is exposed. A number of kimberlite and dolerite dykes cut the Ghaap Plateau and the syncline, many trending north-south or the northeast-southwest. The eastern edge of the syncline is today higher than the western edge

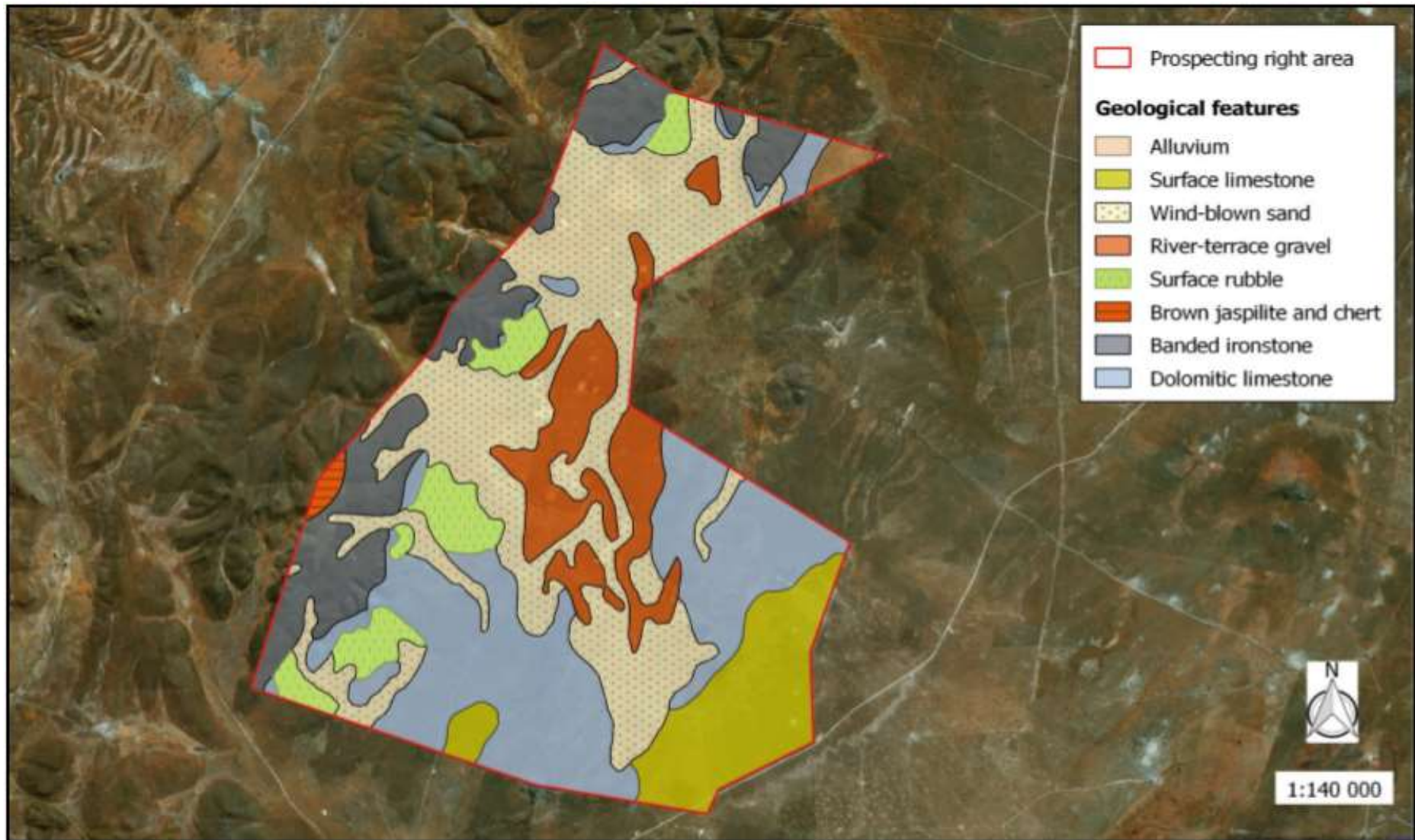


Figure 3. The distribution of geological features in the study area (map taken out of the ecological study by Boscia Ecological



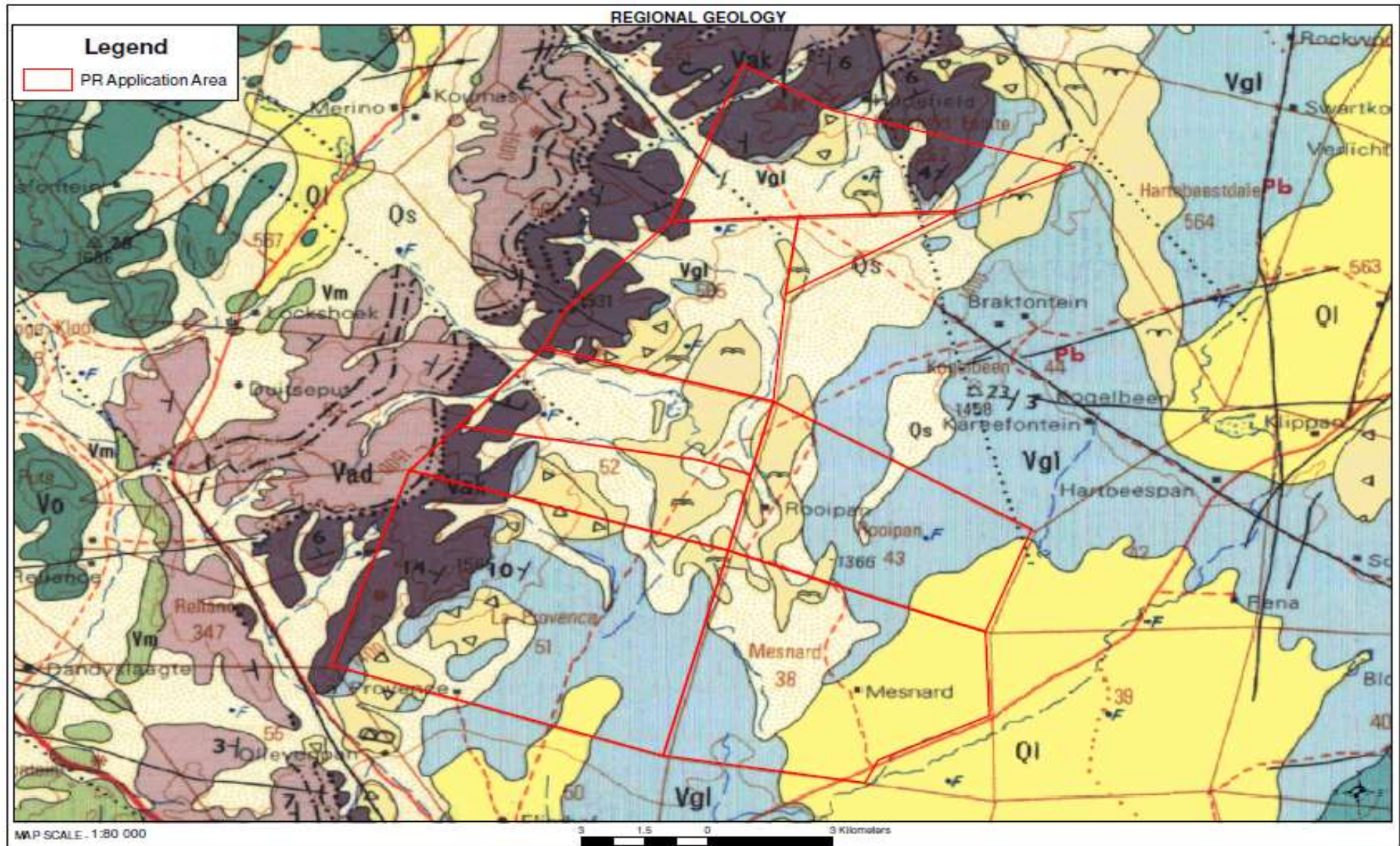


Figure 4. Geological Map of the application area.

**Climate :****Regional Climate:-**

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

**Average Annual Rainfall:-**

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

**Rainfall Intensity:-**

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

**Average Maximum and Minimum Temperatures:**

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

**Average Monthly Wind Direction and Speed:-**

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

**Average Monthly Evaporation:-**

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

**Presence of Extreme Climatic Conditions:-**

Hail: October to March

Frost: May to September

Strong Winds: Occasional strong winds occur but not often

Droughts: Normal for a dessert area – approximately 6 out of 10 years.

**Topography:**

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Thunderflex 78 to provide an Ecological Assessment report in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the application area topography was described and included in this report as part of the Ecological Assessment.

The study area is primarily characterised by plains with open low hills or ridges, but along the western and northern border of the site the terrain transforms into open hills or ridges. A small portion in the south-east comprises level plains with some relief. Altitude ranges from 1 360 m above sea level on the level plains in the south-east, 1 400 m on the plains with open hills or ridges in the centre of the property, and 1 500 m on the hills and ridges in the west and north. The terrain is indicated by a very gentle slope of <1 % on the plains in the east, but increases slightly from 4 % on the ridges to 10 % on the hills. (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p11)

**Soil:**

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Thunderflex 78 to provide an Ecological Assessment report in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the application area soil was described and included in this report as part of the Ecological Assessment.

Land types found on the property include Fc6, Ae217 and Ib271 (Figure 5). The majority of the property is characterised by Red and yellow, well drained sandy soils, with high base status.

These soils are less than 300 mm deep, without dunes and are typically associated with the Ae217 landtype. These soils typically have poor suitability for arable agriculture, but it is possible in areas where the climate permits it. Soils associated with the Fc6 landtype in the south-east are primarily soils with minimal development (Glenrosa/Mispah), usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime is generally present in the landscape. These soils are not suitable for arable agriculture, but are suitable for grazing if the climate permits it. The hills in the north and west are characterised by rocky areas with limited, miscellaneous soils (Ib271 landtype). These soils are not suitable for agriculture and mainly suitable for conservation, recreation or water catchments. The soils of the study site have low to very high erodibility to water and wind erosion, but the majority of soils on site (associated with Ae217) have high potential to regenerate, if badly eroded. However, soils associated with landtypes Fc6 and Ib271 have very low potential to regenerate if badly eroded. (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p11).



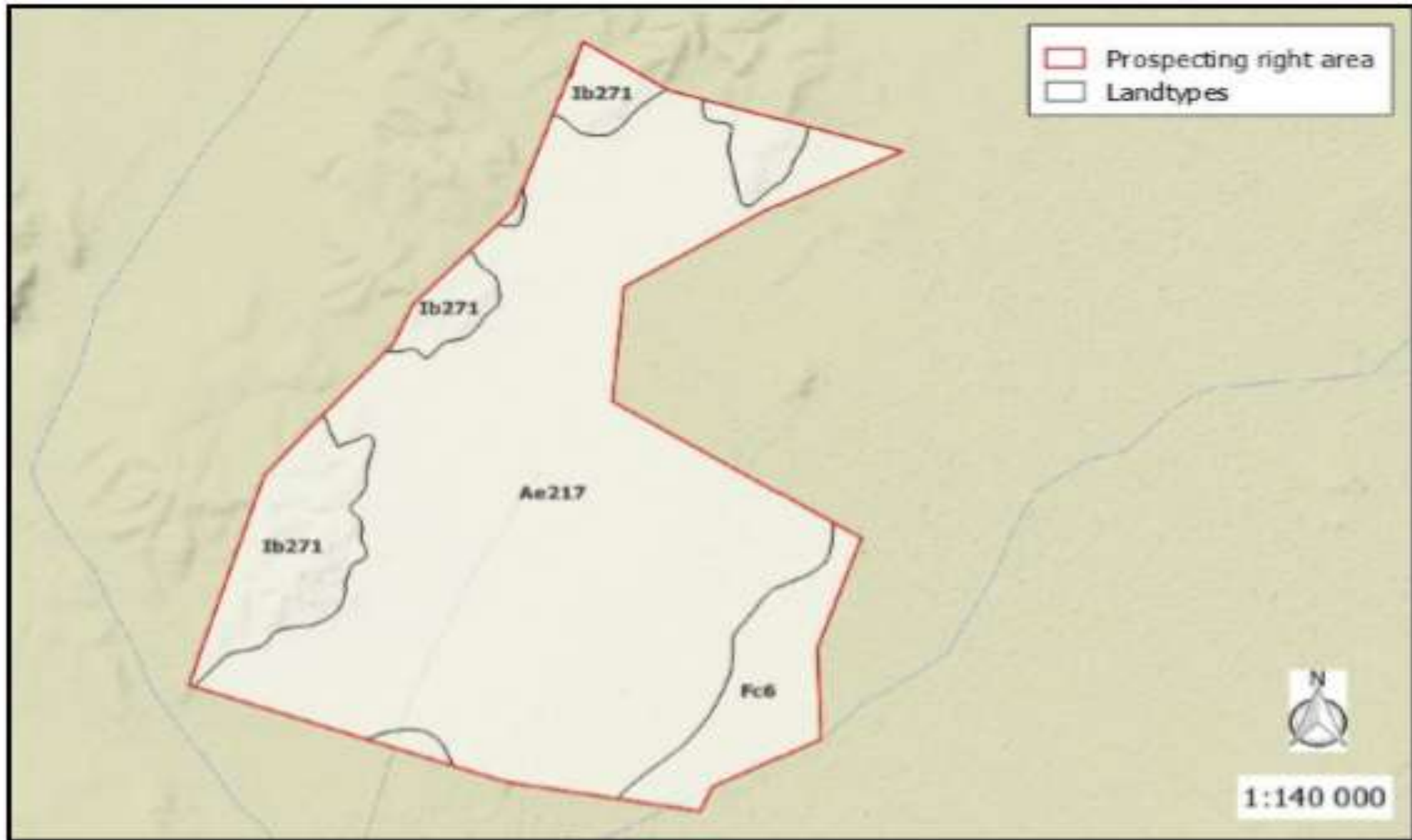


Figure 5. The distribution of land types in the study area.

### **Land Capability and Land Use:**

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Thunderflex 78 to provide an Ecological Assessment report in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the application area. Land Capability and Land Use was described and included in this report as part of the Ecological Assessment.

Currently, the major land uses in the area are mining and agriculture. According to AGIS, the land capability for the majority of the study site is non-arable with low to moderate potential grazing land, while the hills in the north and west are classified as wilderness. The grazing capacity is between 14 and 21 ha/AU, with the agricultural region being demarcated for cattle farming. The area is categorised to have no suitability for crop production.

Turksvypan is mainly used for agriculture. The natural pastures are used for grazing camps and evidence of cultivated land is visible on the topographical maps and satellite images.

Existing infrastructure includes homesteads and farm roads and tracks. Historically, the hills in the north were mined and apart from the current Thunderflex prospecting application for diamonds, the farm has also been subject to applications for the prospecting of limestone. (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p10).

### **Surface Water:**

Dr. Betsie Milne from Boscia Ecological Consulting has been appointed by Thunderflex to provide a desktop Ecological Study to obtain ecological and biodiversity information for the proposed study area and identify the ecological characteristics and sensitivity of the site and to determine the possible impact of prospecting on the application area. Surface water was described and included in this report as part of the ecological and biodiversity Assessment (Study appended as Appendix 6).

#### **Ephemeral wetlands**

Numerous wetlands occur on Turksvypan. All of them are ephemeral and most are endorheic. Due to the high variation in the characteristics of pans in the region it is not possible to describe their associated vegetation communities without a field investigation. However, the surfaces of pans in this region are typically dominated by *Leptochloa fusca*, but other grasses that have been found to occur mostly towards the periphery of the pans include *Aristida congesta* subsp. *barbicollis*, *A. congesta* subsp. *congesta*, *Eragrostis bicolor*, *E. truncata*, *E. trichophora*, *Themeda triandra* and *Enneapogon desvauxii*. *Platycarphella parvifolia* and *Cullen tomentosum* are common herbs on pans, while *Ziziphus mucronatus*, *Olea europaea* subsp. *africana*, *Diospyros lycioides* and *Tarchonanthus camphoratus* typically comprise the woody fringes. Species of conservation concern include *Olea europaea* subsp. *africana*.

### Ephemeral drainage lines

The drainage lines occur along the hills and ridges, where they drain towards the plains and wetlands of the study area. Drainage channels are not always well defined, but usually consist of a higher cover of rocks on the surface. They are often distinguishable by woody riparian canopies that form along the channels, with species that include *Boscia albitrunca* (protected under NFA and NCNCA), *Ehretia rigida*, *Senegalia mellifera*, *Rhigozum obovatum*, *Searsia burchellii* and *Ziziphus mucronate* subsp. *mucronata*. Grasses typically associated with this unit include stands of *Cenchrus ciliaris*, *Enneapogon cenchroides* and *Setaria verticillata*.

The application area falls into the D71B catchment area.

No profound impacts are expected to be related to the proposed prospecting operation due to the low invasive nature of drilling activities. However, the most likely impacts are expected to be related to the disruption of the hydrological regime if any of the ephemeral pans or pan catchments are modified through road creation or drill pad establishment.

### **Ground Water:**

Depth of water-table(s):

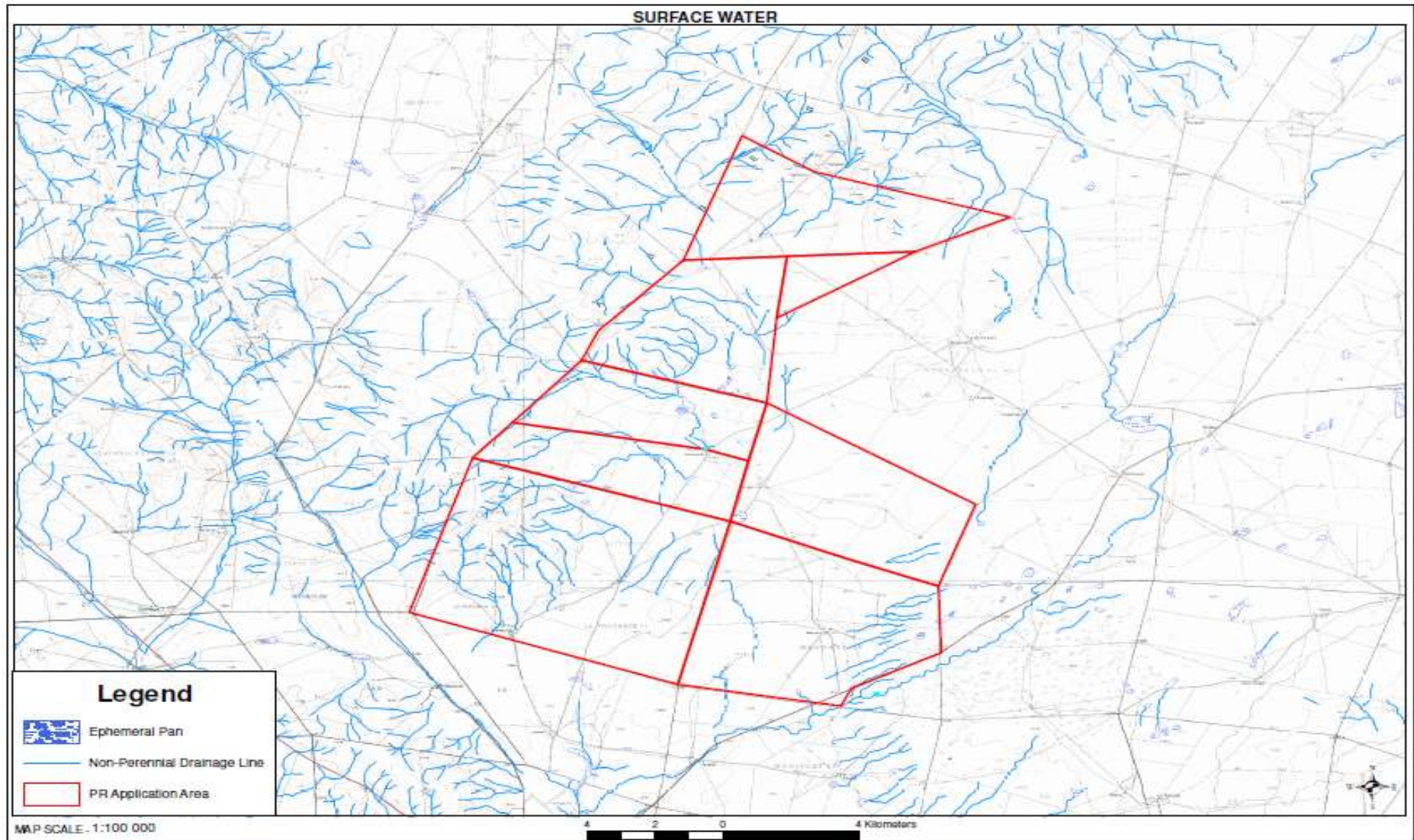
Groundwater flow would follow the topography and the surface drainage direction from the higher area towards the lower areas.

Ground-water zone:

The diamond drilling does not affect the quality of the ground water in any manner. There are no harmful or toxic properties in the drilling being done.







**Figure 7.** Surface Water map of the application area.

**Air Quality and Noise:**

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

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

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

**Fauna:**

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Thunderflex 78 to provide an Ecological Assessment report in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the application area fauna was described and included in this report as part of the Ecological Assessment.

**Assumptions and limitations**

Due to the nature of a desktop survey and the lack of ground-truth information, the species list reflected in this report cannot be regarded as entirely accurate or comprehensive. Ideally, a site should be visited at least once to compare desktop information with information on site as well as to ensure actual habitats and associated species present on site are recorded.

However, an extensive desktop review was conducted to ensure a fairly accurate representation of the study area. This is assumed to be sufficient to support this environmental authorisation application, because the proposed operation is primarily non-invasive with a likelihood of minor disturbances produced by the drilling operation. (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p6).

**Faunal communities**

According to Section 3(a) and 4(a) of the Northern Cape Nature Conservation (NCNCA) Act No. 9 of 2009, no person may, without a permit by any means hunt, kill, poison, capture, disturb, or injure any protected or specially protected animals. Furthermore, Section 12 (1) of NCNCA states that no person may, on a land of which he or she is not the owner, hunt a wild animal without the written permission from the landowner. The many landscape features on Turksvypan provide diverse habitat opportunities to faunal communities. Animals likely to be found in the study area are discussed in their respective faunal groups below. (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p24).

## Mammals

As many as 50 terrestrial mammals and nine bat species have been recorded in the region. Virtually all mammals of the study area are protected; either according to Schedule 1, 2 or 3 of NCNCA (see Appendix 2). Eighteen mammal species of conservation concern potentially occur in the area, of which 12 are listed either in the IUCN or South African Red Data Book.

The protected bat species, Aardvark, Bushveld Gerbil, Aardwolf, Cape Fox, Bat-eared Fox, African Striped Weasel, African Wild Cat, Honey Badger and Striped Polecat all have a high chance of occurring across the site, given their wide habitat tolerances and preference for the habitat found on site.

Ground Pangolin, South African Hedgehog and Black-footed cat may potentially occur on site on account of their preferences for arid areas. They are however rather skittish and therefore they will most likely occur very seldomly. The Brown Hyaena might be present, but has a low potential to be found on site mainly based on the fact that farm fences are restricting their occurrences across their natural distribution range.

The core prospecting activities are associated with the alluvial channel, which include the grassland and shrubland on the plains. Listed mammals that are most likely to be impacted in the form of species- and/or habitat loss resulting from the prospecting activities include those that are associated with these habitats.

## Reptiles

The Turksvypan prospecting area lies within the distribution range of at least 36 reptile species (see Appendix 2). No listed species are known to occur in the area, but most reptiles of the study area are protected either according to Schedule 1 or 2 of NCNCA (see Appendix 2). Specially protected species include *Karusasaurus polyzonus* (Southern Karusa Lizard) and *Chamaeleo dilepis dilepis* (Namaqua Chamaeleon).

The habitat diversity for reptiles in the study area is high. The rocky hills and ridge slopes are considered to be the most important habitat for reptile diversity at the site, while the ephemeral pans could potentially provide a special habitat for the marsh terrapin. (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p25).

## Amphibians

Eleven amphibian species are known from the region (Appendix 2). Low amphibian diversity is normal for an arid area, but is likely to increase within the wetland ecosystems of the ephemeral wetlands. As a result, higher amphibian diversity is most likely to be found in these habitats during periods of inundation, while only those species which are relatively independent of water are likely to be common in the terrestrial habitats.

The Giant Bull Frog (*Pyxicephalus adspersus*) is listed as Near Threatened and is protected according to Schedule 1 of the NCNCA. They prefer seasonal shallow grassy pans, vleis and other rain-filled depressions in open flat areas of grassland or savanna, but mainly remain buried up to 1 m underground until conditions become favourable. The site lies within the known distribution of this species and the ephemeral pans could potentially provide the ideal habitat

for this species. All other amphibians of the study area are protected according to Schedule 2 of NCNCA (see Appendix 2). (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p26).

### **Avifauna**

The study site does not fall within or near; i.e. within 100 km, of any of the Important Bird Areas (IBA) defined by Birdlife South Africa. A total number of 261 bird species have been recorded from the region and all of these species are protected either according to Schedule 1, 2 or 3 of NCNCA (see Appendix 2). As many as 25 listed bird species are known from the region, all of which are classified as Vulnerable, Near Threatened or Endangered.

