mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT

# AND

# ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

## PROSPECTING RIGHT APPLICATION OF DIAMONDS ALLUVIAL & DIAMONDS GENERAL NEAR BARKLY WEST ON THE REMAINING EXTENT AND PORTION 6 OF THE FARM NOOITGEDACHT 66, REGISTRATION DIVISION: KIMBERLEY, NORTHERN CAPE PROVINCE

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** | **Morgenson Mining CC** |
| **PREPARED BY** | **Milnex 189 CC** |
| **TEL NO** | (018) 011 1925 |
| **FAX NO** | 087 231 7021 |
| **POSTAL ADDRESS:** | P.O. Box 1086, Schweizer-Reneke, 2780 |
| **PHYSICAL ADDRESS:** | 4 Botha Street, Schweizer-Reneke, 2780 |
| **FILE REFERENCE NUMBER SAMRAD:** | **NC30/5/1/1/2/11894PR** |

# CLAUSE

This report has been compiled by Milnex 189 CC, using information provided by **Morgenson Mining CC** the client as well as third parties, which information has been presumed to be correct. While Milnex 189 CC have made every endeavour to supply accurate information, and exercised all care, skill and diligence in the drafting of this report, errors and omissions may occur. Accordingly, Milnex 189 CC does not warrant the accuracy or completeness of the materials in this report. Milnex 189 CC does not accept any liability for any loss or damage which may directly or indirectly result from any advice, opinion, information, representation or omission, whether negligent or otherwise, contained in this report. Milnex 189 CC does not accept any liability for any loss or damage, whether direct, indirect or consequential, arising out of circumstances beyond the control of Milnex 189 CC, including the use and interpretation of this report by the client, its officials or their representatives or agents. This document contains information proprietary to Milnex 189 CC and as such should be treated as confidential unless specifically identified as a public document by law. Milnex 189 CC owns all copyright and all other intellectual property rights in this report. The document may not be copied, reproduced in whole or in part, or used for any manner without prior written consent from Milnex 189 CC. Copyright is specifically reserved in terms of the Copyright Act 98 of 1987 including amendments thereto. By viewing this disclaimer and by accepting this document, you acknowledge that you have read and accepted these Terms of Use and undertake to keep the information contained herein confidential and not to do any act or allow any act which is in breach of these Terms of Use.

## 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 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 furthermore 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.

## ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

(1) The environmental impact assessment process must be undertaken in line with the approved plan of study for environmental impact assessment.
(2) The environmental impacts, mitigation and closure outcomes as well as the residual risks of the proposed activity must be set out in the environmental impact assessment report.

## OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

2. The objective of the environmental impact assessment process is to, through a consultative process-
(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
(d) determine the--
(i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
(ii) degree to which these impacts-
(aa) can be reversed;
(bb) may cause irreplaceable loss of resources, and
(cc) can be avoided, managed or mitigated;
(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
(g) identify suitable measures to avoid, manage or mitigate identified impacts; and
(h) identify residual risks that need to be managed and monitored.

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## OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT

**1)** Contact Person and correspondence address

**a)** Details of:

**i) The EAP who prepared the report**

(a) Name of Practitioner: Danie Labuschagne
Tel No.: (018) 011 1925
Fax No. : (053) 963 2009
e-mail address: danie@milnex-sa.co.za

(b) Name of Practitioner: Percy Sehaole
Tel No.: (018) 011 1925
Fax No. : (053) 963 2009
e-mail address: percy@milnex-sa.co.za

**ii) Expertise of the EAP.**

(1) **The qualifications of the EAP**
(With evidence attached as **Appendix 1**).