The ephemeral wetlands could potentially attract protected water birds when inundated, such as Chestnut-banded Plover, Maccoa Duck, Lesser Flamingo, Greater Flamingo and Greater Painted-snipe when inundated, while the remaining species could occur in the core areas by occasionally passing over, foraging or nesting. Plants in general, from grass tufts to shrubs and tall trees provide important micro-habitats to birds and therefore any form of habitat destruction in the form of vegetation clearing will inevitably impact the bird population of the study site. However, due to their high mobility birds are rather resilient to local scale changes.

Apart from general disturbances and habitat loss, other potential impacts would come from electrocution and collisions with power lines and the accidental or intentional killing of birds. Not all species are vulnerable to powerlines, but flamingos, bustards and storks are highly vulnerable to collisions, while many of the raptors, including vultures, are susceptible to electrocution and collision. Furthermore, owls and vultures are often killed due to cultural beliefs and practises.

### **Invertebrates**

Invertebrates dominate inland habitats and play a significant role in the overall function of the ecosystem (Kremen et al. 1993; Weisser and Siemann 2004). Their immense species diversity makes it almost impossible to list all species that may possibly occur on site.

Nevertheless, key morphospecies as well as species of conservation concern are discussed here. Eight invertebrate species of the Northern Cape appear on the IUCN Red Data list of threatened species and are listed in Table 8, along with species that are specially protected according to Schedule 1 of the NCNCA. All other invertebrates from the class Insecta and Arachnida are protected either according to Schedule 2 or 3 of the NCNCA.

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

#### **i. Ephemeral wetlands**

Ephemeral wetlands host species specifically adapted to ephemerality. Crustaceans in particular are specialists of these pans and dominate them. Their eggs lie dormant in the soil until the pans are inundated. Not much is known about the species distribution or conservation status of



species in the Northern Cape, but typical taxa to be expected in the pan on Turksvypan include Notostraca, Anostraca, Spinicaudata, Cladocera, Ostracoda and Copepoda. Within a few days after the wetlands are inundated these species will hatch out and attract a number of wetland birds. Therefore, these pans also act as important breeding and feeding links to birds in terms of connectivity, by providing stepping-stone corridors in an arid landscape. The disturbance or destruction of these pans will not only impact the specialised pan invertebrate communities locally, but will also have a regional and landscape-level effect.

## ii. Karoo vegetation

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

However, those species of conservation concern listed in Table 8 are most likely to be associated with this invertebrate habitat and also comprises the majority of the earmarked area for the Turksvypan operation.

## Critical biodiversity areas and broad-scale processes

The proposed prospecting site falls within critical biodiversity areas (Figure 8), as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole.

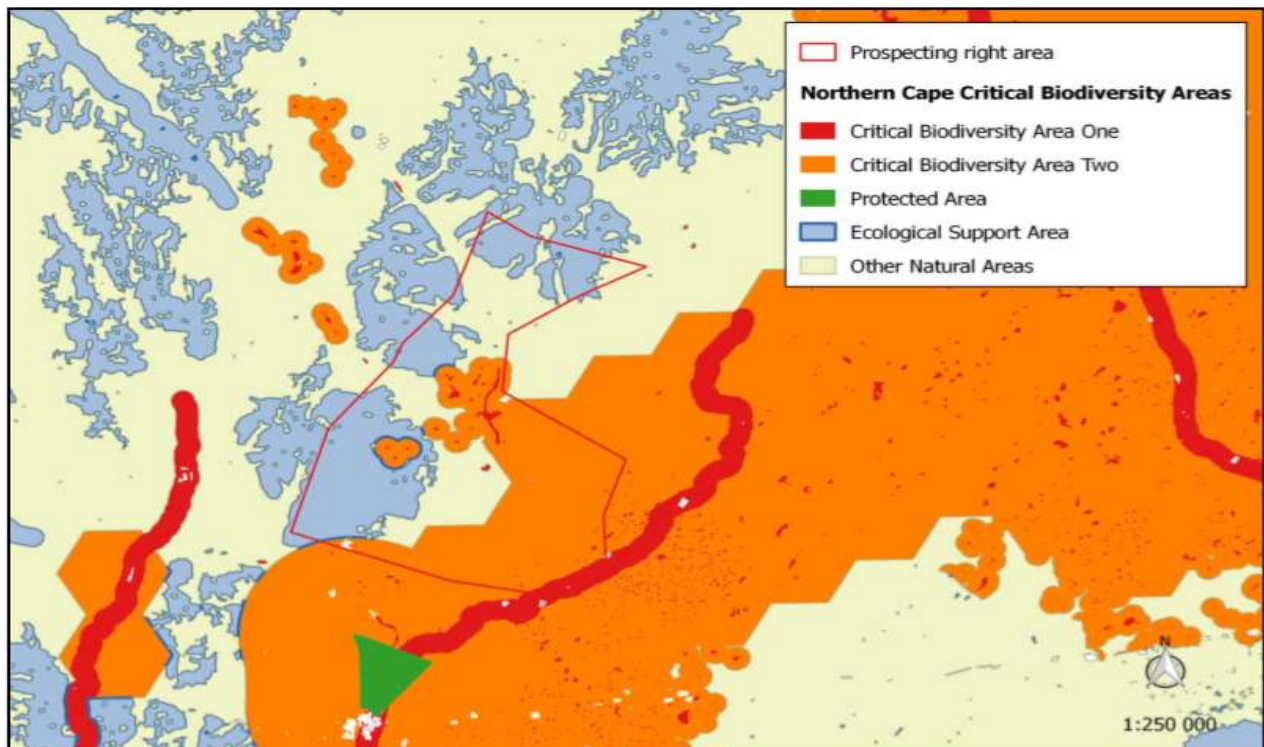


Figure 8. The study area in relation to the Northern Cape Critical Biodiversity Areas.

The ephemeral wetlands of the study area are classified as Critical Biodiversity Area One, with their associated buffer- and catchment areas classified as Critical Biodiversity Area Two. The hills in the north and west are classified as Ecological Support Areas, while a large portion of the Daniel Alluvial channel that is earmarked for core prospecting activities, is classified as Other Natural Areas (Figure 8). No protected areas occur in the study site.

Similarly, the Mining and Biodiversity Guidelines (DENC et al. 2013) recognises those areas where the most pronounced occurrence of wetlands on site are found as Highest Biodiversity Importance (Figure 9), which constitute a high risk for mining. These guidelines were developed to identify and categorize biodiversity priority areas sensitive to the impacts of mining in order to support mainstreaming of biodiversity issues in decision making in the mining sector.

According to the Wetland Freshwater Priority Areas project, all of the ephemeral wetlands in the study area are poorly protected. Although the majority have been classified with a Present Ecological State of Natural or Good Condition, those associated with historical cultivation practises have been classified as Largely Modified. None of the wetlands have however been identified as significant wetlands in terms of Ramsar sites, IUCN Frog localities, threatened water bird localities or Crane breeding grounds.

The broad-scale vegetation units of the study area (Kuruman Mountain Bushveld, Olifantshoek Plains Thornveld and Ghaap Plateau Vaalbosveld) are classified as least threatened and therefore no formal fine-scale conservation planning has been conducted. The Kuruman Mountain Bushveld and Olifantshoek Plains Thornveld vegetation units have however been identified as a medium conservation priority area within the Siyanda Environmental Management Framework, but the study area does not fall within a proposed conservation area for the District Municipality. Neither are any of the features on site prioritised for ecological importance in the Pixley Ka Seme District Municipality (Rumboll 2014).

Furthermore, the study area falls within the Griqualand West Centre (GWC) of Endemism (Van Wyk and Smith 2001). A centre of plant endemism is an area with high concentrations of plant species with very restricted distributions, known as endemics. They are extremely vulnerable; relatively small disturbances in a centre of endemism may easily pose a serious threat to its many range restricted species. The GWC (Figure 10) is considered a priority in the Northern Cape, because the number of threats to the area is increasing rapidly. This is a cause of concern, because the GWC is still greatly misunderstood and under researched.

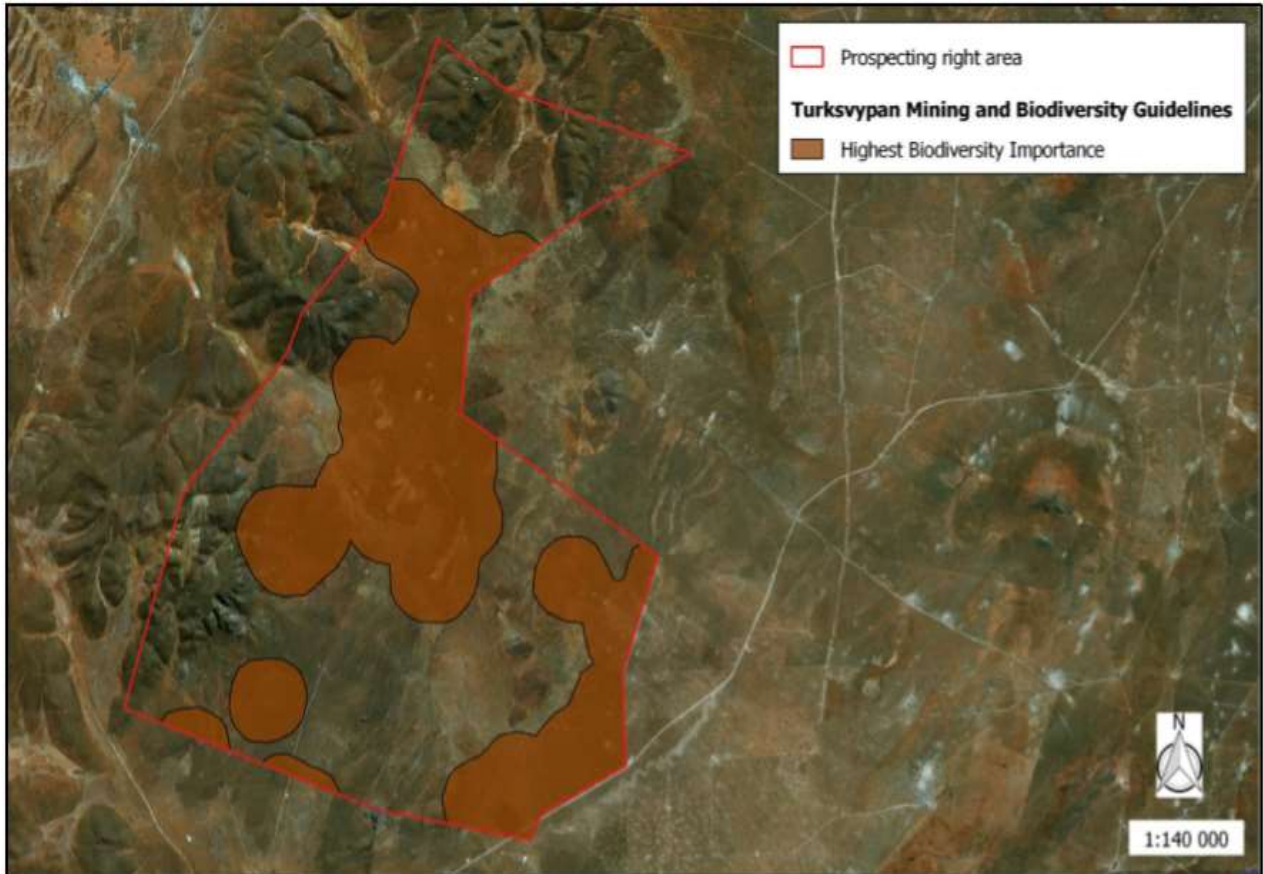


Figure 9. The study area in relation to the Mining and Biodiversity Guidelines.

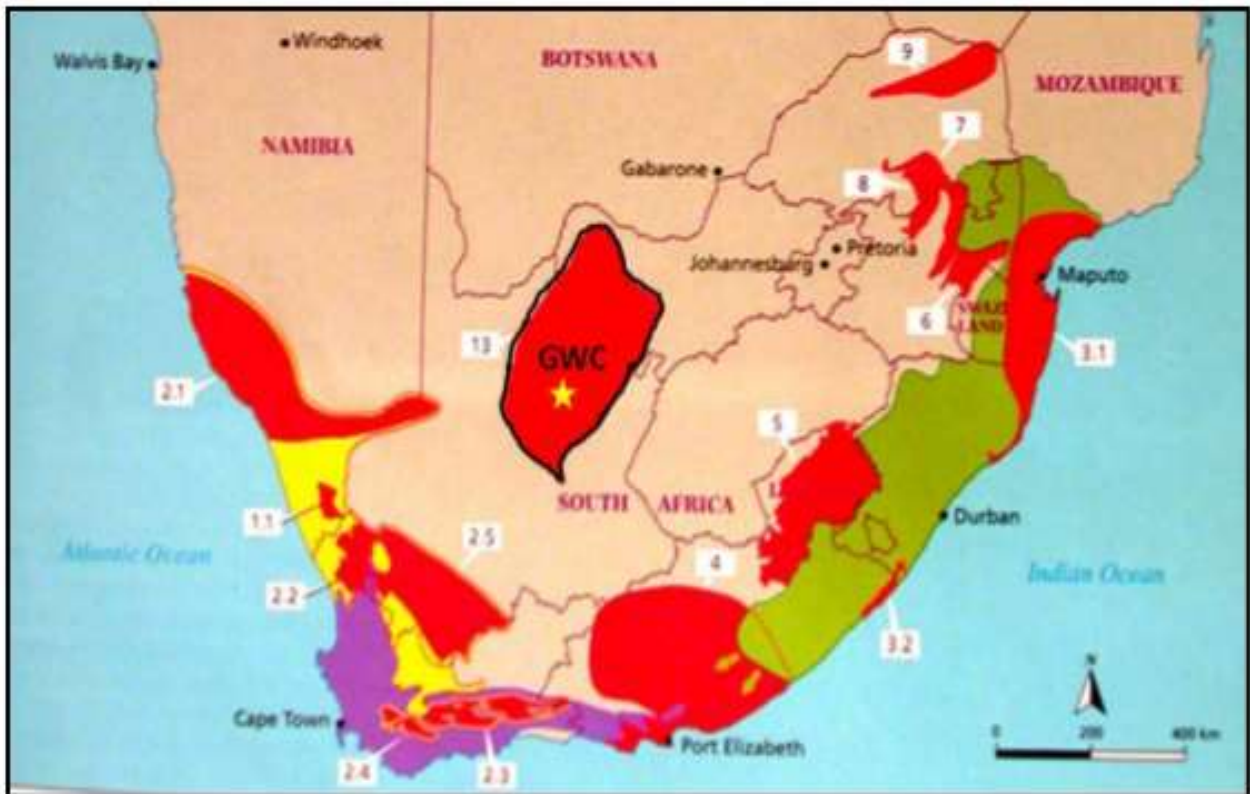


Figure 10. A map indicating the regions of floristic endemism (in red) in southern Africa, according to (Van Wyk and Smith 2001). The location of the study area is presented by the yellow star.



**Flora:**

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Thunderflex 78 to provide an Ecological Assessment report in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the application area fauna was described and included in this report as part of the Ecological Assessment.

For the floral component, the South African National Vegetation Map (Mucina and Rutherford 2006) was used to obtain data on broad-scale vegetation types, associated species and their conservation status. This information was then extrapolated to satellite images where homogenous vegetation units within the proposed prospecting area were identified to infer possible fine-scale communities on site. The South African National Biodiversity Institute's (SANBI) BGIS database was also consulted to obtain information on biodiversity information for the Tsantsabane (NC085) and Siyancuma (NC078) Local Municipalities, in which the study area falls.

Further searches were undertaken specifically for Red List plant species within the current study area. Historical occurrences of Red List plant species were obtained from the SANBI: POSA database for the in the broad geographical area that includes the study site. The IUCN conservation status of plants in the species list was also extracted from the SANBI database and is based on the Threatened Species Programme (SANBI 2017). (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p5).

**Assumptions and limitations**

Due to the nature of a desktop survey and the lack of ground-truth information, the species list reflected in this report cannot be regarded as entirely accurate or comprehensive. Ideally, a site should be visited at least once to compare desktop information with information on site as well as to ensure actual habitats and associated species present on site are recorded.

However, an extensive desktop review was conducted to ensure a fairly accurate representation of the study area. This is assumed to be sufficient to support this environmental authorisation application, because the proposed operation is primarily non-invasive with a likelihood of minor disturbances produced by the drilling operation.

**Broad-scale vegetation patterns**

The study area falls within the Savanna Biome (Mucina and Rutherford 2006). According to the vegetation map of Mucina and Rutherford (2012), the site is represented by three broad-scale vegetation units from the Eastern Kalahari Bushveld Bioregion, i.e. Ghaap Plateau Vaalbosveld, Olifantshoek Plains Thornveld and Kuruman Mountain Bushveld (Figure 11).

Olifantshoek Plains Thornveld is found in the Northern Cape at altitudes between 1 000 and 1 500 m. It is mostly restricted to the pediments of the Korannaberg, Langeberg and Asbestos Mountains. The plains are typically represented by an open tree and shrub layer, with a usually sparse grass layer. The unit occurs on red aeolian sand of the Kalahari Groups with silcrete and

calcrete and some andesitic and basaltic lava of the Griqualand West Supergroup. Soils are deep and the most dominant landtype is Ae, but Ah also occur.

Only 1 % of the Olifantshoek Plains Thornveld has been transformed and erosion is very low. It is classified as being least threatened and a very small proportion is being conserved in the Witsand Nature Reserve. The shrub *Amphiglossa tecta* is the only endemic plant species known from this unit.

Kuruman Mountain Bushveld is distributed in the Northern Cape and North-West Provinces at altitudes between 1 100 and 1 800 m. It stretches from the Asbestos Mountains southwest and northwest of Griekwastad, along the Kuruman Hills north of Danielskuil, passing west of Kuruman and re-emerging as isolated hills. The unit is typically presented as rolling hills with gentle to moderate slopes and hill pediment areas with an open shrubveld. Here, *Calobota cuspidosa* is conspicuous within a well-developed grass layer. The Hills consist of banded iron formation, with jasper, chert and riebeckite-asbestos of the Asbestos Hills Subgroup of the Griqualand West Supergroup. Soils are shallow sandy soils of the Hutton form, with the most common land type being Ib, followed by Ae, Ic and Ag. The unit is classified as being least threatened with very little being transformed and with little erosion being present. It is not currently conserved within any formal conservation areas and the succulent *Euphorbia planiceps* is the only endemic species known from this unit.

Ghaap Plateau Vaalbosveld is distributed in the Northern Cape and North-West Provinces at altitudes between 1 100 and 1 500 m. It occurs on a flat plateau from around Campbell in the south, east of Danielskuil through Reivilo to around Vryburg in the north. The geology includes surface limestone of Tertiary to Recent age, and dolomite and chert of the Campbell Group (Griqualand West Supergroup, Vaalian Erathem). Soils are shallow (0.1 – 0.25 m) and of Mispah and Hutton soil forms. Landtypes mainly represent Fc, but Ae and Ag also occur. The unit is classified as being least threatened with very little (1 %) being transformed and with very low erosion being present. It is not currently conserved within any formal conservation areas and the herb *Rennera stellata* is the only endemic species known from this unit. (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p13 - 15).

### **Population of sensitive, threatened and protected plant species**

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

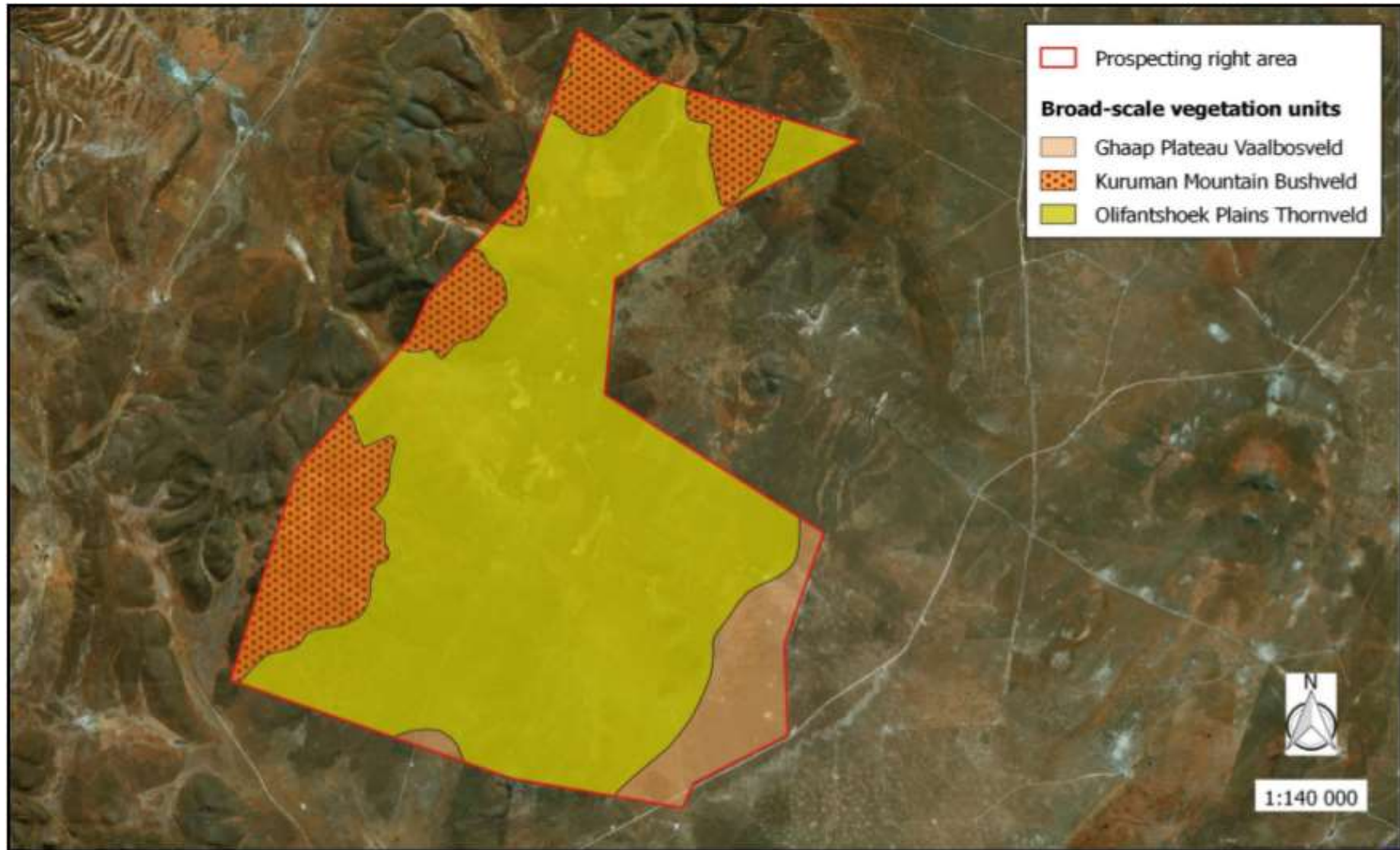


Figure 11. The broad-scale vegetation units (Mucina and Rutherford 2012) present in the study area.

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 previously recorded in the region are classified as least concern; a category which includes widespread and abundant taxa. However, two species, i.e. *Herniaria erckertii* subsp. *pulvinata* (Data Deficient - Taxonomically Problematic) and *Antimima lawsonii* (Rare), are listed under the National Environmental: Biodiversity Act (Act No. 10 of 2004) (NEMBA). Of these, *Antimima lawsonii* is likely to be found on those areas in the study area associated with limestone soils.

Species from the study area that are protected in terms of the National Forests (NFA) Act No 84 of 1998 include *Vachellia haematoxylon*, *V.erioloba* and *Boscia albitrunca*. The latter species is also protected according to the NCNCA. It is expected to be most abundant in the hills and rocky ridges of the site, while *V. haematoxylon* and *V.erioloba* is expected to occur on the sandy plains. In order to damage or remove any protected trees (seedlings to adults) an application must be submitted to the Northern Cape Department of Agriculture, Forestry and Fisheries (DAFF) and a licence obtained from DAFF at least three months prior to such activities. Specially protected species (Schedule 1) and Protected species (Schedule 2) of the Northern Cape Nature Conservation (NCNCA) Act No. 9 of 2009 with a likelihood to occur on site is also listed in Table 2. In addition to these protected species; according to Section 51(2) of NCNCA, a permit is required from the Northern Cape, Department of Environment and Nature Conservation (DENC) for any large-scale clearance of all indigenous (Schedule 3) vegetation, before such activities commence. (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p20 - 22).

### **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 (Schedule 6). 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. All declared weeds and invasive species known from the region are listed in Table 4, along with their categories according to CARA, NEMBA and NCNCA. (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p22).

### **Indicators of bush encroachment**

Bush encroacher species are controlled in terms of Regulation 16 of CARA; where land users of an area in which natural vegetation occurs and that contains communities of encroacher indicator plants are required to follow sound practices to prevent the deterioration of natural resources and to combat bush encroachment where it occurs.