Danie Labuschagne holds a Master's Degree in Environmental Management and Geography (refer to **Appendix 1**)

Percy Sehaole holds a Master's Degree in Environmental Science (refer to **Appendix 1)**

(2) **Summary of the EAP's past experience**.
(Attach the EAP's curriculum vitae as **Appendix 2**)

Milnex 189 CC was contracted by **Morgenson Mining CC** as the independent environmental consultant to undertake the Scoping and EIA process for a prospecting right for the prospecting of diamonds alluvial & diamonds general on the remaining extent and Portion 6 of the farm Nooitgedacht 66, Registration Division: Kimberley, Northern Cape Province, situated within the Sol Plaatjie Local Municipality area of jurisdiction. The property is located approximately 15.9km South East of Barkly West. Milnex 189 CC does not have any interest in secondary developments that may arise out of the authorisation of the proposed project.

Milnex 189 CC is a specialist environmental consultancy with extensive experience in the mining industry which provides a holostic encironmental management service, including environmental assessment and planning to ensure compliance with relevant environmental legislation. Milnex 189 CC benefits from the pooled resources, diverse skills and experience in the environmental and mining field held by its team that has been actively involved in undertaking environmental studies for a wide variety of mining related projects throughout South Africa. The Milnex 189 CC team has considerable expierence in environmental impact assessment and environmental management, esprcially in the mining industry.

Percy Sehaole & Danie Labuschagne have experience consulting in the environmental field. Their key focus is on environmental assessment, advice and management and ensuring compliance to legislation and guidelines. They are currently involved in undertaking EIAs for several projects across the country (refer to **Appendix 2** for CV)

b) **Description of the property.**

| | |
|---|---|
| **Farm Name:** | 1.The remaining extent of the farm Nooitgedact 66<br>Registration Division: Kimberley RD<br>Extent: 3171.0104 hectares<br>Title Deed: T404/1977<br><br>2.Portion 6 of the farm Nooitgedacht 66<br>Registration Division: Kimberley RD<br>Extent: 1449.5964 hectares<br>Title Deed: T2119/1981 |
| **Application area (Ha)** | 4620.6068 hectares |
| **Magisterial district:** | Kimberley |
| **Distance and direction from nearest town** | The property is located approximately 15.9km South East of Barkly West in the Northern Cape Province. |
| **21 digit Surveyor General Code for each farm portion** | 1.C03700000000006600000<br>2.C03700000000006600006 |

c) **Locality map**
(show nearest town, scale not smaller than 1:250000 attached as **Appendix 3).**

A Locality map is attached in **Appendix 3** and on figure 1 below.