Declared indicators of bush encroachment in the Northern Cape, which are most likely to occur on site, are listed in Table 5. (Thunderflex 78 – Turksvypan Desktop Ecological Assessment March 2020 by Dr. Betsie Milne p23).



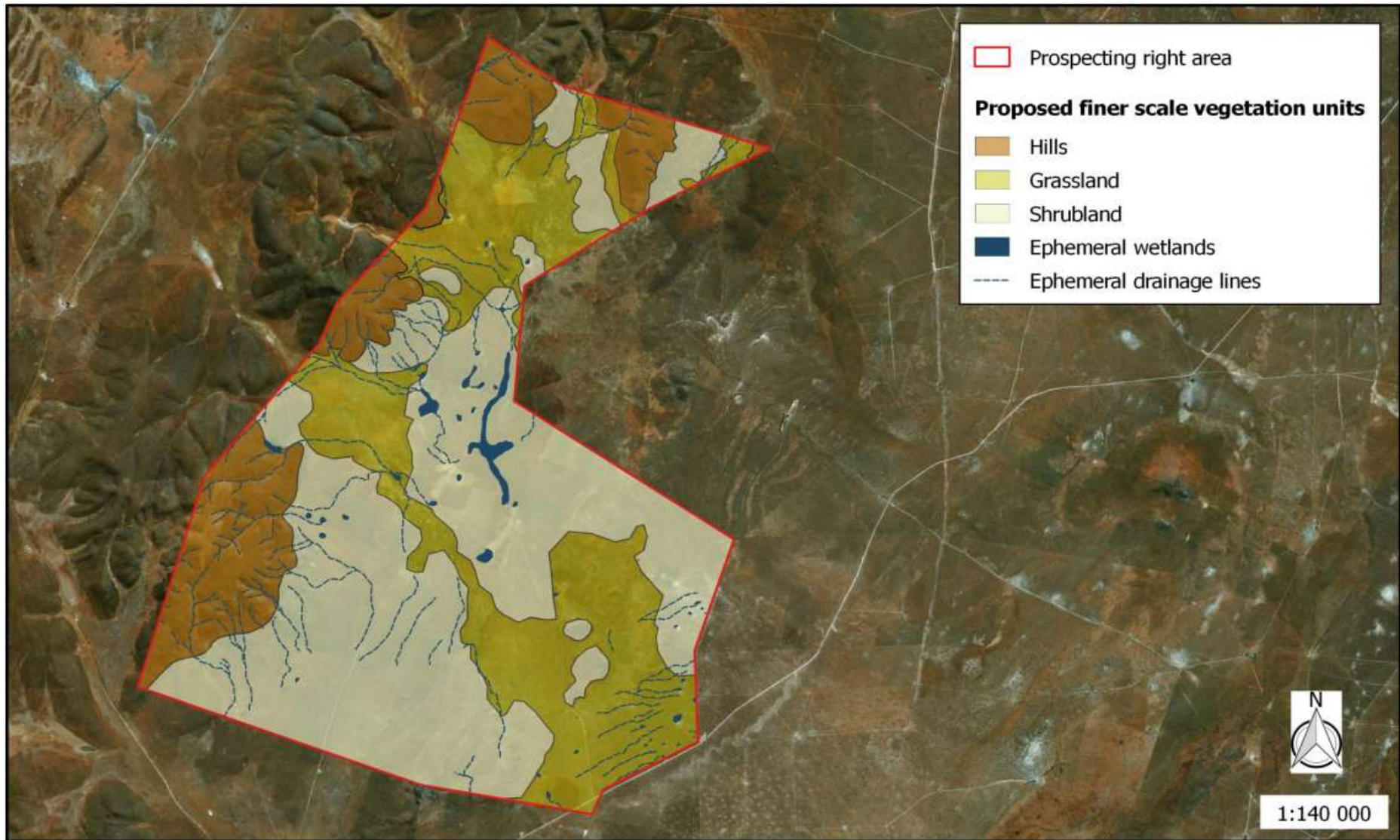


Figure 12. The distribution of fine-scale plant communities in the study area.

**Heritage:**

Dr. Edward Matenga from (AHS) Archaeological and Heritage Services Africa (Pty) Ltd Consultants has been appointed by Thunderflex 78 to provide a Heritage Assessment report in order to highlight the heritage characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the application area.

The following is an outline of the heritage sensitivity of the area:

**The Stone Age**

Stone Age material is widely distributed in the area and a wide range of tools are represented - scrapers, blades, cores and flakes – principally dating from the Middle Stone Age to the Late Stone Age. It is possible that the handaxe and cleaver found date to the transition period from the Early Stone Age to the Middle Stone 250 000 year ago. The artefacts are sparsely distributed and no significant concentrations of artefacts were observed. This pattern seems to indicate general hunter-gatherer activity in the area over time, rather than representing dedicated workshops or regular occupation sites. None of the finds therefore warrant further action.

**The Early Iron Age**

No sites dating to the Iron Age were found.

**The Later Iron Age**

No sites dating to the LIA were found.

**Early Commercial Farming**

There are some buildings of interest at the La Provence farmstead (LPV01, LPV3), which will not be affected by the proposed development.

**Graves and burial grounds**

No graves or burial grounds were recorded.

**General observations**

At the time of the field excursion, access had been granted to the Farm La Provence and the Farm 38/RE. The owner of the latter property was not available at the last minute when we approached the locked main entrance gate, and his mobile phone was not being answered.

As partial compensation for the limited access to the properties, and in order to assess the heritage sensitivity of the broader area we deliberately extended the survey into Farm 50/RE situated immediately south of La Provence, where access was granted.

General observations and postulated heritage sensitivity of the portions that were not surveyed

It is an established fact that the broader area was home to MSA/LSA hunter gatherer communities who left behind stone tools and flake waste which commonly occur. MSA/LSA tools have been recorded in all surveys conducted by the specialist in the area. No occurrences have been deemed highly significant to warrant further action beyond primary documentation.

### **Conclusion and recommendations**

In light of the findings of the ground survey and desk assessment, the mine prospecting can go ahead. The study is mindful that some important discoveries may be made during the prospecting and mining phases. If this will happen, the procedure is to halt operations, notify the provincial heritage resources authority or SAHRA in order for an investigation and evaluation of the finds to take place.

### **Palaeontological**

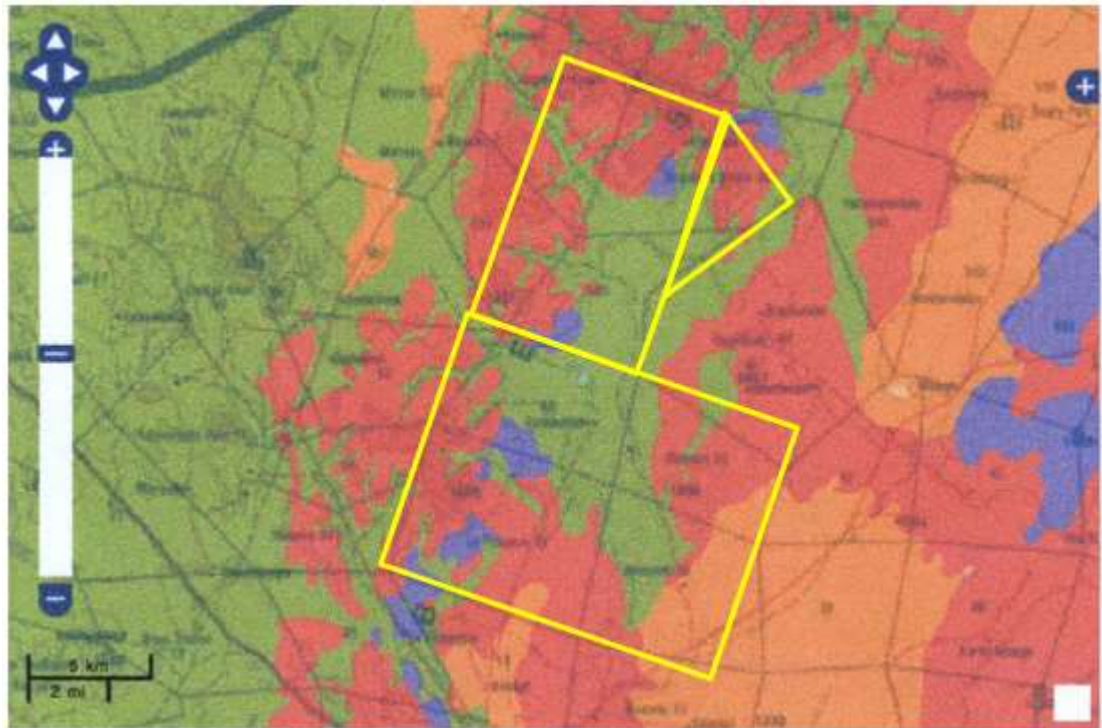
Prof Marion Bamford was appointed by Dr. Edward Matenga from (AHSA) Archaeological and Heritage Services Africa (Pty) Ltd Consultants to provide an Palaeontological Impact Assessment report in order to highlight the palaeontological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the application area.

A palaeontological Impact Assessment was requested for the proposed Prospecting and Mining Rights application on the remaining extent of the Farm Mesnard 28, Farm Rooioan 43, Farm La Provence 5, Remaining Extent and Portion 1 (Turksvypan) of the Farm 52, Portin 1 of the Farm Hopefield Estate 552 and Remaining Extent of the Farm 565. This cluster of farms is northeast of Griquastad and the project is for Thunderflex 78 (Pty) Ltd.

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

The proposed site lies on the potentially moderately fossiliferous Lime Acres Member, and Quaternary Limestone – based on the geology and recommendation of the Western Cape Palaeotechnical Report. The SAHRIS palaeosensitivity report incorrectly assigned the Kuruman Formation as very highly sensitive; BIF does not preserve fossils. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no palaeontological site visit is required for the Prospecting Activities unless fossils are found by the geologist or responsible person. If mining is to be opencast then a site visit will be necessary so that a representative sample of fossils can be removed by a palaeontologist.





**Figure 13.** SAHRIS palaeo sensitivity map for the site for the proposed PR and MR for the cluster of farms northeast of Griquastadt shown within the yellow rectangles. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

#### **Recommendation**

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the surface limestones or loose sands of the Quaternary. There is a very small chance that trace fossils such as stromatolites may occur in the Lime Acres Member. BIF does not preserve fossils although indicated as such in the SAHRIS map.

Since there is a small chance of finding stromatolites, or bones and wood in pans, a Fossil Chance Find Protocol should be added to the EMPr: if fossils are found once drilling or mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.

#### **Chance Find Protocol**

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

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations/mining commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material

- (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. 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.
  4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
  5. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
  6. Fossil plants or stromatolites 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 the mining operation is to open cast and in the highly sensitive area, then a site visit by a palaeontologist will be necessary in order to remove and preserve a representative collection.

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

(a) Population density, growth and location

The local and regional population is illustrated in the table below. From this table, it is evident that Siyathemba had a local population of just more than 21 000 people during 2010. In regional context, this meant that Siyathemba contributed 11.9 % to the District population (i.e. the second largest LM in the District by population) and 1.9 % to the population of the Northern Cape.

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

Local Municipality Source: Quantec Research, 2012

The population of Siyathemba declined from just over 21 370 people in 2000 to about 21 330 in 2010 (Figure 14). This implies that the population contracted by 0.4 % on average per annum. This growth rate is slightly lower in the Pixley Ka Seme DM, which contracted 0.7 % p.a. The decline of the Siyathemba population was mainly driven by lower fertility rates.

The death rate (i.e. the number of deaths per 1 000 people in year) experienced a relative increase from 11.2 deaths per 1 000 people in 1995 to 11.6 during 2010. During 2010, the death rate for Pixley Ka Seme was 11.9 deaths per 1 000 people, while it was 13 for the Northern Cape and 16.4 for the South African population. The reason for the lower death rate in the study area was mainly the result of lower HIV/AIDS prevalence rates when compared with South African averages.



Figure 14. Population statistics for the Siyathemba Local Municipality

The municipal area encompasses a geographic area of some 8 197 km<sup>2</sup> which implies that Siyathemba accounts for some 8.0 % of the total District surface area. The local economy is mainly agriculture based and highly dependent on the Orange River, which flows through the area.

Siyathemba is one of eight Local Municipalities in the Pixley Ka Seme District.

The other seven Municipalities are:

- Thembelihle Local Municipality
- Emthanjeni Local Municipality
- Siyancuma Local Municipality
- Umsobomvu Local Municipality
- Ubuntu Local Municipality
- Kareeberg Local Municipality
- Renosterberg Local Municipality

De Aar is the seat of the Pixley Ka Seme District Municipality (located in the Emthanjeni LM). Prieska is located some 182 km from De Aar and 236 km from Kimberley. Spatially, Siyathemba is very distant from South Africa's largest consumer markets. In this regards, the road transport distances illustrated by the table below would apply to LED initiatives.

City	Distance from Prieska (km)
Upington	249
De Aar	182
Kimberley	236
Bloemfontein	397
Cape Town	835
Johannesburg	714
Pretoria	775
Durban	1029

### Major economic activities and sources of employment

The local economy grew by 1.7 % during 2009/10 compared to the District (1.7 %), Provincial (2.3 %) and National (2.8 %) growth rates. From 2000 to 2010, an average growth rate of 2.0 % can be observed in Siyathemba, which was inadequate to create sufficient jobs in the local economy to reduce the unemployment rate. Local economic growth is not strongly linked with that of the District, which reflects a local economy that is highly concentrated (in Agriculture) with a less balanced profile when compared with the larger region. This implies that the local economy is more vulnerable to market fluctuations (especially in terms of fluctuations that have an impact on regional agriculture).

Figure 15 illustrates the ten year average annual economic growth rates (2000 to 2010) in Siyathemba and the larger region. From this Table is evident that growth in the local economy was mainly driven by Manufacturing (10.2% p.a.), Construction (6.6%) and Finance (5.6% p.a.). The other sectors in the local economy contracted over the past ten years (most notably in the Mining, Utilities and Transport).

When compared to the larger region, it can be observed that local growth in the Finance sector (5.6 % p.a.) is relatively in line with the District (6.2 % p.a.), indicating a strong growth correlation and the importance of Siyathemba to Pixley Ka Seme in terms of its contribution to District Financial Services.

From 2010 sectoral distribution of the labour force in South Africa, the Northern Cape, Pixley Ka Seme and Siyathemba it is evident that most workers in Siyathemba are employed in the Government Services sector (around 1 700 workers), followed by Agriculture (about 1 100 workers) and the Trade (about 670 workers) sectors.

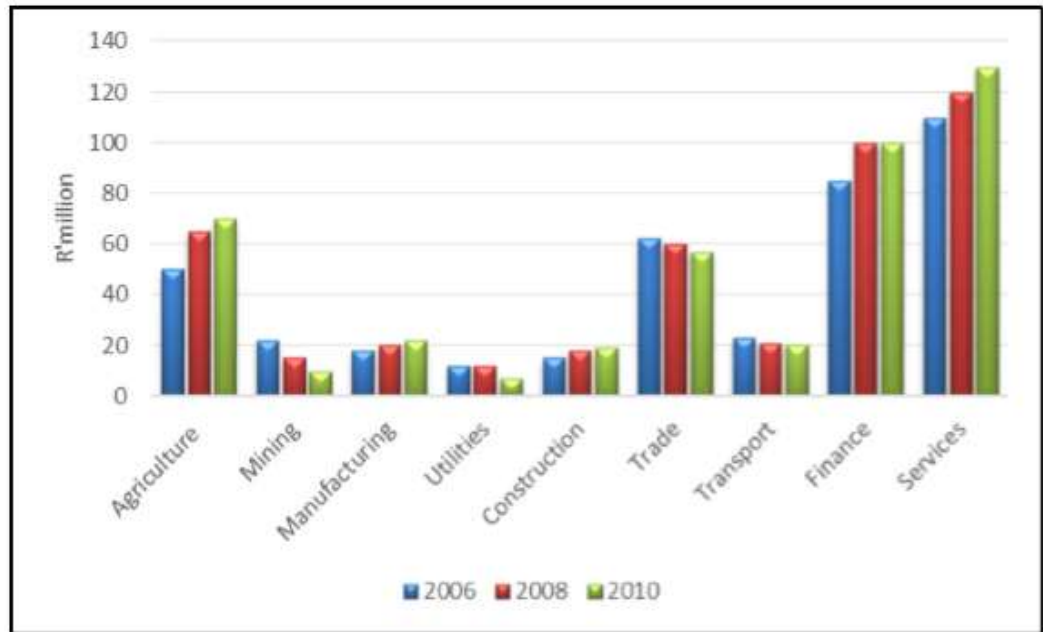


Figure 15. A presentation of the ten-year average annual economic growth rates (2000 to 2010) in Siyathemba and the larger region (Quantec Research, 2012)

#### Estimated unemployment

Total employment in Siyathemba has been in fluctuating over the last ten year. Moreover, employment in the study area declined marginally from some 4,800 jobs during 2000 to just below 4 700 in 2010. Over a ten-year period, this could be translated to an average annual decline of 0.2%. Over the same period, employment in Pixley Ka Seme declined by 1.3% on average per annum, while that of the Northern Cape and South Africa increased by 0.9% and 0.5% respectively.

Local employment trends are not well-integrated with that of the larger region, which could be attributed to the concentrated nature (in the Agriculture sector) of the local economy. In contrast, employment trends in Pixley Ka Seme, the Northern Cape and South Africa follow growth profiles that are better correlated due to higher levels of diversity in these economies. The threat presented by employment vulnerability and its socio-economic implications for local communities in Siyathemba cannot be emphasized enough.

#### Housing-demand and availability

A total of around 5 500 household dwellings were estimated to exist in the Siyathemba municipal area during 2010. This accounted for some 11.7 % of all household dwellings in the District, which ranked Siyathemba fourth among Pixley Ka Seme's Local Municipalities. Since 2000, the number of dwellings increased by 0.8 % on average per annum compared to 0.1 % decline in the District and 0.5 % growth in the Province.

The table below illustrates the type of dwellings found in Siyathemba and the level of household access to municipal services.



Household Indicator	2000	2010	Access	Growth
House or brick structure	4,303	4,419	81.8%	0.3%
Electricity	4,305	4,812	87.3%	1.1%
Piped water	5,001	5,356	97.5%	0.7%
Refuse removal	4,066	4,546	83.5%	1.1%
Flush or chemical toilet	3,597	4,323	78.6%	1.9%

Source: Quantec Research, 2012

More than 81 % of household dwellings found in Siyathemba can be classified as houses or brick structures on separate stands. This indicator is slightly higher when compared with the average for Pixley Ka Seme (80.1 %) and the Northern Cape (77.4 %). Some 8.6 % of local dwellings can be described as shacks.

Around 87 % of household dwellings found in Siyathemba have access to electricity. This indicator is on par with the District and Provincial average. Around 97 % of household dwellings found in Siyathemba have access to piped water while the remainder mostly rely on boreholes as a source. The area rated on par in terms of this indicator when compared with Pixley Ka Seme (96.8 %) and the Northern Cape (96.2 %). Around 83% of local households enjoyed a weekly refuse removal service by the Local Municipality, compared to 76.2 % in Pixley Ka Seme and 68.8% in the Northern Cape.

Approximately 78.6% of local households have access to flush or chemical toilets. This indicator is relatively higher when compared with the District (67.8 %) and Provincial (67.8%) average. Those households that do not have access to flush or chemical toilets, mainly make use of pit latrines as their main source of sanitation. The demand for housing in the Northern Cape Province is critical as can be seen in the number of informal settlements being built on an almost daily basis in the nearby towns and Kimberley.

### **Social infrastructure**

The town of Prieska have formal infrastructures such as schools, hospitals, sport- and recreation facilities and shops.

### **Water supply**

Water is available to almost 50 % of the population in the Northern Cape in the form of water piped to their dwelling. The next most used source of water supply is piped water on-site or in yards, which is available to around 33 % of the population. Surface water from the Riet-, Vaal- and Orange River is the major source of water in the region, although some smaller communities are totally dependent on groundwater for supply.

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

Currently, the major land uses in the area are mining and agriculture. According to AGIS, the land capability for the majority of the study site is non-arable with low to moderate potential grazing land, while the hills in the north and west are classified as wilderness. The grazing capacity is between 14 and 21 ha/AU, with the agricultural region being demarcated for cattle farming. The area is categorised to have no suitability for crop production.

Turksvypan is mainly used for agriculture. The natural pastures are used for grazing camps and evidence of cultivated land is visible on the topographical maps and satellite images. Existing infrastructure includes homesteads and farm roads and tracks. Historically, the hills in the north were mined and apart from the current Thunderflex prospecting application for diamonds, the farm has also been subject to applications for the prospecting of limestone.

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

Please see description of the environment under section (a) Baseline Description above.

The study site is currently mainly used as grazing for cattle. Existing infrastructure includes homesteads and farm roads and tracks. Historically, the hills in the north were mined and apart from the current Thunderflex prospecting application for diamonds, the farm has also been subject to applications for the prospecting of limestone.



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

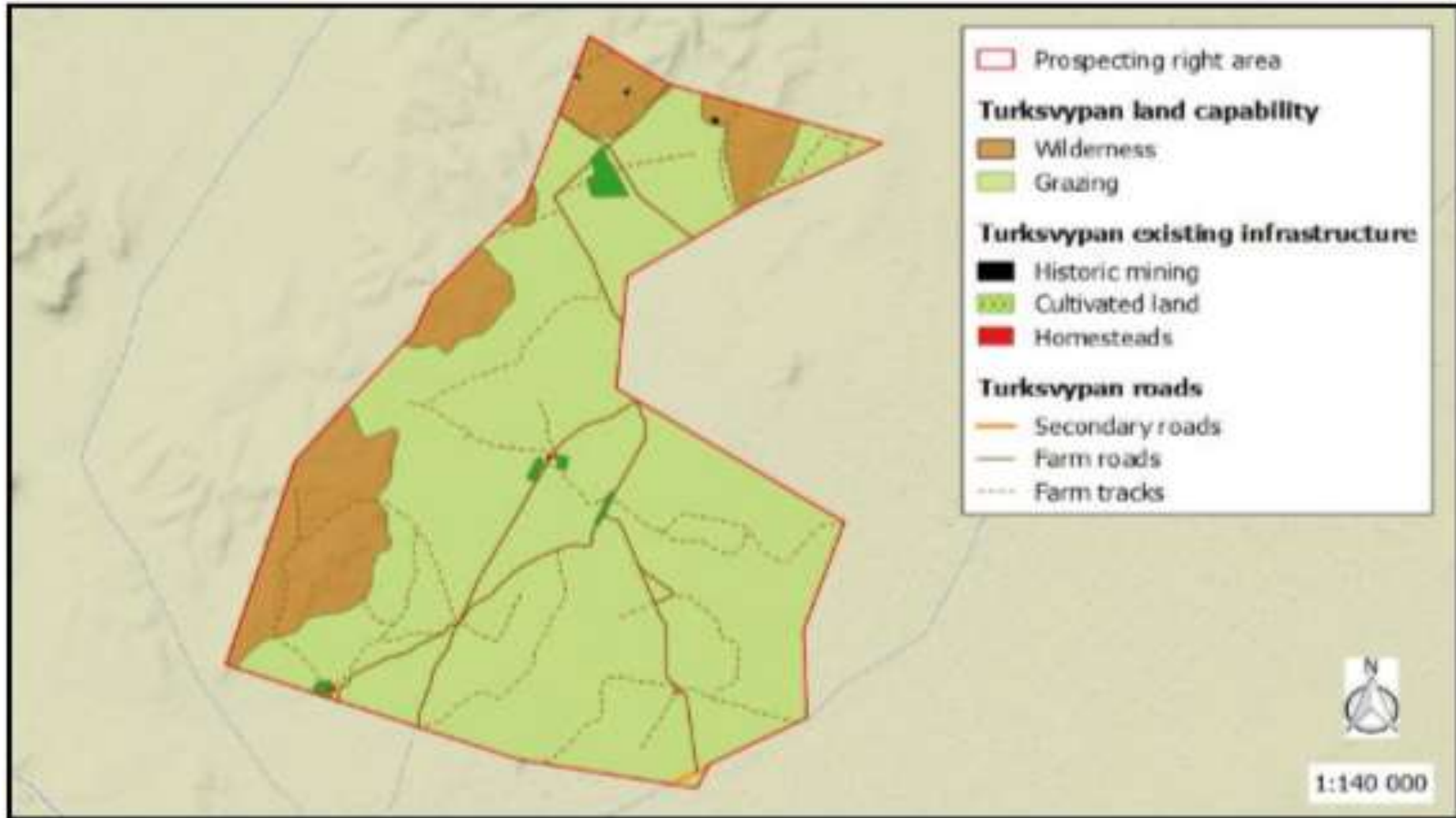


Figure 16. Environmental and current land use (Map taken out of the ecological study done by Dr. Betsie Milne from Boscia Ecological Consultants)

**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
<b>PHYSICAL</b>						
<b>Geology and Mineral Resource</b>	Sterilisation of mineral resources	Low	Possible but infrequently	Decommissioning	Minimum Local	Ensure that optimal use is made of the available mineral resource.
<b>Topography</b>	Changes to surface topography  Development of infrastructure; and drilling.	Low-Medium	Possible but infrequently	Decommissioning	Low Local	<ul style="list-style-type: none"> <li>• Rehabilitation of and backfilling of drill holes when possible continuously, if possible and does not influence prospecting and safety requirements.</li> <li>• Employ effective rehabilitation strategies to restore surface topography of drill sites.</li> <li>• All temporary infrastructures should be demolished during closure.</li> </ul>
<b>Soils</b>	Soil Erosion  Construction of infrastructure;	Low-Medium	Possible but infrequently	Decommissioning	Low Local	<ul style="list-style-type: none"> <li>• At no point may plant cover be removed within the no-development zones.</li> </ul>

	topsoil removal; potential runoff.					<ul style="list-style-type: none"> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration, wherever possible.</li> <li>• Audits must be carried out at regular intervals to identify areas where erosion is occurring.</li> <li>• Appropriate remedial action, including the rehabilitation of the eroded areas, must occur.</li> <li>• Dust suppression must take place.</li> <li>• Linear infrastructure such as roads will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</li> </ul>
	<b>Nature of Impact</b>	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	<b>Loss of soil fertility</b>  During the removal of topsoil.	Low	Rare and infrequent	Residual	Low Local	The topsoil should be replaced as soon as possible onto the cleared areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.

	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	<p><b>Soil pollution</b></p> <p>Spillage of hazardous material; runoff.</p>	Low	Rare and infrequent	Residual	Low Local	<ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.</li> <li>• Spill kits to clean up accidental spills from drilling machinery must be well-marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles and machinery should be regularly serviced and maintained.</li> </ul>
<b>Land Capability</b>	Loss of land capability through topsoil removal, disturbances and loss of fertility.	Low	Rare and infrequent	Residual	Low Local	Employ appropriate rehabilitation strategies to restore land capability.
<b>Land use</b>	Loss of land use due to poor placement of surface infrastructure and ineffective rehabilitation	Low	Rare and infrequent	Residual	Low Local	Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.
<b>Ground Water</b>	Nature of Impact	Significance	Probability	Duration	Consequence	Management / mitigation

Quantity					Extent	
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Hydrocarbon Spills Hydrocarbon spills from construction vehicles and fuel storage areas may contaminate the groundwater resource locally	Low	Highly unlikely and infrequent	Decommissioning	Low Local	Staff at Workshop areas, yellow metal laydown zones and fuel storage areas should be sufficiently trained in hydrocarbon spill response. Each area where hydrocarbons are stored or likely to spill should be equipped with sufficient spill response kits and personnel, contaminated soil should be disposed of correctly at a suitable location.
<b>Surface Water</b>	<ul style="list-style-type: none"> <li>Ground works and stripping of vegetation resulting in a changed land profile.</li> <li>Runoff from vegetation may contain high levels of silt.</li> <li>Transport of construction materials to and from site. Significant levels of dust may emanate from</li> </ul>	Medium to Low	Possible but infrequent	Decommissioning	Low Local	Water Quality deterioration: change in water quality is caused by a change in natural conditions and/or an enhancement of pollution from sources.  Mitigation measures (or safety precautions) that are taken in order to eliminate any risk the project area could have on the natural, cultural and social environment of the concerned area and that must be implemented during the different phases i.e. construction, operational and post closure to



	<p>the use of heavy construction vehicles which in turn will impact on runoff water quality.</p> <ul style="list-style-type: none"> <li>Materials used during construction may impact negatively on the runoff water quality.</li> </ul>					<p>minimize the impacts are as follows:</p> <ul style="list-style-type: none"> <li>Only environmental friendly materials must be used during the construction phase to minimize pollution of surface water runoff and/or underground water resources.</li> <li>Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment.</li> </ul>
	<ul style="list-style-type: none"> <li>Spillages that may occur on access and haul roads may impact negatively on surface water quality. This issue is dealt with in the EMP.</li> <li>A high potential of soil erosion exists due to an increased percentage of bare surfaces.</li> </ul>	<p>Medium to Low</p>	<p>Possible but infrequent</p>	<p>Decommissioning</p>	<p>Low Local</p>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>
	<ul style="list-style-type: none"> <li>Possible leaching of polluted soil through infiltration and</li> </ul>	<p>Medium to Low</p>	<p>Possible but infrequent</p>	<p>Decommissioning</p>	<p>Low Local</p>	

	<p>runoff resulting in surface water pollution.</p> <ul style="list-style-type: none"> <li>• Removal of vegetation could lead to erosion and sediment transportation.</li> <li>• Significant dust levels will emanate from the use of heavy construction vehicles.</li> </ul>					
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
<b>Indigenous Flora</b>	<p><b>Loss of and disturbance to indigenous vegetation</b></p> <p>Construction of roads, plant site, as well as other necessary infrastructure; and the clearing of vegetation for prospecting, materials storage and; vehicular movement.</p>	Very Low	Possible but infrequent	Short term	Low On-site	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation.</li> <li>• Encourage proper rehabilitation of prospecting areas.</li> <li>• Encourage the growth of natural plant species.</li> <li>• Ensure measures for the adherence to the speed limit.</li> </ul>

	<p><b>Loss of flora with conservation concern</b></p> <p>Removal of listed or protected plant species; during Construction of roads, plant site, as well as other necessary infrastructure; and clearing of vegetation for prospecting.</p>	<p>Low-Medium</p>	<p>Possible but infrequent</p>	<p>Residual</p>	<p>Low to Medium Local</p>	<ul style="list-style-type: none"> <li>• Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting.</li> <li>• It is recommended that these plants are identified and marked prior to prospecting.</li> <li>• These plants should, where possible, be incorporated into the design layout and left in situ.</li> <li>• However, if threatened of destruction by prospecting, these plants should be removed (with the relevant permits from DAFF and DENC) and relocated if possible.</li> <li>• All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.</li> </ul>
	<p><b>Proliferation of alien vegetation</b></p> <p>Clearing of vegetation; prospecting activities</p>	<p>Low-Medium</p>	<p>Rare and infrequent</p>	<p>Residual</p>	<p>Low Regional</p>	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation.</li> <li>• Encourage proper rehabilitation of prospected areas.</li> <li>• Encourage the growth of natural plant species.</li> </ul>

						<ul style="list-style-type: none"> <li>• Mechanical methods (hand pulling) of control to be implemented extensively.</li> <li>• Annual follow-up operations to be implemented.</li> </ul>
	<p><b>Encouragement of bush encroachment</b></p> <p>Clearing of vegetation; disturbance through prospecting activities.</p>	Low	Rare and infrequent	Residual	Low Local	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation.</li> <li>• Encourage proper rehabilitation of prospected areas.</li> <li>• Encourage the growth of natural plant species.</li> <li>• Mechanical methods (hand pulling) of control to be implemented extensively.</li> <li>• Annual follow-up operations to be implemented.</li> </ul>
<b>Fauna</b>	<p><b>Loss, damage and fragmentation of natural habitats</b></p> <p>Clearance of vegetation; prospecting activities</p>	Low	Possible but infrequent	Decommissioning	Low Local	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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 construction personnel or vehicles may leave the</li> </ul>

						demarcated area except those authorised to do so.
	<p><b>Disturbance, displacement and killing of fauna</b></p> <p>Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities.</p>	Low- Medium	Possible for life of operation	Decommissioning	Low Regional	<ul style="list-style-type: none"> <li>• Careful consideration is required when planning the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint.</li> <li>• 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.</li> <li>• 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.</li> <li>• All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.</li> </ul>



						<ul style="list-style-type: none"> <li>• The environmental induction should occur in the appropriate languages for the workers who may require translation.</li> <li>• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</li> <li>• Employ measures that ensure adherence to the speed limit.</li> </ul>
<b>Air Quality</b>	Sources of atmospheric emission associated with the prospecting operation are likely to include fugitive dust from materials handling operations, and vehicle entrainment of dust road.	Low	Possible 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.
<b>SOCIAL SURROUNDINGS</b>						
<b>Environmental Factor</b>	<b>Nature of Impact</b>	<b>Significance</b>	<b>Probability</b>	<b>Duration</b>	<b>Consequence Extent</b>	<b>Management</b>
<b>Noise Impacts</b>	Clearing of footprint areas	Low-Medium	Possible for life of operation	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels.

	Construction of Roads	Low- Medium	Possible for life of operation	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Clearing of prospecting area.  Noise increase at the boundary of the prospective footprint.	Low-Medium	Possible	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels.
	Diesel emergency generators Noise increase at the boundary of the prospective footprint.	Low-Medium	Possible	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels. Noise survey to be carried out to monitor the noise levels during these activities.
	Additional traffic to and from the prospective area.	Low-Medium	Possible	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.
	Maintenance activities at the site.	Low-Medium	Possible	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers

						<p>specifications on acceptable noise levels.</p> <p>Noise survey to be carried out to monitor the noise levels during these activities.</p>
	Back fill of prospective footprint area	Low-Medium	Possible	Decommissioning	Low Local	<p>Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels.</p> <p>Backfill of prospective footprint area activities should be limited to daytime only.</p>
	Planting of grass and vegetation at the rehabilitated areas	Low-Medium	Possible	Decommissioning	Low Local	<p>Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels</p> <p>Planting of grass and/or vegetation should be limited to daytime only</p>
	Removal of infrastructure	Low-Medium	Possible	Decommissioning	Low Local	<p>Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels.</p> <p>Removal of infrastructure should be limited to daytime only.</p> <p>Noise survey to be carried out to monitor the noise levels during these activities.</p>

<b>Visual impacts</b>	Potential visual impact	Low	Possible for life of operation	Decommissioning	Low Local Site	The design of the proposed prospecting development will determine the visual impact. As the visual impact would be low, Correct design will ensure that the development will fit into the surrounding area and will become a feature of the area.
	Potential Visual Impact on the surrounding land users/ residents	Low	Possible for life of operation	Decommissioning	Low Local Site	The design of the proposed prospecting development will determine the visual impact.
	Potential visual impact of the proposed development on the operational phase of the surrounding land users in close proximity.	Low	Possible for life of operation	Decommissioning	Low Local Site	Wetting of exposed areas should be undertaken as required to prevent dust pollution having a negative visual impact. <ul style="list-style-type: none"> <li>• Ensure that the design fits into the surrounding environment and it is aesthetically pleasing.</li> <li>• Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way;</li> <li>• Rehabilitation of disturbed areas and re-establishment of vegetation;</li> </ul>
<b>Traffic</b>	Potential negative impacts on traffic safety and deterioration of the existing road networks.	Low	Possible for life of operation	Decommissioning	Low Local	Utilise existing access roads, where applicable; implement measures that ensure adherence to traffic rules.

<p><b>Heritage resources</b></p>	<p>The Deterioration of sites of cultural and heritage importance.</p>	<p>Low-Medium</p>	<p>Possible for life of operation</p>	<p>Decommissioning</p>	<p>Low Local</p>	<p>Any heritage and cultural resources must be protected and preserved by the delineation of a no-go zone if any have been identified.</p> <p><b>Thirty-four (34) sites were recorded all of are of medium to low significance.</b> Should any resources be discovered, exposed or uncovered during site preparations; these should immediately be reported to an accredited archaeologist. Should any Burial remains be uncovered it should not be disturbed or removed until inspected by an archaeologist or for fossil finds by a palaeontologist.</p> <p><b>Chance Find Protocol</b> Monitoring Programme for Palaeontology – to commence once the drilling / mining activities begin.</p> <ol style="list-style-type: none"> <li>1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations/mining commence.</li> <li>2. When excavations begin the rocks and must be given a cursory inspection by the environmental</li> </ol>
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					<p>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.</p> <p>3. 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.</p> <p>4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.</p> <p>5. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.</p> <p>6. Fossil plants or stromatolites 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</p>
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						<p>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.</p> <p>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.</p> <p>8. If the mining operation is to open cast and in the highly sensitive area, then a site visit by a palaeontologist will be necessary in order to remove and preserve a representative collection.</p>
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Interested and Affected Parties	Loss of trust and a good standing relationship between the IAP's and the prospecting company.	Low to medium	Possible for life of operation	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)

The different environmental components on which the project can/may have an impact are:-

- a) Geology
- b) Topography
- c) Soil
- d) Land Capability
- e) Land Use
- f) Vegetation (Flora)
- g) Wild Life (Fauna)
- h) Surface Water
- i) Ground Water
- j) Air Quality
- k) Noise
- l) Archaeological and Cultural Sites
- m) Sensitive Landscapes
- n) Visual Aspects
- o) Socio-economic Structure
- p) Interested and Affected Parties

1) Impact Assessment

Before the impact assessment could be done the different project activities were identified.

2) Activities

- a) Access Roads for drilling;
- b) Drilling;
- c) Ablution facilities

3) Environment Impact Assessment Summary

Environment likely to be affected by the prospecting operation.

The criteria used to assess the significance of the impacts are shown in the table 2 below/overleaf. The limits were defined in relation to prospecting characteristics. Those for probability, intensity/severity and significance are subjective, based on rule-of-thumb

and experience. Natural and existing mitigation measures were considered. These natural mitigation measures were defined as natural conditions, conditions inherent in the project design and existing management measures, which alleviate impacts. The significance of the impacts was calculated by using the following formula:

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

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

**Table 2. Significance of impacts is defined as follows.**

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

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

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

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

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

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

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

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

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

**Table 3.** Explanation of PROBABILITY of impact occurrence

Weight	Probability of Impact Occurrence	Explanation of Probability
1	Improbable	<20% sure of particular fact or likelihood of impact occurring
2	Low Probability Possible	20 – 39% sure of particular fact or likelihood of impact occurring
3	Probable /Likely	40 – 65% sure of particular fact or likelihood of impact occurring
4	Highly Probable /Likely	66 – 85% sure of particular fact or likelihood of impact occurring
5	Definite	86% - 100% sure of particular fact or likelihood of impact occurring

**Table 4.** Explanation of EXTENT of impact

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

**Table 5.** Explanation of DURATION of impact

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

**Table 6.** Explanation of SEVERITY of the impact

Weight	Impact Severity	Explanation of Severity
1	No Impact	There will be no impact at all – not even a very low impact on the system or any of its parts.
2	Very Low	Impact would be negligible. In the cast of negative impacts, almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple. In the case of positive impacts alternative means would almost all likely to be better, if one or a number of ways, then this means of achieving the benefit.
3	Low	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and/or remedial activity would be either easily achieved or little would be required or

		both. In the case of positive impacts alternative means for achieving this benefit would be easier, cheaper, more effective, less time-consuming, or some combination of these.
4	Moderately Severe	Impact would be real but not substantial within the bounds of those which could occur. In the case of negative impacts, mitigation and/or remedial activity would be both feasible and fairly easily possible. In the case of positive impacts other means of covering these benefits would be about equal in cost and effort.
5	High Severance	Impacts of substantial order. In the case of negative impacts, mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these. In the case of positive impacts other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
6	Very High Severity	Of the highest order possible within the bounds of impacts which could occur, in the case of negative impacts, there would be no possible mitigation and/or remedial activity to offset the impact at the spatial or time scale for which was predicted. In the case of positive impacts there is no real alternative to achieving the benefit.

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

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

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

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

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

There is also a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil useless unless they are decontaminated. The storage of fuels on site might have an impact on soil if the diesel cart 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.

Groundwater could be affected, if any oil and fuel spillages occur during these scenarios and activities, then groundwater will be directly contaminated. Similarly, hazardous surface spillages will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources during runoff episodes. If no, or inadequate ablution facilities are available then workers might feel the need to use the veld for this purpose, which can contaminate natural resources.

The operation will create a number of new employment opportunities and uplift the local community. The magnitude of this impact will depend on the number of people that will be employed and the number of contractors sourced. An influx of people into the area could possibly impact on safety and security of local residents. During the



decommissioning and at closure of the site, staff will most likely be retrenched, resulting in people being unable to find new employment for a long period of time.

**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)

Impact	Mitigation	Risk
Air quality	<ul style="list-style-type: none"> <li>• Effective soil management; identification of the required control efficiencies in order to maintain dust generation within acceptable levels. Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> </ul>	Low
Fauna	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Limit the removal of trees</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics of any affected watercourses.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• 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.</li> <li>• However, if any of the protected species are threatened by destruction, the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits.</li> <li>• A full time ECO (Environmental Control Officer) must render guidance to the staff and contractors with respect to suitable areas for all related disturbance.</li> <li>• Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.</li> </ul>	Low

	<ul style="list-style-type: none"> <li>• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</li> <li>• Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.</li> </ul>	
Flora	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> <li>• Apply for permits to authorize the large-scale clearance of indigenous vegetation from DENC.</li> <li>• All footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities.</li> <li>• It is recommended that these plants are identified and marked prior to intended activity.</li> <li>• These plants should, where possible, be incorporated into the activity layout and left in situ.</li> <li>• However, if threatened by destruction, these plants should be removed (with the relevant permits) and relocated if possible.</li> <li>• A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.</li> <li>• The appointment of an Environmental Control Officer 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. The environmental induction should occur in the appropriate languages for the workers who may require translation.</li> <li>• All those working on site must be educated about the conservation importance of the flora occurring on site.</li> <li>• Employ measures to ensure that no illegal harvesting takes place.</li> <li>• Minimise the footprint of transformation.</li> <li>• Encourage the growth of natural plant species.</li> <li>• Mechanical methods of control to be implemented if needed.</li> <li>• Annual follow-up operations to be implemented.</li> </ul>	Low

<p>Ground water</p>	<ul style="list-style-type: none"> <li>• Staff should be sufficiently trained in hydrocarbon spill response.</li> <li>• 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.</li> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution.</li> <li>• Spill kits to clean up accidental spills from the machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles should be regularly serviced and maintained.</li> <li>• Clean &amp; Dirty water system must be well maintained.</li> </ul>	<p>Low</p>
<p>Noise</p>	<ul style="list-style-type: none"> <li>• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary.</li> <li>• The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993.</li> <li>• The applicant will comply with the measures for good practice with regard to management of noise related impacts during prospecting .</li> <li>• The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals.</li> <li>• 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, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.</li> <li>• Hearing protection will be available for all employees where attenuation cannot be implemented.</li> <li>• If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.</li> </ul> <p>Mechanical Equipment:</p> <ul style="list-style-type: none"> <li>• All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act.</li> <li>• All vehicles in operation will be equipped with a silencer on their exhaust system.</li> </ul>	<p>Low</p>

	<ul style="list-style-type: none"> <li>• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.</li> </ul>	
Soil	<ul style="list-style-type: none"> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>	Low
Surface water	<ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• 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.</li> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent surface water pollution.</li> <li>• Spill kits to clean up accidental spills from machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles and machinery should be regularly serviced and maintained.</li> </ul>	Low

	<ul style="list-style-type: none"> <li>Storm water control;</li> <li>Clean &amp; dirty water plan.</li> </ul>	
Topography	<ul style="list-style-type: none"> <li>If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>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.</li> <li>Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>Ground exposure should be minimised in terms of the surface area and duration.</li> <li>Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>	Low
Visual	<ul style="list-style-type: none"> <li>Replacing layer of topsoil over drill pad areas;</li> <li>Sloping of rehabilitated and disturbed areas;</li> <li>Removal of all infrastructures upon closure.</li> <li>The design of the proposed prospecting development will determine the visual impact. As the visual impact would be low</li> <li>The design of the proposed prospecting development will determine the visual impact.</li> </ul>	Low

**ix) Motivation where no alternative sites were considered**

The option to explore the possibility for prospecting is in itself an alternative land use. The applicant is not interested in any other alternative land use over this land aside for diamonds exploration, or any other activity, or any other method used other than prospecting for diamonds in the conventional way, which is the most cost effective.

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

There is no alternative as the area has been selected because of the possible occurrence of alluvial diamonds due to geological sequence.

There can be many more positive impacts if Thunderflex 78 (Pty) Ltd are granted permission to continue prospecting over this area. The option to prospect the site can

have many positive impacts, in that 5 households will benefit from the income generated and thus improving their living standards. The area within which the proposed prospecting area is located is within a rural area that is known for big economic growth, because of its location. A prospecting right within this area will however further benefit the local economy because of the mines monthly expenditure that will contribute towards different service providers locally and nationally. Prospecting will also not adversely impend the landowner's use of its land since the potential area will be concurrently rehabilitated and will become available to grazing animals as it re-vegetates.

- i) 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 not alternative development location for the site and therefore the initial site locality is considered to be the final site locality. The impact assessment provided in section g(v) is therefore sufficient and the process undertaken to identify impacts is the same as in section g(vi).



**j) Assessment of each identified potentially significant impact and risk**

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

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

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE If not mitigated	MITIGATION TYPE	SIGNIFICANCE If mitigate
Roads	Air quality	Nuisance dust will be created by the drilling machine.	Prospecting	Low	<ul style="list-style-type: none"> <li>Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> </ul>	Very Low
	Fauna	Clearing of vegetation and disturbance during the construction of roads and drill pads.	Prospecting	Low	<ul style="list-style-type: none"> <li>All activities associated with the prospecting operation must be planned, where possible in order to encourage faunal dispersal and should minimise dissection</li> </ul>	Very Low

	<p><b>Habitat fragmentation</b> Prospecting activities could result in the loss of connectivity and fragmentation of natural habitat, which generally leads to the loss of migration corridors, in turn resulting in degeneration of the affected population’s genetic make-up. This impact will be most profound if characteristics of the natural watercourses are altered. However, due to the low invasive nature of drilling activities this impact is not expected to be significant.</p> <p><b>Disturbance, displacement and killing of fauna</b></p> <p>Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities.</p> <p>The transformation of natural habitats will result in the loss of</p>			<p>or fragmentation of any important faunal habitat type.</p> <ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• However, if any of the protected species are threatened by destruction, the relevant permits should be obtained followed by the relevant mitigation procedures stipulated in the permits.</li> </ul>	
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	<p>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. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls will negatively affect the local populations.</p> <p><b>Broadscale ecological processes</b> Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pan- and drainage line characteristics.</p> <p>Transformation of intact habitat on a cumulative basis would</p>			<ul style="list-style-type: none"> <li>• An Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance.</li> <li>• Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.</li> <li>• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</li> <li>• Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.</li> </ul>	
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		<p>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 grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.</p>				
	Flora	<p>Construction of roads and drill pads; vehicular movement.</p>	Prospecting	Low-Medium	<ul style="list-style-type: none"> <li>Minimise the footprint of transformation, by keeping to existing roads where possible.</li> </ul>	Low

		<p><b>Loss of indigenous vegetation</b> The construction of roads and drill pads will damage or destroy natural vegetation. It is expected that trampled vegetation will not be significantly affected and any destruction to natural vegetation will be at a very small scale, based on the low invasive nature of drilling activities. It is likely that areas of high ecological function will rehabilitate following such disturbance events. Vehicle traffic generates lots of dust which can reduce the growth success and seed dispersal of many small plant species; however traffic volumes associated with drilling activities are very low.</p> <p><b>Loss of Red data and/or protected floral species</b> Removal of listed or protected plant species during the</p>			<ul style="list-style-type: none"> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> <li>• All footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities.</li> <li>• It is recommended that these plants are identified and marked prior to intended activity.</li> <li>• These plants should, where possible, be incorporated into the activity layout and left in situ.</li> <li>• However, if threatened by destruction, these plants should be removed (with the relevant permits) and relocated if possible.</li> <li>• A management plan should be implemented to ensure proper establishment of ex situ</li> </ul>	
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		<p>construction of roads and drill pads and/or illegal harvesting</p> <p>It is possible that prospecting activities will destroy protected species and other species of conservation concern through construction of drill pads and roads, vehicular movement and if any illegal harvesting occurs.</p> <p><b>Introduction or spread of alien species</b> Clearing of vegetation and disturbance during the construction of roads and drill pads</p> <p>The extent of alien invasive species in the study area is unknown. However, general clearing of vegetation destroys natural vegetation, whereafter invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact</p>			<p>individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.</p> <ul style="list-style-type: none"> <li>• The appointment of an Environmental Control Officer 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. The environmental induction should occur in the appropriate languages for the workers who may require translation.</li> <li>• All those working on site must be educated about the conservation importance of the flora occurring on site.</li> <li>• Employ measures to ensure that no illegal harvesting takes place.</li> <li>• Minimise the footprint of transformation.</li> </ul>	
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		<p>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. However, based on the low invasive nature of drilling activities, this impact is not likely to occur during the proposed operation.</p> <p><b>Encouraging bush encroachment</b> Clearing of vegetation and disturbance during the construction of roads and drill pads.</p>			<ul style="list-style-type: none"> <li>• Encourage the growth of natural plant species.</li> <li>• Mechanical methods of control to be implemented if needed.</li> <li>• Annual follow-up operations to be implemented.</li> </ul>	
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		<p>The potential extent of bush encroaching species on site is unknown. While general clearing of the area and prospecting activities destroy natural vegetation, bush encroaching plants can increase due to their opportunistic nature in disturbed areas. If encroaching plants establish in disturbed areas, it may the lower potential for future land use and decrease biodiversity. With proper mitigation, the impacts can be substantially reduced and if any such species are removed during prospecting activities the prospecting operation can have a positive effect by reducing bush encroachment. Based on the low invasive nature of drilling activities, this impact is expected to be insignificant.</p> <p><b>Broadscale ecological processes</b></p> <p>Clearing of vegetation and disturbance during the</p>				
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		<p>construction of roads and drill pads; alterations to pan- and drainage line characteristics.</p> <p>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 grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the</p>				
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		proposed prospecting operation.				
	Surface Water	<ul style="list-style-type: none"> <li>• Drilling and stripping of vegetation resulting in a changed land profile.</li> <li>• Runoff from stockpiled soil and vegetation may contain high levels of silt.</li> <li>• Spillages that may occur on access and drill tracks may impact negatively on surface water quality. This issue is dealt with in the EMP.</li> <li>• A high potential of soil erosion exists due to an increased percentage of bare surfaces.</li> <li>• Possible leaching of polluted soil through infiltration and runoff resulting in surface water pollution.</li> <li>• Removal of vegetation could lead to erosion and sediment transportation.</li> </ul>	Prospecting	Low	<ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• The extent of the prospecting activities should be demarcated on site layout plans, and no</li> </ul>	Low