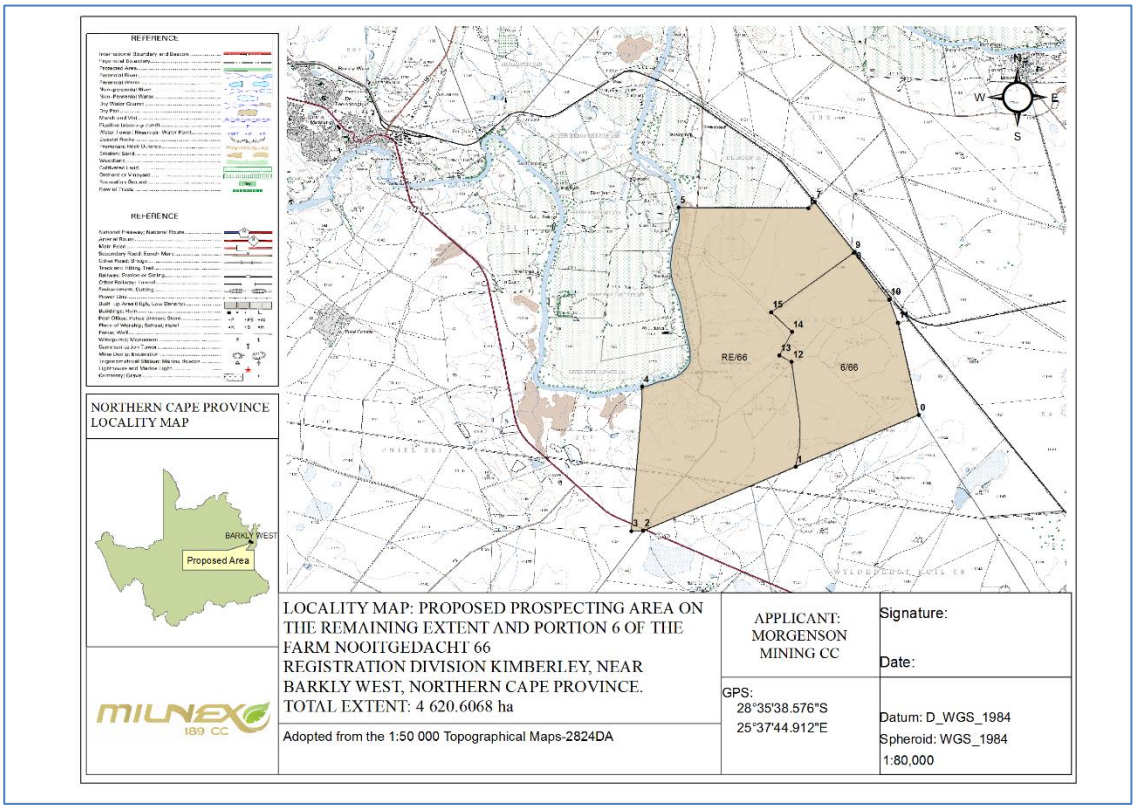



**Figure 1:** Locality Map

### Farm co-ordinates

| FID | X | Y | X2 | Y2 |
|---|---|---|---|---|
| 0 | 24° 40' 10.126"" E | 28° 36' 41.789"" S | 24.669479355200000 | -28.611607917299999 |
| 1 | 24° 38' 11.567"" E | 28° 37' 31.751"" S | 24.636546287900000 | -28.625486305199999 |
| 2 | 24° 35' 43.956"" E | 28° 38' 33.399"" S | 24.595543302500001 | -28.642610773500000 |
| 3 | 24° 35' 32.533"" E | 28° 38' 33.812"" S | 24.592370228000000 | -28.642725682999998 |
| 4 | 24° 35' 42.997"" E | 28° 36' 14.435"" S | 24.595276949999999 | -28.604009603000002 |
| 5 | 24° 36' 18.137"" E | 28° 33' 21.355"" S | 24.605038141000001 | -28.555931990000001 |
| 6 | 24° 38' 23.855"" E | 28° 33' 22.093"" S | 24.639959817000001 | -28.556136873000000 |
| 7 | 24° 38' 29.759"" E | 28° 33' 15.918"" S | 24.641599664000001 | -28.554421534999999 |
| 8 | 24° 39' 8.395"" E | 28° 34' 4.192"" S | 24.652331877999998 | -28.567831038000001 |
| 9 | 24° 39' 7.401"" E | 28° 34' 4.908"" S | 24.652055740600002 | -28.568029922000001 |
| 10 | 24° 39' 41.738"" E | 28° 34' 50.144"" S | 24.661594022999999 | -28.580595551999998 |
| 11 | 24° 39' 49.882"" E | 28° 35' 12.513"" S | 24.663856008000000 | -28.586809281000001 |
| 12 | 24° 38' 7.506"" E | 28° 35' 50.436"" S | 24.635418341000001 | -28.597343443000000 |
| 13 | 24° 37' 55.796"" E | 28° 35' 44.445"" S | 24.632165576999999 | -28.595679141000002 |
| 14 | 24° 38' 7.698"" E | 28° 35' 21.596"" S | 24.635471606999999 | -28.589332231000000 |
| 15 | 24° 37' 47.590"" E | 28° 35' 2.375"" S | 24.629885975000001 | -28.583993055000001 |

**Description of the scope of the proposed overall activity.**

**i) Listed and specified activities**

Provide a plan drawn to a scale acceptable to the competent authority but not less 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 and attach as **Appendix 4**

Refer to Site Plan included within **Appendix 4** and on figure 2 below.