					<p>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.</p> <ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent surface water pollution.</li> <li>• Spill kits to clean up accidental spills from machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles and machinery should be regularly serviced and maintained.</li> <li>• Storm water control;</li> <li>• Clean &amp; dirty water plan.</li> </ul>	
	Ground water	No impact to groundwater is expected from the roads that	Prospecting	Low	<ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over</li> </ul>	Low

		<p>will be used by the planned prospecting operation.</p> <p>Hydrocarbon Spills Hydrocarbon spills from drill vehicles and fuel storage may contaminate the groundwater resource locally</p>			<p>suitable drip trays to prevent ground water pollution.</p> <ul style="list-style-type: none"> <li>• Spill kits to clean up accidental spills from the machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles should be regularly serviced and maintained.</li> <li>• Clean &amp; Dirty water system must be well maintained.</li> </ul>	
Noise	<p>Clearing of footprint areas for drilling, stripping and stockpiling of topsoil</p> <p>Construction of internal Roads</p> <p>Additional traffic to and from the mine</p> <p>Prospecting activities Drilling Removal of infra-structure (Temporary Ablution facility)</p>	Prospecting	Low	<ul style="list-style-type: none"> <li>• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary.</li> <li>• The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993.</li> <li>• The applicant will comply with the measures for good practice with regard to management of noise related impacts during prospecting.</li> <li>• The management objective will be to reduce any level of noise,</li> </ul>	Low	



					<p>shock and lighting that may have an effect on persons or animals.</p> <ul style="list-style-type: none"> <li>• 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, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.</li> <li>• Hearing protection will be available for all employees where attenuation cannot be implemented.</li> <li>• If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.</li> </ul> <p>Mechanical Equipment:</p> <ul style="list-style-type: none"> <li>• All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act.</li> </ul>	
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					<ul style="list-style-type: none"> <li>• All vehicles in operation will be equipped with a silencer on their exhaust system.</li> <li>• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated / adjusted.</li> </ul>	
	Soil	<p>Soil Erosion</p> <p>Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pans and drainage line characteristics.</p> <p>Vegetation will be stripped for construction of new roads and drill pads and these areas will be bare and susceptible to erosion. Any topsoil and overburden that is stripped and piled on surrounding areas can be eroded by wind, rain and flooding. The soil/sediments will be carried away during runoff. The affected areas should be rehabilitated, but full restoration might only occur over a number</p>	Prospecting	Low	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• Topsoil must not be handled when the moisture content exceeds 12 %.</li> <li>• Topsoil stockpiles must be kept separate from sub-soils.</li> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take</li> </ul>	Low

		of years, subsequent to the re-establishment of vegetation and hydrologic regime			<p>place as soon as possible, once activities in the area have ceased.</p> <ul style="list-style-type: none"> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>	
	Topography	<p>Changes to surface topography</p> <p>Construction of roads and drill pads as well as temporary ablation facilities</p>	Prospecting	Low	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the</li> </ul>	Low

					<p>quality of the topsoil is not impaired.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>	
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	Visual	<p>The drill tracks will be visible to some extent from the immediate surroundings.</p> <p>The design of the proposed prospecting development will determine the visual impact. As the prospecting will only entail drilling the visual impact would be low.</p>	Prospecting	Low	<ul style="list-style-type: none"> <li>• Replacing layer of topsoil over backfilled areas;</li> <li>• Sloping of rehabilitated and disturbed areas;</li> <li>• Removal of all infrastructures upon mine closure.</li> </ul>	Low
Drilling	Air quality	Nuisance dust will be created by the drilling machine.	Prospecting	Low	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> </ul>	Very Low
	Fauna	<p>Clearing of vegetation and disturbance during the construction of roads and drill pads.</p> <p><b>Habitat fragmentation</b></p>	Prospecting	Low-Medium	<ul style="list-style-type: none"> <li>• All activities associated with the prospecting operation must be planned, where possible in order to encourage faunal dispersal and should minimise dissection</li> </ul>	Low

		<p>Prospecting activities could result in the loss of connectivity and fragmentation of natural habitat, which generally leads to the loss of migration corridors, in turn resulting in degeneration of the affected population’s genetic make-up. This impact will be most profound if characteristics of the natural watercourses are altered. However, due to the low invasive nature of drilling activities this impact is not expected to be significant.</p> <p><b>Disturbance, displacement and killing of fauna</b></p> <p>Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities.</p> <p>The transformation of natural habitats will result in the loss of micro habitats, affecting</p>			<p>or fragmentation of any important faunal habitat type.</p> <ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• However, if any of the protected species are threatened by destruction, the relevant permits should be obtained followed by the relevant mitigation procedures stipulated in the permits.</li> </ul>	
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		<p>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. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls will negatively affect the local populations.</p> <p><b>Broadscale ecological processes</b> Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pan- and drainage line characteristics.</p> <p>Transformation of intact habitat on a cumulative basis would contribute to the fragmentation</p>			<ul style="list-style-type: none"> <li>• An Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance.</li> <li>• Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.</li> <li>• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</li> <li>• Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.</li> </ul>	
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		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 grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.				
	Flora	Construction of roads and drill pads; vehicular movement.  <b>Loss of indigenous vegetation</b>	Prospecting	Low-Medium	<ul style="list-style-type: none"> <li>Minimise the footprint of transformation, by keeping to existing roads where possible.</li> </ul>	Low

		<p>The construction of roads and drill pads will damage or destroy natural vegetation. It is expected that trampled vegetation will not be significantly affected and any destruction to natural vegetation will be at a very small scale, based on the low invasive nature of drilling activities. It is likely that areas of high ecological function will rehabilitate following such disturbance events. Vehicle traffic generates lots of dust which can reduce the growth success and seed dispersal of many small plant species; however traffic volumes associated with drilling activities are very low.</p> <p><b>Loss of Red data and/or protected floral species</b> Removal of listed or protected plant species during the construction of roads and drill pads and/or illegal harvesting</p>			<ul style="list-style-type: none"> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> <li>• All footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities.</li> <li>• It is recommended that these plants are identified and marked prior to intended activity.</li> <li>• These plants should, where possible, be incorporated into the activity layout and left in situ.</li> <li>• However, if threatened by destruction, these plants should be removed (with the relevant permits) and relocated if possible.</li> <li>• A management plan should be implemented to ensure proper establishment of ex situ</li> </ul>	
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		<p>It is possible that prospecting activities will destroy protected species and other species of conservation concern through construction of drill pads and roads, vehicular movement and if any illegal harvesting occurs.</p> <p><b>Introduction or spread of alien species</b></p> <p>Clearing of vegetation and disturbance during the construction of roads and drill pads</p> <p>The extent of alien invasive species in the study area is unknown. However, general clearing of vegetation destroy natural vegetation, wherafter invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien</p>			<p>individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.</p> <ul style="list-style-type: none"> <li>• The appointment of an Environmental Control Officer 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. The environmental induction should occur in the appropriate languages for the workers who may require translation.</li> <li>• All those working on site must be educated about the conservation importance of the flora occurring on site.</li> <li>• Employ measures to ensure that no illegal harvesting takes place.</li> <li>• Minimise the footprint of transformation.</li> </ul>	
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	<p>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. However, based on the low invasive nature of drilling activities, this impact is not likely to occur during the proposed operation.</p> <p><b>Encouraging bush encroachment</b> Clearing of vegetation and disturbance during the construction of roads and drill pads</p> <p>The potential extent of bush encroaching species on site is</p>			<ul style="list-style-type: none"> <li>• Encourage the growth of natural plant species.</li> <li>• Mechanical methods of control to be implemented if needed.</li> <li>• Annual follow-up operations to be implemented.</li> </ul>	
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	<p>unknown. While general clearing of the area and prospecting activities destroy natural vegetation, bush encroaching plants can increase due to their opportunistic nature in disturbed areas. If encroaching plants establish in disturbed areas, it may the lower potential for future land use and decrease biodiversity. With proper mitigation, the impacts can be substantially reduced and if any such species are removed during prospecting activities the prospecting operation can have a positive effect by reducing bush encroachment. Based on the low invasive nature of drilling activities, this impact is expected to be insignificant.</p> <p><b>Broadscale ecological processes</b></p> <p>Clearing of vegetation and disturbance during the construction of roads and drill</p>				
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	<p>pads; alterations to pan- and drainage line characteristics.</p> <p>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 grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the</p>				
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		proposed prospecting operation.				
	Surface Water	<ul style="list-style-type: none"> <li>• Drilling and stripping of vegetation resulting in a changed land profile.</li> <li>• Runoff from stockpiled soil and vegetation may contain high levels of silt.</li> <li>• Spillages that may occur on access and drill tracks may impact negatively on surface water quality. This issue is dealt with in the EMP.</li> <li>• A high potential of soil erosion exists due to an increased percentage of bare surfaces.</li> <li>• Possible leaching of polluted soil through infiltration and runoff resulting in surface water pollution.</li> </ul> <p>Removal of vegetation could lead to erosion and sediment transportation.</p>	Prospecting	Low	<ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• The extent of the prospecting activities should be demarcated on site layout plans, and no</li> </ul>	Low

					<p>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.</p> <ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent surface water pollution.</li> <li>• Spill kits to clean up accidental spills from machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles and machinery should be regularly serviced and maintained.</li> <li>• Storm water control;</li> <li>• Clean &amp; dirty water plan.</li> </ul>	
	Ground water	No impact to groundwater is expected from the roads that	Prospecting	Low	<ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over</li> </ul>	Low

		<p>will be used by the planned prospecting operation.</p> <p>Hydrocarbon Spills Hydrocarbon spills from drill vehicles and fuel storage may contaminate the groundwater resource locally</p>			<p>suitable drip trays to prevent ground water pollution.</p> <ul style="list-style-type: none"> <li>• Spill kits to clean up accidental spills from the machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles should be regularly serviced and maintained.</li> <li>• Clean &amp; Dirty water system must be well maintained.</li> </ul>	
	Noise	<p>Clearing of footprint areas for drilling, stripping and stockpiling of topsoil</p> <p>Construction of internal Roads</p> <p>Additional traffic to and from the mine</p> <p>Prospecting activities Drilling Removal of infra-structure(Temporary Ablution facility)</p>	Prospecting	Low	<ul style="list-style-type: none"> <li>• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary.</li> <li>• The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993.</li> <li>• The applicant will comply with the measures for good practice with regard to management of noise related impacts during construction and operation.</li> <li>• The management objective will be to reduce any level of noise,</li> </ul>	Low

					<p>shock and lighting that may have an effect on persons or animals.</p> <ul style="list-style-type: none"> <li>• 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, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.</li> <li>• Hearing protection will be available for all employees where attenuation cannot be implemented.</li> <li>• If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.</li> </ul> <p><b>Mechanical Equipment:</b></p> <ul style="list-style-type: none"> <li>• All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act.</li> </ul>	
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					<ul style="list-style-type: none"> <li>• All vehicles in operation will be equipped with a silencer on their exhaust system.</li> <li>• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.</li> </ul>	
	Soil	<p>Soil Erosion</p> <p>Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pans and drainage line characteristics.</p> <p>Vegetation will be stripped for construction of new roads and drill pads and these areas will be bare and susceptible to erosion. Any topsoil and overburden that is stripped and piled on surrounding areas can be eroded by wind, rain and flooding. The soil/sediments will be carried away during runoff. The affected areas should be rehabilitated, but full restoration might only occur over a number</p>	Prospecting	Low	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• Topsoil must not be handled when the moisture content exceeds 12 %.</li> <li>• Topsoil stockpiles must be kept separate from sub-soils.</li> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take</li> </ul>	Very Low

		of years, subsequent to the re-establishment of vegetation and hydrologic regime			<p>place as soon as possible, once activities in the area have ceased.</p> <ul style="list-style-type: none"> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>	
	Topography	<p>Changes to surface topography</p> <p>Construction of roads and drill pads as well as temporary ablation facilities</p>	Prospecting	Low	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the</li> </ul>	Low

					<p>quality of the topsoil is not impaired.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>	
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**k) Summary of specialist reports**

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

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
<p><b>Ecological Assessment Report Thunderflex 78 (Pty) Ltd Turksvypan Diamond Prospecting Operation By Boscia Ecological Consulting</b></p> <p><b>March 2020</b></p> <p><b>Appendix 4</b></p>	<p>Five plant communities potentially occur on site of which the ephemeral drainage lines and ephemeral pans are considered to be of very high sensitivity. The plant community associated with the hills are considered to be of high sensitivity, while the plains of the study area are considered to be of medium sensitivity. No profound impacts are expected to be related to the proposed prospecting operation due to the low invasive nature of drilling activities. However, the most likely impacts are expected to be related to the disruption of the hydrological regime if any of the ephemeral pans or pan catchments are modified through road creation or drill pad establishment.</p> <p>Species of conservation concern that are likely to be found in the prospecting area include <i>Olea europaea</i> subsp. <i>africana</i>, <i>Gymnosporia buxifolia</i>, <i>Deverra burchellii</i>, <i>Euphorbia duseimata</i>, <i>Vachellia erioloba</i>, <i>Ruschia griquensis</i>, <i>R. hamata</i> and <i>Boscia albitrunca</i>. The prospecting operation might result in the large-scale clearance of indigenous vegetation. Permit applications regarding protected flora as well as the harvesting of</p>	X	J

	<p>indigenous vegetation need to be lodged with the Northern Cape Department of Environment and Nature Conservation three months prior to any clearance of vegetation.</p> <p>Similarly, if any of the <i>Boscia albitrunca</i> or <i>Vachellia erioloba</i> trees are to be affected, a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to these trees.</p> <p>To conclude, disturbances to the natural habitat and associated fauna within the study area are inevitable. However, the significance of the impacts is low due to the low invasive nature of drilling activities. Nevertheless, any significance of the impacts will be affected by the success of the mitigation measures implemented and the rehabilitation programme for the prospecting area. In my opinion, authorisation for the proposed operation should be granted. However, the applicant should still commit to the adherence of effective avoidance, management, mitigation and rehabilitation measures.</p>		
<p><b>PHASE I HERITAGE IMPACT ASSESSMENT IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT NO 25/1999 FOR THE PROPOSED PROSPECTING AND MINING RIGHT ON THE REMAINING EXTENT OF THE FARM MESNARD 38,</b></p>	<p><b>CONCLUSION AND RECOMMENDATIONS</b>                  In light of this desk assessment, the mine prospecting can go ahead. The study is mindful that some important discoveries may be made during the prospecting and mining phases. If this will happen, the procedure is to halt operations, notify the provincial heritage resources authority or SAHRA in order for an investigation and evaluation of the finds to take place.</p>	<p>X</p>	

<p>FARM ROOIPAN 43, FARM LA PROVENCE 51, REMAINING EXTENT AND PORTION 1 (TURKSVYPAN) OF THE FARM 52, PORTION 1 OF THE FARM HOPEFIELD ESTATE 552, REMAINING EXTENT OF THE FARM 565 IN THE SIYANCUMA LOCAL MUNICIPALITY, NORTHERN CAPE</p> <p>Prepared by Edward Matenga (PhD Archaeology &amp; Heritage, MPhil, Archaeology; Uppsala /Sweden)</p> <p>Appendix 5</p> <p>05 October 2020</p>			
<p>Palaeontological Impact Assessment for the proposed Prospecting and Mining Rights application by Thunderflex 78, north east of Griekwastad, Northern Cape Province</p> <p>Desktop Study</p> <p>For</p> <p>Archaeological and Heritage Services Africa (Pty) Ltd</p> <p>By</p>	<p><b>Recommendation</b></p> <p>Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the surface limestones or loose sands of the Quaternary. There is a very small chance that trace fossils such as stromatolites may occur in the Lime Acres Member. BIF does not preserve fossils although indicated as such in the SAHRIS map.</p> <p>Since there is a small chance of finding stromatolites, or bones and wood in pans, a Fossil Chance Find Protocol should be added to the EMPr: if fossils are found once drilling or mining has</p>	<p>X</p>	

October 12, 2020

**[BASIC ASSESSMENT REPORT AND EMPR FOR THUNDERFLEX 78  
(PTY) LTD]**

Prof Marion Bamford Palaeobotanist P Bag 652, WITS 2050 Johannesburg, South Africa Marion.bamford@wits.ac.za  03 October 2020  APPENDIX 5	commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.		
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Attach copies of the Specialist Reports as appendices

## I) Environmental impact statement

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

The prospecting operation is definitely going to have an impact on the environment. The main impacts relates to topography, geology, soil, vegetation, land use and land capability.

The application is for drilling to establish if there are potential viable resources of diamonds to mine. This will be done over a 5 year period.

The existing land-use is cattle farming, and while prospecting is on-going the farm will still be able to be used as grazing for the cattle. Only a small portion will be disturbed if the drilling phase of the Prospecting Right is to be continued.

The conservation of topsoil is of utmost importance and therefore in order ensure a sustainable land use again on the areas to be prospected the top 15 – 30cm if available need to be removed prior to any prospecting, drilling. This will be used as growth medium during the rehabilitation phase of the drill sites. Topsoil should be stored in a berm wall on the border of each drill hole in order to divert any surface runoff during a rain event.

Other environmental impacts relate to day to day prospecting and could easily be managed with sound housekeeping rules such as dust and noise.

The only buffers that must be implemented is the 100m away from any fixed infrastructure like the tar road and the farm house and out buildings in terms of Mine Health and Safety Act, 1996) Regulations relating to surveying, mapping and mine plans. These regulations states that a mine must take reasonable measures to ensure that –

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

**(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**

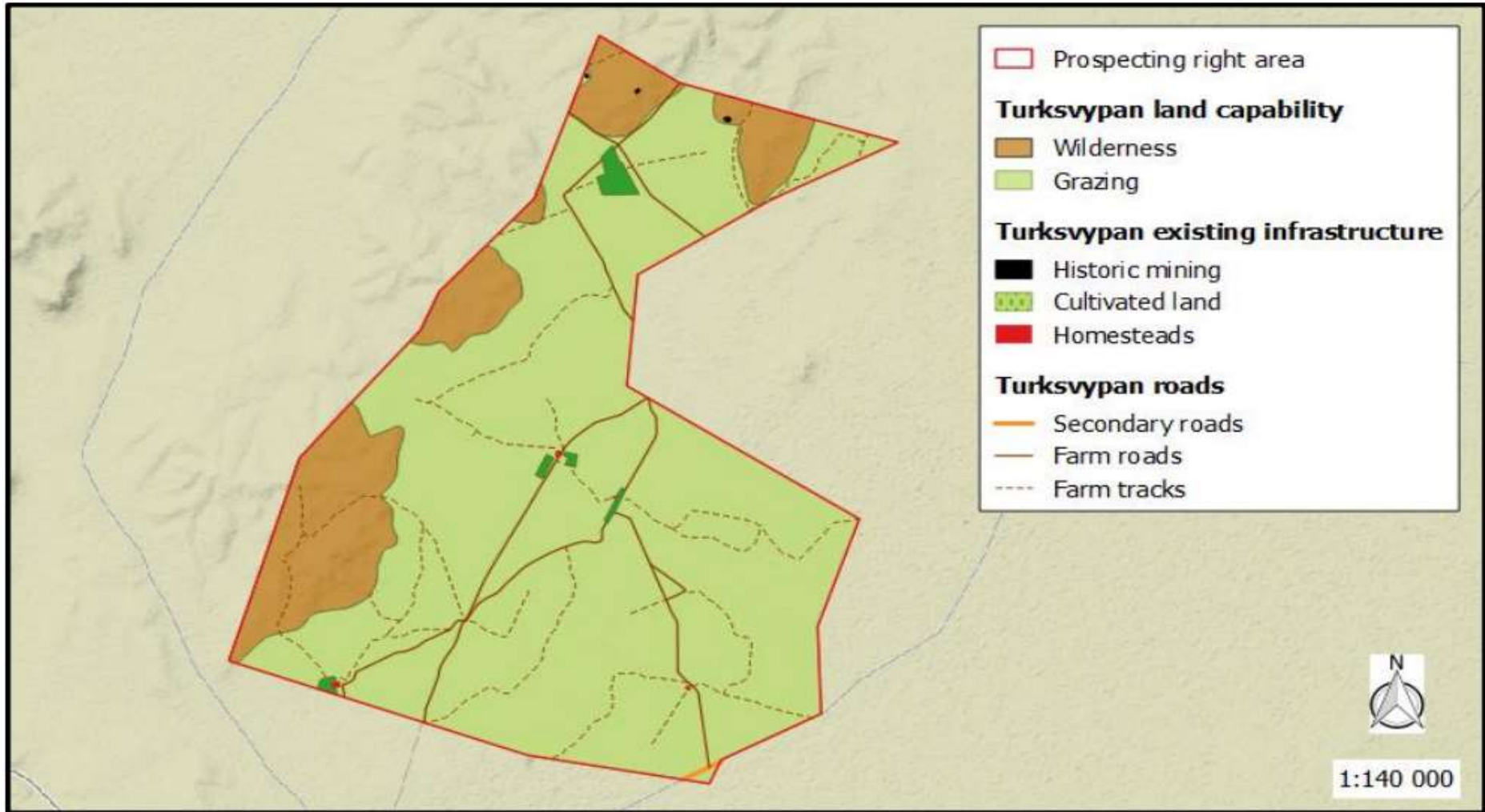


Figure 17. Final Site map.



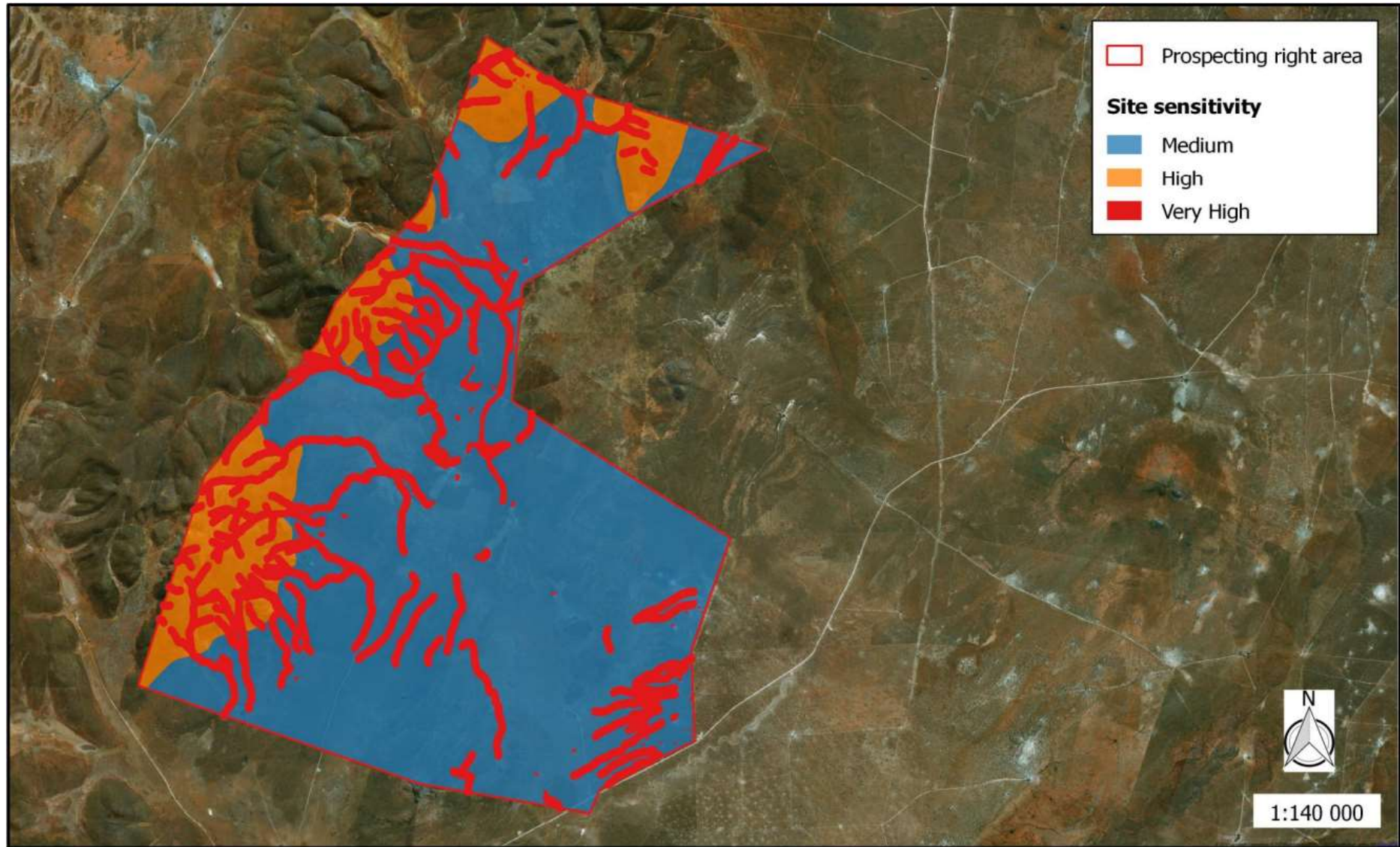


Figure 18. Sensitivity map



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

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

Although this is only a prospecting operation it will provide 5 jobs when drilling is reached. This will also add to the increased economic activity and area surrounding the farm.

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

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

The specific occurrence of diamonds in the area dictates the selection of the specific prospecting site.

**m) 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.

The main closure objective of Thunderflex 78 (Pty) Ltd. planned prospecting operation is to restore the site to its current land capability in a sustainable manner.

- To prevent the sterilization of any reserves.
- To prevent the establishment of any permanent structures or features except where the owners have indicated that they would prefer structures to be left.
- The prospecting operation also has the objective to establish a stable and self-sustainable vegetation cover if necessary.
- To limit and rehabilitate any erosion features and prevent any permanent impact to the soil capability of the prospecting operation.
- To limit and manage the visual impact of the prospecting operation.
- To safeguard the safety and health of humans and animals on the prospecting operation.
- The last closure objective is that the prospecting operation is closed efficiently, cost effectively and in accordance with government policy.

***Rehabilitation Plan***

***Infrastructure Areas:***

On completion of the prospecting operation, the various surfaces, including the access road, the office area, storage areas and the ablution facilities, will finally be rehabilitated as follows:-

- ❖ All remaining material on the surface will be removed to the original topsoil level. This material will then be backfilled into the depressions. Any compacted area will then be ripped to a depth of 300mm if necessary and where possible, the topsoil or growth medium returned and landscaped.
- ❖ All infrastructures, equipment, ablution facilities 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, which states:-
  1. *Regulation 44: When a prospecting right, mining right, retention permit or mining permit lapses, is cancelled or is abandoned or when any prospecting or mining operation comes to an end, the holder of such right or permit may not demolish or remove any building, structure or object –*
    - (a) *which may not be demolished or removed in terms of any other law;*
    - (b) *which has been identified in writing by the Minister for purposes of this section; or*
    - (c) *which is to be retained in terms of an agreement between the holder and the owner or occupier of the land, which agreement has been approved by the Minister in writing.*
  2. *The provision of subsection (1) does not apply to bona fide mining equipment, which may be removed.*

#### Topsoil:

- ❖ **Disposal Facilities:-**

Waste material of all description inclusive of receptacles, scrap, rubble and tyres will be removed entirely from the prospecting area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- ❖ **Ongoing Seepage, Control of Rain Water:-**

No monitoring of ground or surface water will take place, except if so requested by the DWS – Kimberley.
- ❖ **Long Term Stability and Safety:-**

It will be the objective of mine management to ensure the long term stability of all rehabilitated areas including the backfilled drill holes / depressions. This will 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 planned.

#### Final Rehabilitation Roads:-

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

Submission of Information:-

- ❖ Reports on rehabilitation and monitoring will be submitted annually to the Department of Mineral Resources – Kimberley, as described in Regulation 55.

Maintenance (Aftercare):-

- ❖ Maintenance after closure will mainly concern the regular inspection and monitoring and/or completion of the re-vegetation programme.
- ❖ The aim of the 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 will be to create an acceptable post-mine (prospecting) environment and land-use. Therefore all agreed commitments will be implemented by Mine Management.

After-effects Following Closure:-

- ❖ Acid Mine Drainage:-  
No potential for bad quality leachate or acid mine drainage development exists after 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 will be to obtain a self-sustaining and stable end result. Cleaning of all drill chip material concurrently and replacing of topsoil where available.

**n) Aspects for inclusion as conditions of Authorisation**

Any aspects which must be made conditions of the Environmental Authorisation

All activities associated with the prospecting operation must be planned.

- a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to these trees.
- No activities should take place in the ephemeral wetlands.
- 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.
- Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.

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

(Which relate to the assessment and mitigation measure proposed)

Due to the nature of a desktop survey and the lack of ground-truth information, the species list reflected in this report cannot be regarded as entirely accurate or comprehensive. Ideally, a site

should be visited at least once to compare desktop information with information on site as well as to ensure actual habitats and associated species present on site are recorded.

However, an extensive desktop review was conducted to ensure a fairly accurate representation of the study area. This is assumed to be sufficient to support this environmental authorisation application, because the proposed operation is primarily non-invasive with a likelihood of minor disturbances produced by the drilling operation.

**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.**

In my opinion, authorisation for the proposed operation can be granted. 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 and the applicant should take all the necessary steps to ensure that the prospecting operation complies with the conditions set out in the approval of the EMPR.

**ii) Conditions that must be included in the authorisation.**

Disturbances to the natural habitat and associated fauna within the study area are likely. However, the significance of the impacts is low due to the low invasive nature of drilling activities. Nevertheless, any significance of the impacts will be affected by the success of the mitigation measures implemented and the rehabilitation programme for the prospecting area. In my opinion, authorisation for the proposed operation can be granted. However, the applicant should still commit to the adherence of effective avoidance, management, mitigation, rehabilitation measures and the implementation of the EMPR.

**q) Period for which the Environmental Authorisation is required**

It is required for 5 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 Basis Assessment Report and the Environmental Management Programme Report.

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

**s) Financial Provision**

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

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
<b>Remark:</b>							
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	15,68	1	1	-
2 (A)	Demolition of steel buildings and structures	m2	25	218,41	1	1	5 460,25
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	321,86	1	1	-
3	Rehabilitation of access roads	m2	1000	37,00	1	1	37 000,00
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	379,34	1	1	-
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	206,91	1	1	-
5	Demolition of housing and/or administration facilities	m2	0	436,81	1	1	-
6	Opencast rehabilitation including final voids and ramps	ha	5	222 313,32	0,04	1	44 462,66
7	Sealing of shafts adits and inclines	m3	0	117,25	1	1	-
8 (A)	Rehabilitation of overburden and spoils	ha	0	152 653,61	1	1	-
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	190 127,32	1	1	-
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	552 219,84	1	1	-
9	Rehabilitation of subsided areas	ha	0	127 824,41	1	1	-
10	General surface rehabilitation	ha	0	120 927,41	1	1	-
11	River diversions	ha	0	120 927,41	1	1	-
12	Fencing	m	0	137,94	1	1	-
13	Water management	ha	0	45 980,00	1	1	-
14	2 to 3 years of maintenance and aftercare	ha	0	16 093,00	1	1	-
15 (A)	Specialist study	Sum	0			1	-
15 (B)	Specialist study	Sum	0			1	-
<b>Sub Total 1</b>							<b>86 922,91</b>
1	Preliminary and General			5 215,37		<b>weighting factor 2</b> 1,05	5 476,14
2	Contingencies				8692,2914		8 692,29
<b>Subtotal 2</b>							<b>101 091,35</b>
<b>VAT (15%)</b>							<b>15 163,70</b>
<b>Grand Total</b>							<b>116 255,05</b>

**i) Explain how the aforesaid amount was derived**

The quantum of the financial provision contemplated in Regulation 54 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) will be revised and adjusted accordingly annually, based on a survey assessment of the environmental liability of Thunderflex 78 (Pty) Ltd. Logging and surveys of drill holes are conducted by a registered surveyor and results are forwarded to the Environmental Manager who calculates the outstanding rehabilitation as per the agreed rate in the DMR Guideline. A bank guarantee is prepared for the amount and submitted to the DMR.

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

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

(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)

Thunderflex 78 (Pty) Ltd. will fund the operation; please see last audited financial statements to undertake prospecting operations.

**t) Specific information required by the competent Authority****i) Compliance with the provisions of sections 24 (4)(a) and (b) read with section 24 (3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998), the EIA Report must include the:-****(1) Impact on the socio-economic conditions of any directly affected person** (Provide the results of investigation, assessment, and evaluation of the impact of the mining, 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 an **Appendix**)

Socio-economic upliftment will take place due to the creation of employment opportunities as well as economic support to the surrounding business community.

- (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)

**Heritage:**

Dr. Edward Matenga from (AHSA) Archaeological and Heritage Services Africa (Pty) Ltd Consultants has been appointed by Thunderflex 78 to provide an Heritage Assessment report in order to highlight the heritage characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the application area.

The following is an outline of the heritage sensitivity of the area:

**The Stone Age**

Stone Age material is widely distributed in the area and a wide range of tools are represented - scrapers, blades, cores and flakes – principally dating from the Middle Stone Age to the Late Stone Age. It is possible that the handaxe and cleaver found date to the transition period from the Early Stone Age to the Middle Stone 250 000 year ago. The artefacts are sparsely distributed and no significant concentrations of artefacts were observed. This pattern seems to indicate general hunter-gatherer activity in the area over time, rather than representing dedicated workshops or regular occupation sites. None of the finds therefore warrant further action.

**The Early Iron Age**

No sites dating to the Iron Age were found.

**The Later Iron Age**

No sites dating to the LIA were found.

**Early Commercial Farming**

There are some buildings of interest at the La Provence farmstead (LPV01, LPV3), which will not be affected by the proposed development.

**Graves and burial grounds**

No graves or burial grounds were recorded.

**General observations**



At the time of the field excursion, access had been granted to the Farm La Provence and the Farm 38/RE. The owner of the latter property was not available at the last minute when we approached the locked main entrance gate, and his mobile phone was not being answered.

As partial compensation for the limited access to the properties, and in order to assess the heritage sensitivity of the broader area we deliberately extended the survey into Farm 50/RE situated immediately south of La Provence, where access was granted.

General observations and postulated heritage sensitivity of the portions that were not surveyed

It is an established fact that the broader area was home to MSA/LSA hunter gatherer communities who left behind stone tools and flake waste which commonly occur. MSA/LSA tools have been recorded in all surveys conducted by the specialist in the area. No occurrences have been deemed highly significant to warrant further action beyond primary documentation.

#### **Conclusion and recommendations**

In light of the findings of the ground survey and desk assessment, the mine prospecting can go ahead. The study is mindful that some important discoveries may be made during the prospecting and mining phases. If this will happen, the procedure is to halt operations, notify the provincial heritage resources authority or SAHRA in order for an investigation and evaluation of the finds to take place.

#### **Palaeontological**

Prof Marion Bamford was appointed by Dr. Edward Matenga from (AHSA) Archaeological and Heritage Services Africa (Pty) Ltd Consultants to provide an Palaeontological Impact Assessment report in order to highlight the palaeontological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the application area.

A palaeontological Impact Assessment was requested for the proposed Prospecting and Mining Rights application on the remaining extent of the Farm Mesnard 28, Farm Rooioan 43, Farm La Provence 5, Remaining Extent and Portion 1 (Turksvypan) of the Farm 52, Portin 1 of the Farm Hopefield Estate 552 and Remaining Extent of the Farm 565. This cluster of farms is northeast of Griquastad and the project is for Thunderflex 78 (Pty) Ltd.

To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No.

25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed rights applications.

The proposed site lies on the potentially moderately fossiliferous Lime Acres Member, and Quaternary Limestone – based on the geology and recommendation of the Western Cape Palaeotechnical Report. The SAHRIS palaeosensitivity report incorrectly assigned the Kuruman Formation as very highly sensitive; BIF does not preserve fossils. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no palaeontological site visit is required for the Prospecting Activities unless fossils are found by the geologist or responsible person. If mining is to be opencast then a site visit will be necessary so that a representative sample of fossils can be removed by a palaeontologist.

#### **Recommendation**

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the surface limestones or loose sands of the Quaternary. There is a very small chance that trace fossils such as stromatolites may occur in the Lime Acres Member. BIF does not preserve fossils although indicated as such in the SAHRIS map.

Since there is a small chance of finding stromatolites, or bones and wood in pans, a Fossil Chance Find Protocol should be added to the EMPr: if fossils are found once drilling or mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.

#### **Chance Find Protocol**

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

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations/mining commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. 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.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.

5. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or stromatolites 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 the mining operation is to open cast and in the highly sensitive area, then a site visit by a palaeontologist will be necessary in order to remove and preserve a representative collection.

**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 identified with 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 requirements for the provision of the details and expertise of the EAP are already included in PART A, section 1(a).

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

I hereby confirm that the requirements to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section 1(h).

Confirmed (Mark with an X)	X
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- 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)

The only buffers that must be implemented is the 100m away from any fixed infrastructure like the roads and the farm house and out buildings in terms of Mine Health and Safety Act, 1996) Regulations relating to surveying, mapping and mine plans. These regulations states that a mine must take reasonable measures to ensure that –

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

There is a 15.5m building and tree restriction on either side of the 132kV power lines which must be adhered to in all future developments and or construction. Eskom's rights are protected by Wayleave.

The most profound impacts are expected to be related to the loss of plant species of conservation concern as well as the disruption of ecological corridors and the hydrological regime if the ephemeral pans and ephemeral drainage lines are modified through road creation or drill pad establishment. Buffers must be kept from all ephemeral pans and ephemeral drainage lines.

Please see Final Site Map.

**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)

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 although none is anticipated except for the chemical toilet

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

- To ensure the infrastructure identified for removal is successfully demolished and removed.
- To ensure that infrastructure identified to remain after mine closure is maintained until the issue of a closure certificate.

Maintenance

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

- Such processes include erosion of the rehabilitated surfaces, surface water drainage, air quality, surface water quality, ground water quality, vegetative re-growth, weed encroachment.
- The closure plan will be reviewed yearly.

- Rehabilitation of the land will be maintained until a closure certificate is granted or until the land use is regarded as sustainable.
- All rehabilitated areas will be monitored and maintained until such time as required to enable the mine to apply for closure of these different areas.

#### Performance Assessments

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

- Implement the necessary monitoring programmes, as discussed as part of the EMPR;
- Conduct performance assessments of this EMPR as required by the MPRDA and associated Regulations; and
- Compile and submit the afore-mentioned performance assessment reports to the DMR. The frequency of the performance assessments will occur every second year. An independent and competent person will undertake all performance assessments.

#### Decommissioning and Closure Objectives

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

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

#### Negative Economic Impacts

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

- Thunderflex will undertake a carefully planned step-wise decommissioning process.
- Closure planning will form an integral part of planning.
- The main closure objective of Thunderflex planned prospecting operation is to restore the site to its current land capability in a sustainable manner.
- To prevent the establishment of any permanent structures or features except where the owners have indicated that they would prefer structures to be left.
- The prospecting operation also has the objective to establish a stable and self-sustainable vegetation cover if necessary.
- To limit and rehabilitate any erosion features and prevent any permanent impact to the soil capability of the prospecting operation.
- To limit and manage the visual impact of the prospecting operation.
- To safeguard the safety and health of humans and animals on the prospecting operation.
- The last closure objective is that the prospecting operation is closed efficiently, cost effectively and in accordance with government policy.

**ii) Volumes and rate of water use required for the operation**

The operation would require about 250 litres per day for drinking water. No water for the drilling is required.

**iii) Has a water use licence been applied for?**

No Water will be used for the drilling operation. Only a small amount of water will be used for drinking purposes of the workers.



## iv) Impact to be mitigated in their respective phases

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

ACTIVITY AND PHASE	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION OR CONTROL MEASURE RELATED TO COMPLIANCE WITH STANDARDS
Roads Construction, operational and decommissioning	Air quality  Nuisance dust will be created by the drilling machine.	Local On-site	<ul style="list-style-type: none"> <li>Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> </ul>
	Fauna  Clearing of vegetation and disturbance during the construction of roads and drill pads.  Habitat fragmentation Prospecting activities could result in the loss of connectivity and fragmentation of natural habitat, which generally leads to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This impact will be most	Local Regional	<ul style="list-style-type: none"> <li>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.</li> <li>No activities should take place in the ephemeral wetlands.</li> <li>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.</li> </ul>

	<p>profound if characteristics of the natural watercourses are altered. However, due to the low invasive nature of drilling activities this impact is not expected to be significant.</p> <p>Disturbance, displacement and killing of fauna</p> <p>Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities.</p> <p>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. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls will negatively affect the local populations.</p> <p>Broadscale ecological processes Clearing of vegetation and disturbance during the construction of roads and drill pads;</p>		<ul style="list-style-type: none"> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• However, if any of the protected species are threatened by destruction, the relevant permits should be obtained followed by the relevant mitigation procedures stipulated in the permits.</li> <li>• An Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance.</li> <li>• Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.</li> <li>• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</li> <li>• Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.</li> </ul>
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	<p>alterations to pan- and drainage line characteristics.</p> <p>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 grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.</p>		
	<p>Flora</p> <p>Construction of roads and drill pads; vehicular movement.</p> <p>Loss of indigenous vegetation</p>	<p>Local and Regional</p>	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings</li> </ul>

	<p>The construction of roads and drill pads will damage or destroy natural vegetation. It is expected that trampled vegetation will not be significantly affected and any destruction to natural vegetation will be at a very small scale, based on the low invasive nature of drilling activities. It is likely that areas of high ecological function will rehabilitate following such disturbance events. Vehicle traffic generates lots of dust which can reduce the growth success and seed dispersal of many small plant species; however traffic volumes associated with drilling activities are very low.</p> <p>Loss of Red data and/or protected floral species Removal of listed or protected plant species during the construction of roads and drill pads and/or illegal harvesting</p> <p>It is possible that prospecting activities will destroy protected species and other species of conservation concern through construction of drill pads and roads, vehicular movement and if any illegal harvesting occurs.</p> <p>Introduction or spread of alien species Clearing of vegetation and disturbance during the construction of roads and drill pads</p>		<p>where major vegetation clearance has taken place.</p> <ul style="list-style-type: none"> <li>• All footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities.</li> <li>• It is recommended that these plants are identified and marked prior to intended activity.</li> <li>• These plants should, where possible, be incorporated into the activity layout and left in situ.</li> <li>• However, if threatened by destruction, these plants should be removed (with the relevant permits) and relocated if possible.</li> <li>• A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.</li> <li>• The appointment of an Environmental Control Officer 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. The environmental induction should occur in the appropriate languages for the workers who may require translation.</li> </ul>
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	<p>The extent of alien invasive species in the study area is unknown. However, general clearing of vegetation destroy natural vegetation, wherafter invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced. However, based on the low invasive nature of drilling activities, this impact is not likely to occur during the proposed operation.</p> <p>Encouraging bush encroachment Clearing of vegetation and disturbance during the construction of roads and drill pads</p> <p>The potential extent of bush encroaching species on site is unknown. While general</p>		<ul style="list-style-type: none"> <li>• All those working on site must be educated about the conservation importance of the flora occurring on site.</li> <li>• Employ measures to ensure that no illegal harvesting takes place.</li> <li>• Minimise the footprint of transformation.</li> <li>• Encourage the growth of natural plant species.</li> <li>• Mechanical methods of control to be implemented if needed.</li> <li>• Annual follow-up operations to be implemented.</li> </ul>
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	<p>clearing of the area and prospecting activities destroy natural vegetation, bush encroaching plants can increase due to their opportunistic nature in disturbed areas. If encroaching plants establish in disturbed areas, it may the lower potential for future land use and decrease biodiversity. With proper mitigation, the impacts can be substantially reduced and if any such species are removed during prospecting activities the prospecting operation can have a positive effect by reducing bush encroachment. Based on the low invasive nature of drilling activities, this impact is expected to be insignificant.</p> <p>Broadscale ecological processes</p> <p>Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pan- and drainage line characteristics.</p> <p>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</p>		
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	<p>fluctuations. The grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.</p>		
	<p>Surface Water</p> <ul style="list-style-type: none"> <li>• Drilling and stripping of vegetation resulting in a changed land profile.</li> <li>• Runoff from stockpiled soil and vegetation may contain high levels of silt.</li> <li>• Spillages that may occur on access and drill tracks may impact negatively on surface water quality. This issue is dealt with in the EMP.</li> <li>• A high potential of soil erosion exists due to an increased percentage of bare surfaces.</li> <li>• Possible leaching of polluted soil through infiltration and runoff resulting in surface water pollution.</li> </ul>	<p>On-site Local</p>	<ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> </ul>



	<ul style="list-style-type: none"> <li>Removal of vegetation could lead to erosion and sediment transportation.</li> </ul>		<ul style="list-style-type: none"> <li>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.</li> <li>Refuelling must take place in well demarcated areas and over suitable drip trays to prevent surface water pollution.</li> <li>Spill kits to clean up accidental spills from machinery must be well marked and available on site.</li> <li>Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>Vehicles and machinery should be regularly serviced and maintained.</li> <li>Storm water control;</li> <li>Clean &amp; dirty water plan.</li> </ul>
	<p>Ground water</p> <p>No impact to groundwater is expected from the roads that will be used by the planned prospecting operation.</p> <p>Hydrocarbon Spills</p>	On-site and Local	<ul style="list-style-type: none"> <li>Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution.</li> <li>Spill kits to clean up accidental spills from the machinery must be well marked and available on site.</li> </ul>

	<p>Hydrocarbon spills from drill vehicles and fuel storage may contaminate the groundwater resource locally</p>		<ul style="list-style-type: none"> <li>Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>Vehicles should be regularly serviced and maintained.</li> <li>Clean &amp; Dirty water system must be well maintained.</li> </ul>
	<p>Noise</p> <p>Clearing of footprint areas for drilling, stripping and stockpiling of topsoil</p> <p>Construction of internal Roads</p> <p>Additional traffic to and from the mine</p> <p>Prospecting activities Drilling</p> <p>Removal of infra-structure (Temporary Ablution facility)</p>	<p>On-site and Local</p>	<ul style="list-style-type: none"> <li>As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary.</li> <li>The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993.</li> <li>The applicant will comply with the measures for good practice with regard to management of noise related impacts during prospecting.</li> <li>The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals.</li> <li>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, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.</li> </ul>

			<ul style="list-style-type: none"> <li>• Hearing protection will be available for all employees where attenuation cannot be implemented.</li> <li>• If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.</li> </ul> <p>Mechanical Equipment:</p> <ul style="list-style-type: none"> <li>• All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act.</li> <li>• All vehicles in operation will be equipped with a silencer on their exhaust system.</li> <li>• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.</li> </ul>
	<p>Soil</p> <p>Soil Erosion</p> <p>Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pans and drainage line characteristics.</p> <p>Vegetation will be stripped for construction of new roads and drill pads and these areas will be bare and susceptible to erosion. Any topsoil and overburden that is stripped and piled on surrounding areas can be eroded by wind, rain</p>	<p>On-site Local</p>	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• Topsoil must not be handled when the moisture content exceeds 12 %.</li> <li>• Topsoil stockpiles must be kept separate from sub-soils.</li> <li>• 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.</li> </ul>

	<p>and flooding. The soil/sediments will be carried away during runoff. The affected areas should be rehabilitated, but full restoration might only occur over a number of years, subsequent to the re-establishment of vegetation and hydrologic regime</p>		<ul style="list-style-type: none"> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>
	<p>Topography</p> <p>Changes to surface topography</p> <p>Construction of roads and drill pads as well as temporary ablation facilities</p>	<p>On-site Local</p>	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> </ul>

			<ul style="list-style-type: none"> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>
	<p>Visual</p> <p>The drill tracks will be visible to some extent from the immediate surroundings.</p> <p>The design of the proposed prospecting development will determine the visual impact. As the prospecting will only entail drilling the visual impact would be low.</p>	On-site Local	<ul style="list-style-type: none"> <li>• Replacing layer of topsoil over backfilled areas;</li> <li>• Sloping of rehabilitated and disturbed areas;</li> <li>• Removal of all infrastructures upon mine closure.</li> </ul>
Drilling operational and decommissioning	<p>Air quality</p> <p>Nuisance dust will be created by the drilling machine.</p>	On-site Local	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> </ul>
	Fauna	Local and Regional	<ul style="list-style-type: none"> <li>• All activities associated with the prospecting operation must be planned, where possible in</li> </ul>