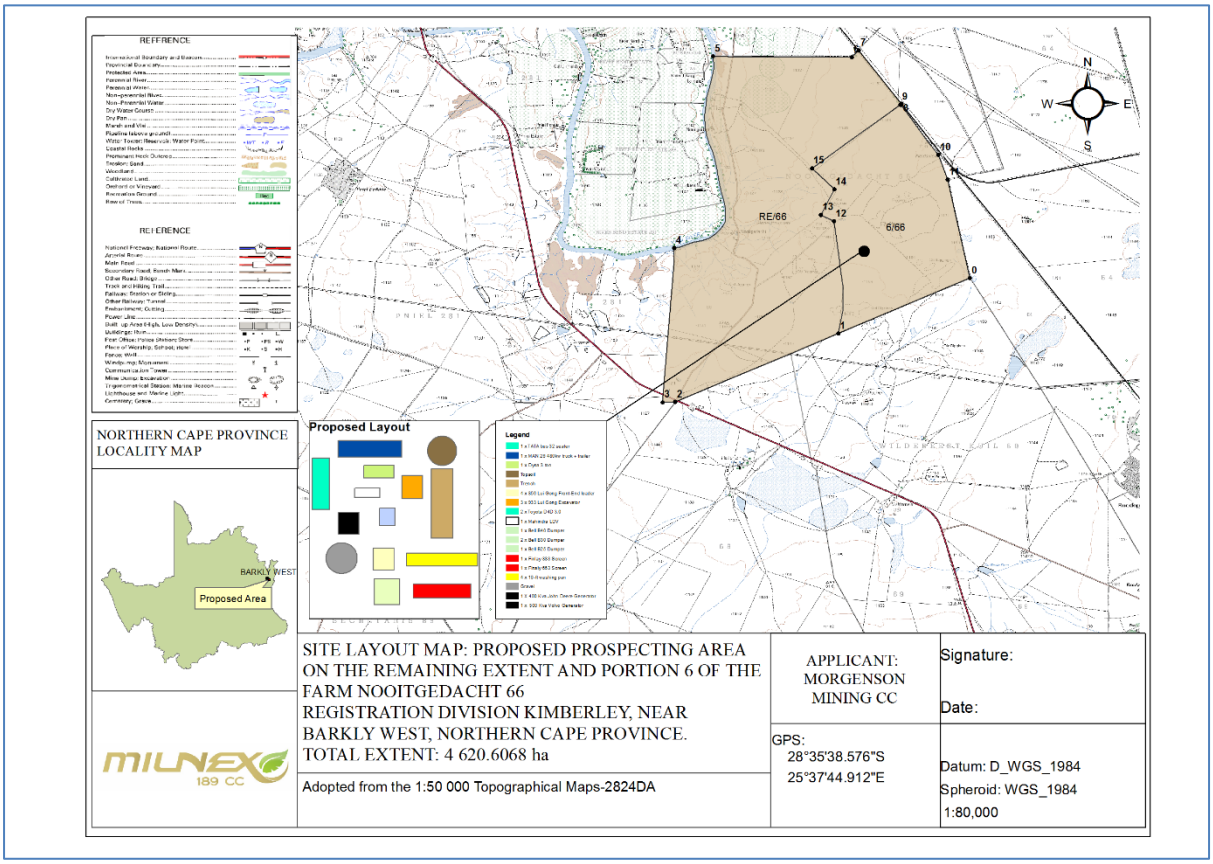



**Figure 2:** Site Plan Map

| **NAME OF ACTIVITY (All activities including activities not listed) (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)** | **Aerial extent of the Activity Ha or m²** | **LISTED ACTIVITY Mark with an X where applicable or affected.** | **APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985)/NOT LISTED*** |
|---|---|---|---|
| Clearance of indigenous vegetation | 4620.6068 hectares - Only the areas where prospecting takes place, will be cleared. Concurrent backfilling will take place in order to rehabilitate. | X | GNR. 984 |
| Office and Workshop | 50m² | - | - |
| Roads | +- 10Km | - | GNR. 983 |

| | | | |
|---|---|---|---|
| Stockpiling op topsoil | 4620.6068 ha – 50m x 30m x 5m x 50 = 375 000m³ | - | - |
| Prospecting of Diamond Alluvial - Excavations | 4620.6068 ha – 5m x 3m x 5m pit (200 pits), 50m x 30m x 5m trench (50 trenches) | X | GNR. 984 |
| Processing Plant | 1 x 16 Ft Pan with Conveyor – 330 000 tons to be washed | X | - |

**Listed activities**

| | |
|---|---|
| **Description of the overall activity.**<br>**(Indicate Mining Right, Mining Permit, Prospecting right, Bulk Sampling, Production Right, Exploration Right, Reconnaissance permit, Technical co-operation permit, Additional listed activity)** | ***1. Listing Notice GNR 984, Activity 15****:"The clearance of an area of 20 hectares or more, of indigenous vegetation."* – Random indigenous vegetation clearance of over a 4620.6068 hectare area.<br><br>***2.*** **Listing Notice GNR 984, Activity 19**: "The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resource4s Development Act (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)" – Prospecting right with bulk samples for the mining of Diamond Alluvial (DA) and Diamond General (D) including associated infrastructure, structures and earthworks.<br><br>**3. Listing Notice GNR 984, Activity 21:** "Any activity including the operation of that activity associated with the primary processing of a mineral resource including winning, reduction, extraction, classifying, concentrating, crushing, screening and washing but excluding the smelting, beneficiation, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies."<br><br>4. **Listing Notice GNR 983, Activity 20**: "Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 |

| | |
|---|---|
| | (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource…" – Prospecting right with bulk samples for the mining of Diamond Alluvial (DA) and Diamond General (D)including associated infrastructure, structure and earthworks. |

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

(Describe Methodology or technology to be employed, and for a linear activity, a description of the route of the activity

Morgenson Mining CC has embarked on a process for applying for a prospecting right for the prospecting of diamonds alluvial & diamonds general on the remaining extent and Portion 6 of the farm Nooitgedacht 66, Registration Division: Kimberley, Northern Cape Province. These portions are preferred due to the sites expected mineral resources. Morgenson Mining CC requires a prospecting right in terms of NEMA and the Mineral and Petroleum Resources Development Act to mine diamonds alluvial, diamonds general within the SP Local Municipality, Northern Cape Province (refer to a locality map attached in **Appendix 3**).

Access roads

Several existing roads and tracks already traverse the proposed prospecting site and where practicable, these roads will be used.

Temporary access roads may be established for repeated access to the site if the identified site cannot be access via existing roads and tracks, but this should be limited and the location thereof should be corresponded with and approved by the property owner.

These roads should also be normal two-tracked farm roads.

Water Supply

Water will be obtained from the river. After the prospecting right is granted to the applicant, the applicant will apply for such.

It is anticipated that if water should be brought onto site, that water will be sourced from the applicant's other farm through borehole abstraction.

Additional water requirements related to the portable water supply for employees and workers.

No new water storage dams will be needed. The existing dam close to the old processing plant area will be used.

The first option will be to pump the slurry directly back in the correct sequence into the trenches, but if a puddle/fines residue dam is needed two 100m x 100m x 4m slime dams will be constructed within the existing slimes dam. After prospecting, all will be rehabilitated as far as possible.

Ablution

Chemical toilets shall be used, no french drains and pits shall be permitted.

Blasting

According to the client blasting is not expected to take place. If such activity is to take place, the land owners and surrounding land owners should be notified and applicable schedule should be concluded. Also, accredited consultants will be appointed if blasting is needed and explosives will not be stored close to any buildings.