	<p>Clearing of vegetation and disturbance during the construction of roads and drill pads.</p> <p>Habitat fragmentation Prospecting activities could result in the loss of connectivity and fragmentation of natural habitat, which generally leads to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This impact will be most profound if characteristics of the natural watercourses are altered. However, due to the low invasive nature of drilling activities this impact is not expected to be significant.</p> <p>Disturbance, displacement and killing of fauna</p> <p>Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities.</p> <p>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. Increased noise and vibration will</p>		<p>order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.</p> <ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• However, if any of the protected species are threatened by destruction, the relevant permits should be obtained followed by the relevant mitigation procedures stipulated in the permits.</li> <li>• An Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance.</li> <li>• Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.</li> </ul>
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	<p>disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls will negatively affect the local populations.</p> <p>Broadscale ecological processes Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pan- and drainage line characteristics.</p> <p>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 grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on</p>		<ul style="list-style-type: none"> <li>• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</li> <li>• Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.</li> </ul>
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	<p>a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.</p>		
	<p>Flora Construction of roads and drill pads; vehicular movement.</p> <p>Loss of indigenous vegetation The construction of roads and drill pads will damage or destroy natural vegetation. It is expected that trampled vegetation will not be significantly affected and any destruction to natural vegetation will be at a very small scale, based on the low invasive nature of drilling activities. It is likely that areas of high ecological function will rehabilitate following such disturbance events. Vehicle traffic generates lots of dust which can reduce the growth success and seed dispersal of many small plant species; however traffic volumes associated with drilling activities are very low.</p> <p>Loss of Red data and/or protected floral species Removal of listed or protected plant species during the construction of roads and drill pads and/or illegal harvesting</p>	<p>Local and Regional</p>	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> <li>• All footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities.</li> <li>• It is recommended that these plants are identified and marked prior to intended activity.</li> <li>• These plants should, where possible, be incorporated into the activity layout and left in situ.</li> <li>• However, if threatened by destruction, these plants should be removed (with the relevant permits) and relocated if possible.</li> <li>• A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for</li> </ul>

	<p>It is possible that prospecting activities will destroy protected species and other species of conservation concern through construction of drill pads and roads, vehicular movement and if any illegal harvesting occurs.</p> <p>Introduction or spread of alien species</p> <p>Clearing of vegetation and disturbance during the construction of roads and drill pads</p> <p>The extent of alien invasive species in the study area is unknown. However, general clearing of vegetation destroy natural vegetation, wherafter invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can</p>		<p>at least two years after re-establishment in order to ensure successful translocation.</p> <ul style="list-style-type: none"> <li>• The appointment of an Environmental Control Officer 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. The environmental induction should occur in the appropriate languages for the workers who may require translation.</li> <li>• All those working on site must be educated about the conservation importance of the flora occurring on site.</li> <li>• Employ measures to ensure that no illegal harvesting takes place.</li> <li>• Minimise the footprint of transformation.</li> <li>• Encourage the growth of natural plant species.</li> <li>• Mechanical methods of control to be implemented if needed.</li> <li>• Annual follow-up operations to be implemented.</li> </ul>
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	<p>be substantially reduced. However, based on the low invasive nature of drilling activities, this impact is not likely to occur during the proposed operation.</p> <p>Encouraging bush encroachment Clearing of vegetation and disturbance during the construction of roads and drill pads</p> <p>The potential extent of bush encroaching species on site is unknown. While general clearing of the area and prospecting activities destroy natural vegetation, bush encroaching plants can increase due to their opportunistic nature in disturbed areas. If encroaching plants establish in disturbed areas, it may the lower potential for future land use and decrease biodiversity. With proper mitigation, the impacts can be substantially reduced and if any such species are removed during prospecting activities the prospecting operation can have a positive effect by reducing bush encroachment. Based on the low invasive nature of drilling activities, this impact is expected to be insignificant.</p> <p>Broadscale ecological processes</p>		
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	<p>Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pan- and drainage line characteristics.</p> <p>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 grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.</p>		
	<p>Surface Water</p> <ul style="list-style-type: none"> <li>• Drilling and stripping of vegetation resulting in a changed land profile.</li> </ul>	<p>On-site and Local</p>	<ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> </ul>

	<ul style="list-style-type: none"> <li>• Runoff from stockpiled soil and vegetation may contain high levels of silt.</li> <li>• Spillages that may occur on access and drill tracks may impact negatively on surface water quality. This issue is dealt with in the EMP.</li> <li>• A high potential of soil erosion exists due to an increased percentage of bare surfaces.</li> <li>• Possible leaching of polluted soil through infiltration and runoff resulting in surface water pollution.</li> </ul> <p>Removal of vegetation could lead to erosion and sediment transportation.</p>		<ul style="list-style-type: none"> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• 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.</li> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent surface water pollution.</li> <li>• Spill kits to clean up accidental spills from machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> </ul>
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			<ul style="list-style-type: none"> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles and machinery should be regularly serviced and maintained.</li> <li>• Storm water control; Clean &amp; dirty water plan.</li> </ul>
	<p>Ground water</p> <p>No impact to groundwater is expected from the roads that will be used by the planned prospecting operation.</p> <p>Hydrocarbon Spills Hydrocarbon spills from drill vehicles and fuel storage may contaminate the groundwater resource locally</p>	On-site and Local	<ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution.</li> <li>• Spill kits to clean up accidental spills from the machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles should be regularly serviced and maintained.</li> <li>• Clean &amp; Dirty water system must be well maintained.</li> </ul>
	<p>Noise</p> <p>Clearing of footprint areas for drilling, stripping and stockpiling of topsoil</p> <p>Construction of internal Roads</p> <p>Additional traffic to and from the mine</p>	On-site and Local	<ul style="list-style-type: none"> <li>• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary.</li> <li>• The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993.</li> <li>• The applicant will comply with the measures for good practice with regard to management of noise related impacts during prospecting.</li> </ul>

	<p>Prospecting activities Drilling Removal of infra-structure(Temporary Ablution facility)</p>		<ul style="list-style-type: none"> <li>• The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals.</li> <li>• 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, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.</li> <li>• Hearing protection will be available for all employees where attenuation cannot be implemented.</li> <li>• If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.</li> </ul> <p><b>Mechanical Equipment:</b></p> <ul style="list-style-type: none"> <li>• All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act.</li> <li>• All vehicles in operation will be equipped with a silencer on their exhaust system.</li> <li>• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.</li> </ul>
	<p>Soil  Soil Erosion</p>	<p>On-site and Local</p>	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> </ul>



	<p>Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pans and drainage line characteristics.</p> <p>Vegetation will be stripped for construction of new roads and drill pads and these areas will be bare and susceptible to erosion. Any topsoil and overburden that is stripped and piled on surrounding areas can be eroded by wind, rain and flooding. The soil/sediments will be carried away during runoff. The affected areas should be rehabilitated, but full restoration might only occur over a number of years, subsequent to the re-establishment of vegetation and hydrologic regime</p>		<ul style="list-style-type: none"> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• Topsoil must not be handled when the moisture content exceeds 12 %.</li> <li>• Topsoil stockpiles must be kept separate from sub-soils.</li> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>
	<p>Topography</p> <p>Changes to surface topography</p>	Local	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> </ul>

	<p>Construction of roads and drill pads as well as temporary ablution facilities</p>		<ul style="list-style-type: none"> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>
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**e) Impact Management Outcomes**

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

ACTIVITY	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
<b>Roads</b>	Air quality	Nuisance dust will be created by the drilling machine.	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	<ul style="list-style-type: none"> <li>Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> </ul>
	Fauna	Clearing of vegetation and disturbance during the construction of roads and drill pads.  <b>Habitat fragmentation</b> Prospecting activities could result in the loss of connectivity and fragmentation of natural habitat, which generally leads	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	<ul style="list-style-type: none"> <li>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.</li> <li>No activities should take place in the ephemeral wetlands.</li> <li>The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the</li> </ul>

	<p>to the loss of migration corridors, in turn resulting in degeneration of the affected population’s genetic make-up. This impact will be most profound if characteristics of the natural watercourses are altered. However, due to the low invasive nature of drilling activities this impact is not expected to be significant.</p> <p><b>Disturbance, displacement and killing of fauna</b></p> <p>Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities.</p> <p>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</p>	<p>demarcated area except those authorised to do so.</p> <ul style="list-style-type: none"> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• However, if any of the protected species are threatened by destruction, the relevant permits should be obtained followed by the relevant mitigation procedures stipulated in the permits.</li> <li>• An Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance.</li> <li>• Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.</li> <li>• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</li> </ul>
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	<p>species that depend on such habitats, e.g. birds that nest in trees or animals residing in holes in the ground. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls will negatively affect the local populations.</p> <p><b>Broadscale ecological processes</b> Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pan- and drainage line characteristics.</p> <p>Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt</p>	<ul style="list-style-type: none"> <li>• Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.</li> </ul>
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		<p>the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.</p>		
	Flora	<p>Construction of roads and drill pads; vehicular movement.</p> <p><b>Loss of indigenous vegetation</b></p>	<p>Construction, Commissioning, Operational, Decommissioning,</p>	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> </ul>

		<p>The construction of roads and drill pads will damage or destroy natural vegetation. It is expected that trampled vegetation will not be significantly affected and any destruction to natural vegetation will be at a very small scale, based on the low invasive nature of drilling activities. It is likely that areas of high ecological function will rehabilitate following such disturbance events. Vehicle traffic generates lots of dust which can reduce the growth success and seed dispersal of many small plant species; however traffic volumes associated with drilling activities are very low.</p> <p><b>Loss of Red data and/or protected floral species</b> Removal of listed or protected plant species during the construction of roads and drill pads and/or illegal harvesting</p>	<p>Closure and post closure</p>	<ul style="list-style-type: none"> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> <li>• All footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities.</li> <li>• It is recommended that these plants are identified and marked prior to intended activity.</li> <li>• These plants should, where possible, be incorporated into the activity layout and left in situ.</li> <li>• However, if threatened by destruction, these plants should be removed (with the relevant permits) and relocated if possible.</li> <li>• A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.</li> <li>• The appointment of an Environmental Control Officer 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. The environmental induction</li> </ul>
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		<p>It is possible that prospecting activities will destroy protected species and other species of conservation concern through construction of drill pads and roads, vehicular movement and if any illegal harvesting occurs.</p> <p><b>Introduction or spread of alien species</b> Clearing of vegetation and disturbance during the construction of roads and drill pads</p> <p>The extent of alien invasive species in the study area is unknown. However, general clearing of vegetation destroys natural vegetation, where after invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien</p>		<p>should occur in the appropriate languages for the workers who may require translation.</p> <ul style="list-style-type: none"> <li>• All those working on site must be educated about the conservation importance of the flora occurring on site.</li> <li>• Employ measures to ensure that no illegal harvesting takes place.</li> <li>• Minimise the footprint of transformation.</li> <li>• Encourage the growth of natural plant species.</li> <li>• Mechanical methods of control to be implemented if needed.</li> <li>• Annual follow-up operations to be implemented.</li> </ul>
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		<p>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. However, based on the low invasive nature of drilling activities, this impact is not likely to occur during the proposed operation.</p> <p><b>Encouraging bush encroachment</b> Clearing of vegetation and disturbance during the construction of roads and drill pads</p> <p>The potential extent of bush encroaching species on site is</p>		
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		<p>unknown. While general clearing of the area and prospecting activities destroy natural vegetation, bush encroaching plants can increase due to their opportunistic nature in disturbed areas. If encroaching plants establish in disturbed areas, it may the lower potential for future land use and decrease biodiversity. With proper mitigation, the impacts can be substantially reduced and if any such species are removed during prospecting activities the prospecting operation can have a positive effect by reducing bush encroachment. Based on the low invasive nature of drilling activities, this impact is expected to be insignificant.</p> <p><b>Broadscale ecological processes</b></p> <p>Clearing of vegetation and disturbance during the</p>		
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		<p>construction of roads and drill pads; alterations to pan- and drainage line characteristics.</p> <p>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 grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative</p>		
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		impacts is not significant during the proposed prospecting operation.		
	Surface Water	<ul style="list-style-type: none"> <li>• Drilling and stripping of vegetation resulting in a changed land profile.</li> <li>• Runoff from stockpiled soil and vegetation may contain high levels of silt.</li> <li>• Spillages that may occur on access and drill tracks may impact negatively on surface water quality. This issue is dealt with in the EMP.</li> <li>• A high potential of soil erosion exists due to an increased percentage of bare surfaces.</li> <li>• Possible leaching of polluted soil through infiltration and runoff resulting in surface water pollution.</li> <li>• Removal of vegetation could lead to erosion and sediment transportation.</li> </ul>	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	<ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• 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.</li> </ul>

				<ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent surface water pollution.</li> <li>• Spill kits to clean up accidental spills from machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles and machinery should be regularly serviced and maintained.</li> <li>• Storm water control;</li> <li>• Clean &amp; dirty water plan.</li> </ul>
	Ground water	<p>No impact to groundwater is expected from the roads that will be used by the planned prospecting operation.</p> <p>Hydrocarbon Spills Hydrocarbon spills from drill vehicles and fuel storage may contaminate the groundwater resource locally</p>	Commissioning, Operational, Decommissioning, Closure	<ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution.</li> <li>• Spill kits to clean up accidental spills from the machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles should be regularly serviced and maintained.</li> </ul>

				<ul style="list-style-type: none"> <li>• Clean &amp; Dirty water system must be well maintained.</li> </ul>
	Noise	<p>Clearing of footprint areas for drilling, stripping and stockpiling of topsoil</p> <p>Construction of internal Roads</p> <p>Additional traffic to and from the mine</p> <p>Prospecting activities Drilling Removal of infra-structure (Temporary Ablution facility)</p>	<p>Construction, Commissioning, Operational, Decommissioning, Closure</p>	<ul style="list-style-type: none"> <li>• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary.</li> <li>• The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993.</li> <li>• The applicant will comply with the measures for good practice with regard to management of noise related impacts during prospecting.</li> <li>• The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals.</li> <li>• 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, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.</li> <li>• Hearing protection will be available for all employees where attenuation cannot be implemented.</li> <li>• If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.</li> </ul>



				<p>Mechanical Equipment:</p> <ul style="list-style-type: none"> <li>• All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act.</li> <li>• All vehicles in operation will be equipped with a silencer on their exhaust system.</li> <li>• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.</li> </ul>
	Soil	<p>Soil Erosion</p> <p>Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pans and drainage line characteristics.</p> <p>Vegetation will be stripped for construction of new roads and drill pads and these areas will be bare and susceptible to erosion. Any topsoil and overburden that is stripped and piled on surrounding areas can be eroded by wind, rain and flooding. The soil/sediments will be carried away during runoff. The affected areas should be</p>	Commissioning, Operational, Decommissioning, Closure and post closure	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• Topsoil must not be handled when the moisture content exceeds 12 %.</li> <li>• Topsoil stockpiles must be kept separate from sub-soils.</li> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> </ul>

		rehabilitated, but full restoration might only occur over a number of years, subsequent to the re-establishment of vegetation and hydrologic regime		<ul style="list-style-type: none"> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>
	Topography	Changes to surface topography  Construction of roads and drill pads as well as temporary ablution facilities	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> </ul>

				<ul style="list-style-type: none"> <li>Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>
	Visual	<p>The drill tracks will be visible to some extent from the immediate surroundings.</p> <p>The design of the proposed prospecting development will determine the visual impact. As the prospecting will only entail drilling the visual impact would be low.</p>	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	<ul style="list-style-type: none"> <li>Replacing layer of topsoil over backfilled areas;</li> <li>Sloping of rehabilitated and disturbed areas;</li> <li>Removal of all infrastructures upon mine closure.</li> </ul>
Drilling	Air quality	Nuisance dust will be created by the drilling machine.	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	<ul style="list-style-type: none"> <li>Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> </ul>

	<p>Fauna</p>	<p>Clearing of vegetation and disturbance during the construction of roads and drill pads.</p> <p><b>Habitat fragmentation</b> Prospecting activities could result in the loss of connectivity and fragmentation of natural habitat, which generally leads to the loss of migration corridors, in turn resulting in degeneration of the affected population’s genetic make-up. This impact will be most profound if characteristics of the natural watercourses are altered. However, due to the low invasive nature of drilling activities this impact is not expected to be significant.</p> <p><b>Disturbance, displacement and killing of fauna</b></p> <p>Vegetation clearing; increase in noise and vibration; human and vehicular movement on site</p>	<p>Construction, Commissioning, Operational, Decommissioning, Closure and post closure</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• However, if any of the protected species are threatened by destruction, the relevant permits should be obtained followed by the relevant mitigation procedures stipulated in the permits.</li> <li>• An Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance.</li> </ul>
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	<p>resulting from prospecting activities.</p> <p>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. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls will negatively affect the local populations.</p> <p><b>Broadscale ecological processes</b></p>	<ul style="list-style-type: none"> <li>• Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.</li> <li>• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</li> <li>• Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.</li> </ul>
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		<p>Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pan- and drainage line characteristics.</p> <p>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 grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on</p>		
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		<p>a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.</p>		
	<p>Flora</p>	<p>Construction of roads and drill pads; vehicular movement.</p> <p><b>Loss of indigenous vegetation</b> The construction of roads and drill pads will damage or destroy natural vegetation. It is expected that trampled vegetation will not be significantly affected and any destruction to natural vegetation will be at a very small scale, based on the low invasive nature of drilling activities. It is likely that areas of high ecological function will rehabilitate following such disturbance events. Vehicle traffic generates lots of dust which can reduce the growth</p>	<p>Construction, Commissioning, Operational, Decommissioning, Closure and post closure</p>	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> <li>• All footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities.</li> <li>• It is recommended that these plants are identified and marked prior to intended activity.</li> <li>• These plants should, where possible, be incorporated into the activity layout and left in situ.</li> <li>• However, if threatened by destruction, these plants should be removed (with the relevant permits) and relocated if possible.</li> </ul>



	<p>success and seed dispersal of many small plant species; however, traffic volumes associated with drilling activities are very low.</p> <p><b>Loss of Red data and/or protected floral species</b> Removal of listed or protected plant species during the construction of roads and drill pads and/or illegal harvesting</p> <p>It is possible that prospecting activities will destroy protected species and other species of conservation concern through construction of drill pads and roads, vehicular movement and if any illegal harvesting occurs.</p> <p><b>Introduction or spread of alien species</b> Clearing of vegetation and disturbance during the construction of roads and drill pads</p>	<ul style="list-style-type: none"> <li>• A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.</li> <li>• The appointment of an Environmental Control Officer 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. The environmental induction should occur in the appropriate languages for the workers who may require translation.</li> <li>• All those working on site must be educated about the conservation importance of the flora occurring on site.</li> <li>• Employ measures to ensure that no illegal harvesting takes place.</li> <li>• Minimise the footprint of transformation.</li> <li>• Encourage the growth of natural plant species.</li> <li>• Mechanical methods of control to be implemented if needed.</li> <li>• Annual follow-up operations to be implemented.</li> </ul>
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		<p>The extent of alien invasive species in the study area is unknown. However, general clearing of vegetation destroy natural vegetation, wherafter invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced. However, based on the low invasive nature of drilling activities, this impact is</p>		
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		<p>not likely to occur during the proposed operation.</p> <p><b>Encouraging bush encroachment</b> Clearing of vegetation and disturbance during the construction of roads and drill pads</p> <p>The potential extent of bush encroaching species on site is unknown. While general clearing of the area and prospecting activities destroy natural vegetation, bush encroaching plants can increase due to their opportunistic nature in disturbed areas. If encroaching plants establish in disturbed areas, it may the lower potential for future land use and decrease biodiversity. With proper mitigation, the impacts can be substantially reduced and if any such species are removed during prospecting activities the</p>		
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	<p>prospecting operation can have a positive effect by reducing bush encroachment. Based on the low invasive nature of drilling activities, this impact is expected to be insignificant.</p> <p><b>Broadscale ecological processes</b></p> <p>Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pan- and drainage line characteristics.</p> <p>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 grassland habitat is the most vulnerable</p>		
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		terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.		
	Surface Water	<ul style="list-style-type: none"> <li>• Drilling and stripping of vegetation resulting in a changed land profile.</li> <li>• Runoff from stockpiled soil and vegetation may contain high levels of silt.</li> <li>• Spillages that may occur on access and drill tracks may impact negatively on surface water quality. This</li> </ul>	Commissioning, Operational, Decommissioning, Closure and post closure	<ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• 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.</li> </ul>

		<p>issue is dealt with in the EMP.</p> <ul style="list-style-type: none"> <li>• A high potential of soil erosion exists due to an increased percentage of bare surfaces.</li> <li>• Possible leaching of polluted soil through infiltration and runoff resulting in surface water pollution.</li> <li>• Removal of vegetation could lead to erosion and sediment transportation.</li> </ul>		<ul style="list-style-type: none"> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• 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.</li> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent surface water pollution.</li> <li>• Spill kits to clean up accidental spills from machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles and machinery should be regularly serviced and maintained.</li> <li>• Storm water control;</li> </ul>
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	Ground water	<p>No impact to groundwater is expected from the roads that will be used by the planned prospecting operation.</p> <p>Hydrocarbon Spills Hydrocarbon spills from drill vehicles and fuel storage may contaminate the groundwater resource locally</p>	<p>Commissioning, Operational, Decommissioning, Closure and post closure</p>	<p>Clean &amp; dirty water plan.</p> <ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution.</li> <li>• Spill kits to clean up accidental spills from the machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles should be regularly serviced and maintained.</li> <li>• Clean &amp; Dirty water system must be well maintained.</li> </ul>
	Noise	<p>Clearing of footprint areas for drilling, stripping and stockpiling of topsoil</p> <p>Construction of internal Roads</p> <p>Additional traffic to and from the mine</p> <p>Prospecting activities Drilling Removal of infra-structure (Temporary Ablution facility)</p>	<p>Construction, Commissioning, Operational, Decommissioning, Closure and post closure</p>	<ul style="list-style-type: none"> <li>• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary.</li> <li>• The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993.</li> <li>• The applicant will comply with the measures for good practice with regard to management of noise related impacts during prospecting.</li> <li>• The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals.</li> <li>• When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and</li> </ul>



				<p>Assessment of Occupational Noise for Hearing Conservation Purposes, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.</p> <ul style="list-style-type: none"> <li>• Hearing protection will be available for all employees where attenuation cannot be implemented.</li> <li>• If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.</li> </ul> <p><b>Mechanical Equipment:</b></p> <ul style="list-style-type: none"> <li>• All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act.</li> <li>• All vehicles in operation will be equipped with a silencer on their exhaust system.</li> <li>• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.</li> </ul>
	Soil	<p>Soil Erosion</p> <p>Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pans and drainage line characteristics.</p>	<p>Construction, Commissioning, Operational, Decommissioning, Closure and post closure</p>	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> </ul>

		Vegetation will be stripped for construction of new roads and drill pads and these areas will be bare and susceptible to erosion. Any topsoil and overburden that is stripped and piled on surrounding areas can be eroded by wind, rain and flooding. The soil/sediments will be carried away during runoff. The affected areas should be rehabilitated, but full restoration might only occur over a number of years, subsequent to the re-establishment of vegetation and hydrologic regime		<ul style="list-style-type: none"> <li>• Topsoil must not be handled when the moisture content exceeds 12 %.</li> <li>• Topsoil stockpiles must be kept separate from sub-soils.</li> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>
	Topography	Changes to surface topography  Construction of roads and drill pads as well as temporary ablution facilities	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> </ul>

				<ul style="list-style-type: none"> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>
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**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) and (d) will be achieved)

ACTIVITY	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 STANDARD  (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)
<b>Roads</b>	Air quality	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> </ul>	Upon the cessation of prospecting as the case may be.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> </ul>

				<ul style="list-style-type: none"> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
	Fauna	<ul style="list-style-type: none"> <li>• 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.</li> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles</li> </ul>	Upon cessation of prospecting as the case may be.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> </ul>

		<p>may leave the demarcated area except those authorised to do so.</p> <ul style="list-style-type: none"> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• 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.</li> <li>• However, if any of the protected species are</li> </ul>		<ul style="list-style-type: none"> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
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		<p>threatened by destruction, the relevant permits should be obtained followed by the relevant mitigation procedures stipulated in the permits.</p> <ul style="list-style-type: none"> <li>• An Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance.</li> <li>• Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.</li> <li>• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</li> </ul>		
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		<ul style="list-style-type: none"> <li>• Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.</li> </ul>		
	<p>Flora</p>	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> <li>• All footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities.</li> <li>• It is recommended that these plants are identified and marked prior to intended activity.</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul>

		<ul style="list-style-type: none"> <li>• These plants should, where possible, be incorporated into the activity layout and left in situ.</li> <li>• However, if threatened by destruction, these plants should be removed (with the relevant permits) and relocated if possible.</li> <li>• A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.</li> <li>• The appointment of an Environmental Control Officer 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</li> </ul>		<p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
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		<p>prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation.</p> <ul style="list-style-type: none"> <li>• All those working on site must be educated about the conservation importance of the flora occurring on site.</li> <li>• Employ measures to ensure that no illegal harvesting takes place.</li> <li>• Minimise the footprint of transformation.</li> <li>• Encourage the growth of natural plant species.</li> <li>• Mechanical methods of control to be implemented if needed.</li> <li>• Annual follow-up operations to be implemented.</li> </ul>		
	<p>Surface Water</p>	<ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• Any road construction over drainage lines or pan</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> </ul>