Storage of dangerous goods

During the prospecting activities, limited quantities of diesel and fuel, oil and lubricants will be stored on site. These goods should be placed in a bunded area one and a half times the volume of the total amount of goods to be stored.

Prospecting activities and phases

Please find the Prospecting Work Programme attached as **Appendix 8**.

**Phase 1 – Site Visit**

A site visit will be conducted within 3 months after execution of the Prospecting Right. It is envisaged that the information will be obtained from the site visit to do the desktop studies and other prospecting activities. This site visit is relevant to the general manager and other employees of the mine to determine the first area of prospecting. Two of Milnex's EAPs visited the site on two different occasions, namely: 13 December 2016 (Me. Lizanne Esterhuizen) and 9 May 2017 (Mr. Danie Labuschagne).

**Phase 2 – Desktop Studies**

Desktop studies will be undertaken after a site investigation was done to determine the target areas including the identification of any infrastructure to be build and any potential problems that may need to be addressed.

**Phase 3 – Pitting**

Pits will be dug by an excavator to look for gravel. If gravel is found, the applicant will determine the composition and quality of the gravel.

It is envisaged that 200 pits will be dug. It may be less depending on results.

4620.6068 ha – 5m x 3m x 5m (200 pits). It is planned that only 50 pits will be excavated in the first year, but it may be more if the process is quicker than planned for. It should be kept in mind that no more than 200 pits will be excavated.

The total area to be disturbed a year will be- 50 pits x (5m x 3m) = 0.075Ha per year.

**Phase 4 – Trenches**

The applicant will proceed with this way of prospecting by means of the open cast / trenching method, simultaneously or after pitting depending on the information obtained from the earlier work done. The trenches will be dug to remove and to wash the gravel. It will be washed by 1 x 16 feet washing pan to determine diamond proceeds per 100 ton of gravel.

4620.6068 ha - 50m x 30m x 5m trench (50 trenches). It is planned that only 10 trenches will be excavated in the first year, but it may be more if the process is quicker than planned for. It should be kept in mind that no more than 50 trenches will be excavated.

The total area to be disturbed a year will be- 10 trenches x (50m x30m) = 1.5 Ha per year. No more than 1.575 ha will be left as un-rehabilitated in two years. Rehabilitation will be done concurrently.

It should also be mentioned that the first option will be to pump the slurry directly back in the correct sequence into the trenches, but if a puddle/fines residue dam is needed two 100m x 100m x 4m slime dams will be constructed within the existing slimes dam in order to minimize the impacts. Furthermore, the existing residue dam will be sloped as far as possible after drying. After the prospecting right is granted to the applicant, the applicant will apply for such with the Department of Water and Sanitation.

**Phase 5 – Consolidation and interpretation**

All data will be consolidated and processed to determine the diamond bearing resource on the property. This will be a continuous process throughout the prospecting work. Each phase of prospecting will be followed by desktop studies involving interpretation and modeling of all data gathered and how the applicant will proceed with the work program in terms of activity, quantity, resources expenditures and duration. A pre-feasibility study will be done to determine the preliminary economic assessment of the resource and to determine whether additional evaluation of the deposit will be warranted to increase confidence in the resource estimation. Prospecting work will be conducted by a multi-disciplinary team to determine whether the resource can be viable exploited and if the results can support an application for a mining right.

**Phase 6 – Rehabilitation and Closure**

- Remove all prospecting related infrastructure
- Return tailings and overburden to the excavation in order to fill up the excavation.
- Place topsoil on top of the backfilled excavation.
- Rehabilitate disturbed areas appropriately

## d) 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** |
|---|---|
| The Constitution of South Africa (Act No. 108 of 1996) | - |
| The National Environmental Management Act (Act No. 107 of 1998) | S24(1) of NEMA<br>S28(1) of NEMA |
| The National Water Act (Act No. 36 of 1998) | S21 (a)(b) of NWA |
| Management: Air Quality Act (Act No. 39 of 2004) | S21 |
| The National Heritage Resources Act (Act No. 25 of 1999) | - |
| Conservation of Agricultural Resources Act (Act No. 85 of 1983) | - |
| Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) | - |

| | |
|---|---|
| National Infrastructure Plan | - |
| Frances Baard District Municipality Integrated Development Plan (IDP) | - |
| Sol Plaatjie Local Municipality Integrated Development Plan (IDP) Review | - |
| National Forests Acts, Act 84 of 1998 | Chap 3 (Part 1)<br>1998<br>S12(1)<br>S15(1) |

b) **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).

Prospecting rights and mining permits have been applied for all around the proposed site, and the outcome of that studies suggest the possibility of encountering further diamond deposits. Proof of previous prospecting/mining activities also occurred on site.

Prospecting as defined by the MPRDA: "intentionally searching for any mineral by means of any method - which disturbs the surface or subsurface of the earth, including any portion of the earth that is under the sea or under other water; or in or on any residue stockpile or residue depos it, in order to establish the existence of any mineral and to determine the extent and economic value thereof; or in the sea or other water on land" therefore Morgenson Mining CC applied for a prospecting right on the mentioned properties in order to determine the presence of diamonds, as expected, and to determine whether it will be feasible to enter into further studies.

The Northern Cape Province is an important supplier of rough diamonds to the international market and is a large corner stone of the South African economy.

**c) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site.**
NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

**Location of the site**

The location of the site is preferred due to the expected presence of shallow diamonds. Access will be obtained from gravel road off the R31.

**Preferred activity**

The prospecting of diamonds alluvial, diamonds general and diamonds is one of the optimum preferred activities for the site. The other is agricultural and educational and the impact thereon should be limited. The shallow diamond deposits make the site ideal for alluvial diamond mining. The mine will provide additional job opportunities than what is providing currently.

**Technology alternatives**
In terms of the technologies proposed, these have been chosen based on the long term success of their prospecting history. The prospecting activities proposed in the Prospecting Works Programme (**Appendix 9**) is dependent on the preceding phase as previously discussed, therefore no alternatives are indicated, but rather a phased approach of trusted prospecting techniques.

The preferred technology for the proposed mining activity, will be to remove the diamond bearing gravel with an excavator, depositing it in the 10 – 18 feet rotary pan(s) to be washed and sorted. Please find the Prospecting Work Programme attached as **Appendix 9**.
Pros & Cons of the alternative **Dense Media Separation (DMS)**

| **Advantages** | **Disadvantages** |
|---|---|
| DMS plants is used mostly for kimberlite deposits | 10 times more expensive than Rotary pan |
| | Water consumption is high |
| | Operating costs are expensive |

In a Dense Media Separation (DMS) plant, powdered ferrosilicon (an alloy of iron and silicone) is suspended in water to form a fluid near the density of diamond (3.52 g/cm3), to which the diamond bearing material is added to begin the separation process of the heavier minerals from the lighter material. Additional separation of the denser material occurs by centrifuge in “cyclones” that swirl the mixture at low and high speeds, forcing the diamonds and other dense minerals to the walls and then out the bottom of the cyclone. Waste water rises at the center of the cyclones and is sucked out and screened to remove waste particles. The DMS process results in a concentrate that generally weighs less than one percent of the original material fed into the plant at the beginning of the process.

Pros & Cons of the alternative **Rotary Pan Plants**

| **Advantages** | **Disadvantages** |
|---|---|
| More cost effective | The industry perception that Rotary Pan Plants yield poorer diamond recoveries |
| Readily available | |
| Generate more work opportunities | |
| Consume less water | |
| Rotary Pan Plants are most often used when mining alluvial deposits | |

In a Rotary Pan plant, crushed ore, when mining kimberlite, or alluvial gravel and soil is mixed with water to create a liquid slurry called “puddle” which has a density in the 1.3 to 1.5 g/cm3 range. The mix is stirred in the pan by angled rotating “teeth”. The heavier minerals, or “concentrate”, settle to the bottom and are pushed toward an extraction point, while lighter waste remains suspended and overflows out of the centre of the pan as a separate stream of material. The concentrate, representing just a small percentage of the original kimberlite ore or alluvial gravels, is drawn off for final recovery of the diamonds.