		<p>catchments should be done to allow continuance of the natural hydrological regime.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.</li> <li>• 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</li> </ul>		<ul style="list-style-type: none"> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
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		<p>so. Areas surrounding the earmarked site that are not part of the demarcated area should be considered as a no-go zone.</p> <ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent surface water pollution.</li> <li>• Spill kits to clean up accidental spills from machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles and machinery should be regularly serviced and maintained.</li> <li>• Storm water control;</li> <li>• Clean &amp; dirty water plan.</li> </ul>		
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	<p>Ground water</p>	<ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution.</li> <li>• Spill kits to clean up accidental spills from the machinery must be well marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles should be regularly serviced and maintained.</li> <li>• Clean &amp; Dirty water system must be well maintained.</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
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	<p>Noise</p>	<ul style="list-style-type: none"> <li>• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary.</li> <li>• The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993.</li> <li>• The applicant will comply with the measures for good practice with regard to management of noise related impacts during construction and operation.</li> <li>• The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals.</li> <li>• 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, SABC 083 as amended, in any place at or in any mine or works where persons may</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
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		<p>travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.</p> <ul style="list-style-type: none"> <li>• Hearing protection will be available for all employees where attenuation cannot be implemented.</li> <li>• If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.</li> </ul> <p>Mechanical Equipment:</p> <ul style="list-style-type: none"> <li>• All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act.</li> <li>• All vehicles in operation will be equipped with a silencer on their exhaust system.</li> <li>• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be</li> </ul>		
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	Soil	<p>appropriately calibrated/adjusted.</p> <ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• Topsoil must not be handled when the moisture content exceeds 12 %.</li> <li>• Topsoil stockpiles must be kept separate from sub-soils.</li> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> </ul>	Upon cessation of prospecting as the case may be.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres</p>
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		<ul style="list-style-type: none"> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>		<p>to the contents of the BAR and EMPr documents.</p>
	<p>Topography</p>	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the</p>

		<p>ensure that the quality of the topsoil is not impaired.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>		<p>contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
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	<p>Visual</p>	<ul style="list-style-type: none"> <li>• Replacing layer of topsoil over backfilled areas;</li> <li>• Sloping of rehabilitated and disturbed areas;</li> <li>• Removal of all infrastructures upon mine closure.</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
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<b>Drilling</b>	Air quality	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.</li> </ul>	Upon cessation of prospecting as the case may be.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
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	<p>Fauna</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• 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.</li> <li>• Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas.</li> <li>• Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
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		<p>minimise the overall disturbance footprint.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• However, if any of the protected species are threatened by destruction, the relevant permits should be obtained followed by the relevant mitigation procedures stipulated in the permits.</li> <li>• An Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance.</li> </ul>		
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		<ul style="list-style-type: none"> <li>• Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.</li> <li>• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</li> <li>• Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.</li> </ul>		
	<p>Flora</p>	<ul style="list-style-type: none"> <li>• Minimise the footprint of transformation, by keeping to existing roads where possible.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> </ul>

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		<p>situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.</p> <ul style="list-style-type: none"> <li>• The appointment of an Environmental Control Officer 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. The environmental induction should occur in the appropriate languages for the workers who may require translation.</li> <li>• All those working on site must be educated about the conservation importance of the flora occurring on site.</li> </ul>		
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	<p>Surface Water</p>	<ul style="list-style-type: none"> <li>• No activities should take place in the ephemeral wetlands.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• 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.</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> </ul>

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	<p>Ground water</p>	<ul style="list-style-type: none"> <li>• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution.</li> <li>• Spill kits to clean up accidental spills from the machinery must be well marked and available on site.</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul>

		<ul style="list-style-type: none"> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>• Vehicles should be regularly serviced and maintained.</li> <li>• Clean &amp; Dirty water system must be well maintained.</li> </ul>		<p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
	<p>Noise</p>	<ul style="list-style-type: none"> <li>• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary.</li> <li>• The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993.</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul>

		<ul style="list-style-type: none"> <li>• The applicant will comply with the measures for good practice with regard to management of noise related impacts during construction and operation.</li> <li>• The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals.</li> <li>• 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, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.</li> <li>• Hearing protection will be available for all employees where attenuation cannot be implemented.</li> </ul>		<p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
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		<ul style="list-style-type: none"> <li>• If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.</li> </ul> <p><b>Mechanical Equipment:</b></p> <ul style="list-style-type: none"> <li>• All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act.</li> <li>• All vehicles in operation will be equipped with a silencer on their exhaust system.</li> <li>• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.</li> </ul>		
	Soil	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> </ul>	Upon cessation of prospecting as the case may be.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul>

		<ul style="list-style-type: none"> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• Topsoil must not be handled when the moisture content exceeds 12 %.</li> <li>• Topsoil stockpiles must be kept separate from sub-soils.</li> <li>• 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.</li> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Any road construction over drainage lines or pan catchments should be done to allow continuance of the natural hydrological regime.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to</li> </ul>		<p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the BAR and EMPr documents.</p>
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		<p>March) should be monitored and controlled.</p> <ul style="list-style-type: none"> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>		
	<p>Topography</p>	<ul style="list-style-type: none"> <li>• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• 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.</li> </ul>	<p>Upon cessation of prospecting as the case may be.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> </ul>

		<ul style="list-style-type: none"> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.</li> <li>• Ground exposure should be minimised in terms of the surface area and duration.</li> <li>• Disturbances during the rainy season (November to March) should be monitored and controlled.</li> <li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li> <li>• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.</li> </ul>		<ul style="list-style-type: none"> <li>• 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 BAR and EMPr documents.</li> </ul>
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**i) Financial Provision****(1) Determination of the amount of Financial Provision****(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.**

Closure:

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

**Thunderflex** will ensure that the site is:

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

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

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

**Thunderflex** will ensure that the prospecting site is closed efficiently and cost effectively.

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

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

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

The management of environmental impacts:

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

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

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

An advert was placed in the DFA on 22 January 2020. Site notices was also placed at the entrance to the farms on the fence of the Farms, at the Griekwastad Police Station and at the Griekwastad library to inform the public that a Prospecting Right was accepted for Thunderflex 78 (Pty) Ltd and that any interested or affected parties must register (copy attached).

With this site notice all passers-by are requested to register and submit any written comments to be forwarded to the consultant.

A copy of the Background Information Document with a cover letter and comments form to invite their comments was sent by registered post to the farm owners and government departments on 22 January 2020

A notification letter was send with the BAR document to all I & APs.

I&AP	ADDRESS	DATE CONSULTED
P.J. Ludwick	PO Box 319 Postmasburg 8420	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
P.J.S. Ludwick	PO Box 88 Griekwastad 8365	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Anphan Plase (Pty) Ltd	PO Box 91 Griekwastad 8365	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
B.J. Esterhuizen	PO Box 708 Postmasburg 8420	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Koumas Boerdery CC	PO Box 33 Postmasburg 8420	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
J.F. Jacobs	PO Box	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Pixley Ka Seme Distict Municipality	Private Bag X1012 De Aar 7000	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Siyancoma Municipality	P.O. Box 27 Douglas 8730	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
NC Department of Roads and Public Works	PO Box 3132 Squarehill Park Kimberley 8300	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
ESKOM Holdings SOC Limited Northern Cape Operating Unit: Land Development	P O Box 606 Kimberley 8300	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Department of Agriculture, Land Reform and Rural Development	PO Box 28 De Aar 7000	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Department of Agriculture, Land Reform and Rural Development	Private Bag X5108 Kimberley 8300	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Department of Agriculture, Forestry and Fisheries: Directorate: Forestry Management	P O Box 2782 Upington 8800	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Department of Environment and Nature Conservation	Private Bag X6102 Kimberley 8300	Registered letter posted on 21 January 2020 and 15 September 2020 BAR

SANRAL	P O Box 415 Pretoria 0001	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Transnet	PO Box 72501 Parkview 2122	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
SAHRA	P.O. Box 4637 Cape Town 8000	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
National Department of Public Works	PO Box 1931 Kimberley 8300	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
ESKOM Environmental Division	PO Box 356 Bloemfontein 9300	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Department of Land Affairs and Rural Development	Private Bag X5018 Kimberley 8300	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Department of Rural Development and Land reform	Private Bag X5007 Kimberley 8300	Registered letter posted on 21 January 2020 and 15 September 2020 BAR
Department of Water and Sanitation	Private Bag X6101 Kimberley 8300	Registered letter posted on 21 January 2020 and 15 September 2020 BAR

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

Infrastructure Areas:

On completion of the prospecting operation, the various surfaces, including the access road, storage areas and the ablution facilities, will finally be rehabilitated as follows:-



- ❖ All remaining material on the surface will be removed to the original topsoil level. This material will then be backfilled into the drill holes / depressions. Any compacted area will then be ripped to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.
- ❖ All infrastructures, equipment, and other items used during the operational period will be removed from the site.
- ❖ 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, which states:-
  3. *Regulation 44: When a prospecting right, mining right, retention permit or mining permit lapses, is cancelled or is abandoned or when any prospecting or mining operation comes to an end, the holder of such right or permit may not demolish or remove any building, structure or object –*
    - (d) *which may not be demolished or removed in terms of any other law;*
    - (e) *which has been identified in writing by the Minister for purposes of this section; or*
    - (f) *which is to be retained in terms of an agreement between the holder and the owner or occupier of the land, which agreement has been approved by the Minister in writing.*
  4. *The provision of subsection (1) does not apply to bona fide mining equipment, which may be removed.*

Topsoil Deposits:

- ❖ **Disposal Facilities:-**

Waste material of all description inclusive of receptacles, scrap, rubble and tyres will be removed entirely from the prospecting area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- ❖ **On-going Seepage, Control of Rain Water:-**

No monitoring of ground or surface water will take place, except is so requested by the DWS – Kimberley.
- ❖ **Long Term Stability and Safety:-**

It will be the objective of prospecting management to ensure the long term stability of all rehabilitated areas including the backfilled depressions. This will 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 planned.

Final Rehabilitation Roads:-

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

Submission of Information:-

- ❖ Reports on rehabilitation and monitoring will be submitted biennially to the Department of Mineral Resources – Welkom, as described in Regulation 55.

Maintenance (Aftercare):-

- ❖ Maintenance after closure will mainly concern the regular inspection and monitoring and/or completion of the re-vegetation programme.
- ❖ The aim of the 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 prospecting activities will be to create an acceptable post-prospecting environment and land-use. Therefore all agreed commitments will be implemented by Mine Management.

After-effects Following Closure:-

- ❖ Acid Mine Drainage:-  
No potential for bad quality leachate or acid mine drainage development exists after 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 will be to obtain a self-sustaining and stable end result. Cleaning of all drill chip material concurrently and replacing of topsoil where available.

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

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

- ❖ The removal of infrastructure, equipment, plant and other items from the site.
- ❖ The ripping of compacted areas to a level of 300mm and the levelling of such areas in order to re-establish a growth medium for plants (such areas will furthermore be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to the prospecting operation, if the re-establishment of vegetation is unacceptably slow.
- ❖ The backfilling of the final drill hole with drill chips and subsoil and the covering thereof with previously stored topsoil (whereafter this area will also be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to the proposed operation, and seedlings protected for a period of one) if the re-establishment of vegetation is unacceptably slow.

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

It is estimated at R 116 255,05 for the financial provision to manage and rehabilitate the environment.

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

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

Thunderflex 78 (Pty) Ltd will fund the operation please see the last audited financial statements to undertake prospecting operations.

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

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

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Topography	To minimise the reduction of land capability.	To ensure that rehabilitation post-prospecting slopes are stable, free draining and no slopes have an angle in excess of 20°.	Site Manager/ Environmentalists	Monitoring will be done on an <i>annual basis</i> to ensure that the levels and the slopes are in order.
Soil	To prevent soil pollution; To limit soil compaction; To curb soil erosion; and To reinstate a growth medium able to sustain plant life.	Soil depth and chemical composition will be tested and possible erosion damage will be assisted and rectified.	Site Manager/ Environmentalists	Monitoring will be done on an <i>annual basis</i> or after a heavy rain event.
Air Quality	To control the incidence of unacceptable levels of dust pollution on site.	To ensure that the prospecting activities minimizes dust omissions, so that dust does not become a nuisance for affected parties and a health hazard.	Site Manager/Foreman appointed SHE Consultant	Visual inspections will be done and managed by dust suppression by a water tanker. Quarterly tests will also be conducted by a Safety Health and Environmental Consultant and submitted to Mine

				Health and Safety for monitoring purposes.
Fauna	To minimise vegetation destruction in prospecting areas, and therefore a habitat for wildlife; and To eliminate poaching and the extermination of animal species within the boundaries of the study area as well as the surrounding areas.	To ensure that the species diversity and abundance is not significantly reduces.	Site Manager/ Environmentalists	Monitoring will be done at rehabilitated area on an <i>annually basis</i> to investigate species diversity and abundance.
Flora	To minimise the destruction of vegetation units; and To control invasion of exotic and invasive plant species.	To ensure that the rehabilitated areas become self-maintaining.	Site Manager/ Environmentalists	Monitoring will be done at the rehabilitated areas on a <i>twice a year basis</i> (mid-summer and mid-winter), where species diversity and vegetation cover will be investigated.
<b>SOURCE ACTIVITY</b>	<b>IMPACTS REQUIRING MONITORING PROGRAMMES</b>	<b>FUNCTIONAL REQUIREMENTS FOR MONITORING</b>	<b>ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)</b>	<b>MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS</b>
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 area	The manager	Quarterly reports on fall-out dust and noise monitoring will be conducted as required by legislation.  If any complaints are received from the public or state department

	To control the incidence of unacceptable noise levels on site.	and that which may migrate outside the area.		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 Rivers in the vicinity of the prospecting operation. A borehole will be used for water and will be monitored by collecting water samples quarterly.	Site Manager/Water Supply	Monitoring takes place by collecting surface water samples every quarter.

**l) Indicate the frequency of the submission of the performance assessment/environmental audit 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 financial quantum calculation should be done annually and submitted to the competent authority.

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

**m) Environmental Awareness Plan**

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

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

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

- Procedures will be developed to facilitate training of employees, on-site service providers and contractors;

- Environmental awareness will focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements;
- Top management will build awareness and motivate and reward employees for achieving environmental objectives;
- Environmental policies will be availed to mine employees and contractors;
- Environmental inductions will be conducted for employees, contractors and visitors;
- There will be an ongoing system of identifying training needs.

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

- General environmental awareness
- The prospecting policies and vision concerning environmental management
- Legal requirements
- Prospecting activities and their potential impacts
- Different management measures to manage identified impacts

Prospecting 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 Thunderflex should focus on the following:

General environmental awareness, which incorporates environmental, ecological and heritage elements (fossil finds procedure);  
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 (Fossil Finds Procedure);  
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.**

**Air quality:**

To control the incidence of unacceptable levels of dust pollution on site via dust dispersion control.

**Surface water:**

Mitigation measures (or safety precautions) that are taken in order to eliminate any risk the project area could have on the natural, cultural and social environment of the concerned area and that must be implemented during the different phases i.e. construction, operational and post closure to minimize the impacts are as follows:

- Only environmental friendly materials must be used during the construction phase to minimize pollution of surface water runoff and/or underground water resources.
- 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.

**Ground water:****Groundwater Management Plan**

The mine must develop a monitoring response protocol. This protocol will describe procedures in the event that groundwater monitoring information indicates that action is required.

**Natural flora:****Loss of and disturbance to indigenous vegetation**

- Minimise the footprint of transformation.
- Encourage proper rehabilitation of prospecting areas.
- Encourage the growth of natural plant species.
- Ensure measures for the adherence to the speed limit.

**Loss of flora with conservation concern**

- Footprint areas of the Prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting.
- It is recommended that these plants are identified and marked prior to prospecting.
- These plants should, where possible, be incorporated into the design layout and left in situ.
- However, if threatened of destruction by Prospecting, these plants should be removed (with the relevant permits from DAFF and DENC) and relocated if possible.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.

**Proliferation of alien vegetation**

- Minimise the footprint of transformation.
- Encourage proper rehabilitation of mined areas.

- Encourage the growth of natural plant species.
- Mechanical methods (hand-pulling) of control to be implemented extensively.
- Annual follow-up operations to be implemented.

**Encouragement of bush encroachment**

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

**Fauna:****Loss, damage and fragmentation of natural habitats**

- 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 construction personnel or vehicles may leave the demarcated area except those authorised to do so.

**Disturbance, displacement and killing of fauna**

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

**Broad-scale ecological processes**

- Minimise the footprint of transformation.
- Encourage proper rehabilitation of mined areas.
- Encourage the growth of natural plant species.
- 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).

**Noise and vibration:**

- To control the incidence of unacceptable noise and vibration levels on site.
- There will be a shift in the immediate noise levels of the proposed activities on a temporary basis during the drilling phase. Regular feedback to the community during the operational phase of the project.
- A system whereby complaints are recorded and investigated must be made available.

**Visual (Aesthetics):**

- Mitigation measures may be considered in two categories:
  - Primary measures that intrinsically comprise part of the development design through an iterative process. Mitigation measures are more effective if they are implemented from project inception when alternatives are being considered; and
  - Secondary measures designed to specifically address the remaining negative effects of the final development proposals.
- Primary measures that will be implemented should mainly be measures that minimise the visual impact by softening the visibility of the prospecting activities, by “blending” with the surrounding areas. Such measures will include rehabilitation of the disturbed areas, by re-vegetation of the area and using an aesthetically pleasing design for the proposed development.
- During the construction phase the following mitigation measures should be implemented to minimise the visual impact.
  - Reduce the construction period through careful planning and productive implementation of resources;
  - Ensure that rubble, litter and disused construction materials are managed and removed regularly;
  - Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way;
  - Reduce and control construction dust emitting activities through the use of approved dust suppression techniques;
- During operational phase, the following mitigation measures should be implemented to minimise the visual impact.

- Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way;
- Rehabilitation of disturbed areas and re-establishment of vegetation;

**Soils:****Topography, soil erosion and associated degradation of ecosystems**

- Backfill all drill holes continuously.
- Employ effective rehabilitation strategies to restore surface topography of drill holes and pads.
- All temporary infrastructures should be demolished during closure.

**Soil erosion**

- At no point may plant cover be removed within the no-development zones.
- All attempts must be made to avoid exposure of dispersive soils.
- Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.
- Ground exposure should be minimised in terms of the surface area and duration, wherever possible.
- The prospecting operation must co-ordinate different activities in order to optimise the utilisation of the manganese and iron ore and thereby prevent repeated and unnecessary dumping.
- Audits must be carried out at regular intervals to identify areas where erosion is occurring.
- Appropriate remedial action, including the rehabilitation of the eroded areas, must occur.
- Rehabilitation of the erosion channels and gullies.
- Dust suppression must take place.
- 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.

**Loss of soil fertility**

- The topsoil should be replaced as soon as possible on to the backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.

**Soil pollution**

- 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.
- At no point may plant cover be removed within the no-development zones.
- All attempts must be made to avoid exposure of dispersive soils.
- Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.
- Ground exposure should be minimised in terms of the surface area and duration, wherever possible.
- Audits must be carried out at regular intervals to identify areas where erosion is occurring.
- Appropriate remedial action, including the rehabilitation of the eroded areas, must occur.
- Rehabilitation of the erosion channels and gullies.
- Dust suppression must take place.
- 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.
- The topsoil should be replaced as soon as possible on to the backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.
- Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
- Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site.
- Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.
- All facilities where dangerous materials are stored must be contained in a bund wall.
- Vehicles and machinery should be regularly serviced and maintained.
  - *To prevent soil pollution;*
  - *To limit soil compaction;*
  - *To curb soil erosion; and*
  - *To reinstate a growth medium able to sustain plant life.*

**Land capability:**

- To minimise the reduction of land capability.

**Sensitive landscapes:**

- To protect sensitive landscapes from potential negative impacts.

- Maintain buffer areas.

**Surface environment - waste management:**

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

**n) Specific information required by the Competent Authority**

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

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

The holder of a right as described in the relevant sections of the MPRDA and its regulations must provide the Department of Mineral Resources (DMR) with sufficient financial provision. Officials in the DMR Regional Offices are required to assess, review and approve the quantum of financial provision submitted (that is, the monetary value of the financial provision that has been computed by the holder of a prospecting right, mining right or mining permit during the annual review) as being sufficient to cover the environmental liability at that time and for closure of the mine at that time.

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

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

## 2) UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports;
- b) the inclusion of comments and inputs from stakeholders and I&APs;
- c) the inclusion of inputs and recommendations from the specialist reports where relevant; and
- d) that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.



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Signature of the environmental assessment practitioner:

Wadala Mining and Consulting (Pty) Ltd

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Name of company:

Date: 12 October 2020

**-END-**



## APPENDIX 1

### CURRICULUM VITAE

**Roelina Henriette Oosthuizen**

**Cell: 084 208 9088**

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

#### 1. PERSONAL INFORMATION

Name: Roelina Henriette Oosthuizen

Surname: Oosthuizen (Maiden: Alberts)

Identity number: 7004180037082

Date of birth: 18 April 1970

Gender: Female

Marital status: Married (26 years) with 3 children

Driving license: Yes, Code EB

Languages: Fluent in Afrikaans and English

Nationality: South African

Criminal offences: None

Health: Excellent, fit

## **2. SYNOPSIS OF PROFESSIONAL CAREER**

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

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

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

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

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

## **3. QUALIFICATIONS**

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

#### 4. TRAINING COURSES

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

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

#### 5. PROFESSIONAL REGISTRATION

Registered Environmental Assessment Practitioner: Number 2019/1467 at EAPASA (Environmental Assessment Practitioners Association of South Africa).

Registered as a professional at IAIAAsa (International Association for Impact Assessment South Africa). IAIAAsa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisations code of ethics.

#### 6. PROFESSIONAL EXPERIENCE

Projects are listed below by area of expertise.

##### Environmental Management Systems (EMS) and Environmental Auditing

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

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

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

Performance Assessment reports for a mining company near Douglas.

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

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

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

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

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

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

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

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

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

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

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

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

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

## **7. CAREER PATH**

*01 April 1997 to 28 February 2005*

**DEPT OF MINERALS & ENERGY**

*Senior Environmentalist - Assistant Director Environment*

### **MAIN JOB FUNCTIONS**

- Collect analyse and interpret information regarding the measurement of impacts of mining operations on the environment, the rehabilitation of land surfaces.
- The prevention, control and combating of pollution.
- Co-ordinate and prioritise the rehabilitation of derelict and ownerless mines.
- Co-ordinate, investigate, audit and resolve environmental problems in conjunction with the Department of Water Affairs and Forestry, Department of Agriculture and the provincial Department of Tourism, Environment and Conservation.

- Address complaints and inquiries received from the public and mining industry.
- Consult with relevant authorities and interested and affected people regarding the approval of Environmental Management Programmes.
- Ensuring that rehabilitation standards are applied.
- Ensuring that the requirements stated in Environmental Management Programme Reports are adhered to.
- Conduct inspections and recommendations on mines that apply for closure.
- Evaluate mining licences and prospecting applications and recommend site-specific conditions according to legislative requirements.
- Constant liaison with the public, the mining industry and other government authorities on environmental matters, legislation and agreements.
- Influence new development processes through participation in the EMPR and EIA processes and give guidance through education and awareness programmes.
- Calculate and verify financial provision for outstanding rehabilitation.

**01 March 2005 – 30 September 2012**

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

**MAIN JOB FUNCTIONS**

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

Undertaking of environmental reviews, audits and management plans:

Formulation of an environmental policy and guidelines for the Group.

Participation in the development of the budget for environmental expenditure.

Co-ordination of technical studies (e.g. monitoring of groundwater quality).

Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. Forestry Licences and water sampling for Water Use Licences).

Development of environmental guidelines for contractors on sites.

Liaison with regulatory authorities on compliance with environmental legislation.

Documentation of environmental incidents.

Environmental awareness and training.

Development of a public participation strategy.

Formulation of a complaint's procedure.

**01 October 2012 to 29 February 2020**

Appointed as professional Mineral Law Administration and Environmental Manager for **Mentor Trade and Investments Pty Ltd**

**MAIN JOB FUNCTIONS**

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

Undertaking of environmental reviews, audits and management plans.

Formulation of an environmental policy and guidelines for the Mine.

Co-ordination of technical studies (e.g. monitoring of groundwater quality) as well as updating of the Mine's IWWMP.

Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. as water sampling and effluent).

Development of environmental guidelines for contractors.

Liaison with regulatory authorities on compliance with environmental legislation.

Documentation of environmental incidents.

Environmental awareness and training.

Development of a public participation strategy.

Formulation of a complaint's procedure.

**01 March 2020 to Present full time**

*Appointed as EAP on projects for **Wadala Mining and Consulting Pty Ltd***

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

*Undertaking of environmental reviews, audits and management plans.*

*Liaison with regulatory authorities on compliance with environmental legislation.*

*Environmental awareness and training.*



APPENDIX 2





## APPENDIX 3 PUBLIC PARTICIPATION