Both methods are in actual fact used for bulk material reduction and require a further process for the final diamond recovery however, for this project the Rotary Pan will be used.

When it comes to dust suppression two main methods were considered, namely molasses stillage and the wetting (water) of roads. The table below provides a short summary of the advantages and disadvantages of each.

| **Water** | **Molasses stillage** |
|---|---|
| More cost effective | Much more expensive |
| Could lead to the depleting of water resources | Requires less water |
| No damage (only if used excessively) | The product may be toxic to aquatic organisms. (As this product could have |

| | |
|---|---|
| | physical effects on aquatic organisms for e.g. floating, osmotic damage) |
| No harm to humans or animals(Only a high quantity will have harm to humans or animals) | Not Hazardous or toxic.<br>Could cause irritation to eyes, skin or when ingested and inhaled. |
| Non-flammable | Non-flammable |
| Eye-wash fountains not needed | Eye-wash fountains in the work place are strongly recommended |
| | Working procedures should be designed to minimize worker exposure to this product. |
| Basic storing methods | Storing methods are a bit more complicated. Should be stored in a plastic, plastic lined or stainless steel, tight closed containers between 5 and 40 degrees Centigrade. |

Considering the above mentioned information, water will be used for dust suppression purposes. After the prospecting right is granted to the applicant, the applicant will apply for such with the department.

### i) Details of all 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.

**Consideration of alternatives**

The DEAT 2006 guidelines on 'assessment of alternatives and impacts' proposes the consideration of four types of alternatives namely, the no-go, site, activity, and technology alternatives. It is however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer, the EAP and Interested and affected parties, which in some instances culminates in a single preferred project proposal. The following sections explore each type of alternative in relation to the proposed activity.

**Location alternatives**

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. Due to the expected diamonds on the proposed farm portions, no other portions have been identified for this application. Also it is expected that the diamonds alluvial, diamonds general and diamonds have been deposited on this farm and therefore the applicant would like to commence with their prospecting activities.

The proposed development falls within Land in Class V and VII:

- Land in Class V has little or no erosion hazard but have other limitations impractical to remove that limit its use largely to pasture, range, woodland or wildlife food and cover. These limitations restrict the kind of plants that can be grown and prevent normal tillage of cultivated crops. Pastures can be improved and benefits from proper management can be expected.
- It is nearly level. Some occurrences are wet or frequently flooded. Other are stony, have climatic limitations, or have some combination of these limitations.

- Examples of Class V are:
  - Bottomlands subject to frequent flooding that prevents the normal production of cultivated crops.
  - Nearly level land with a growing season that prevents the normal production of cultivated crops.
  - Level or nearly level stony or rocky land.
  - Ponded areas where drainage for cultivated crops is not feasible but which are suitable for grasses or trees.

- Land in Class VII has very severe limitations that makes it unsuited to cultivation and that restrict its use largely to grazing, woodland or wildlife.
- Restrictions are more severe than those for Class VI because of one or more continuing limitations that cannot be corrected, such as:
  - Very steep slopes.
  - Erosion.
  - Shallow soil.
  - Stones.
  - Wet soil.
  - Salts or sodicity.
  - Unfavourable climate.
- Physical conditions are such that it is impractical to apply such pasture or range improvements as seeding, liming and fertilizing.
- Depending on soil characteristics and climate, land in Class VII may be well or poorly suited to woodland.
- In unusual instances some occurrences may be used for special crops under unusual management practices.

(AGIS, 2016) (refer to Land capability map on **figure 3** and attached as **Appendix 5).**

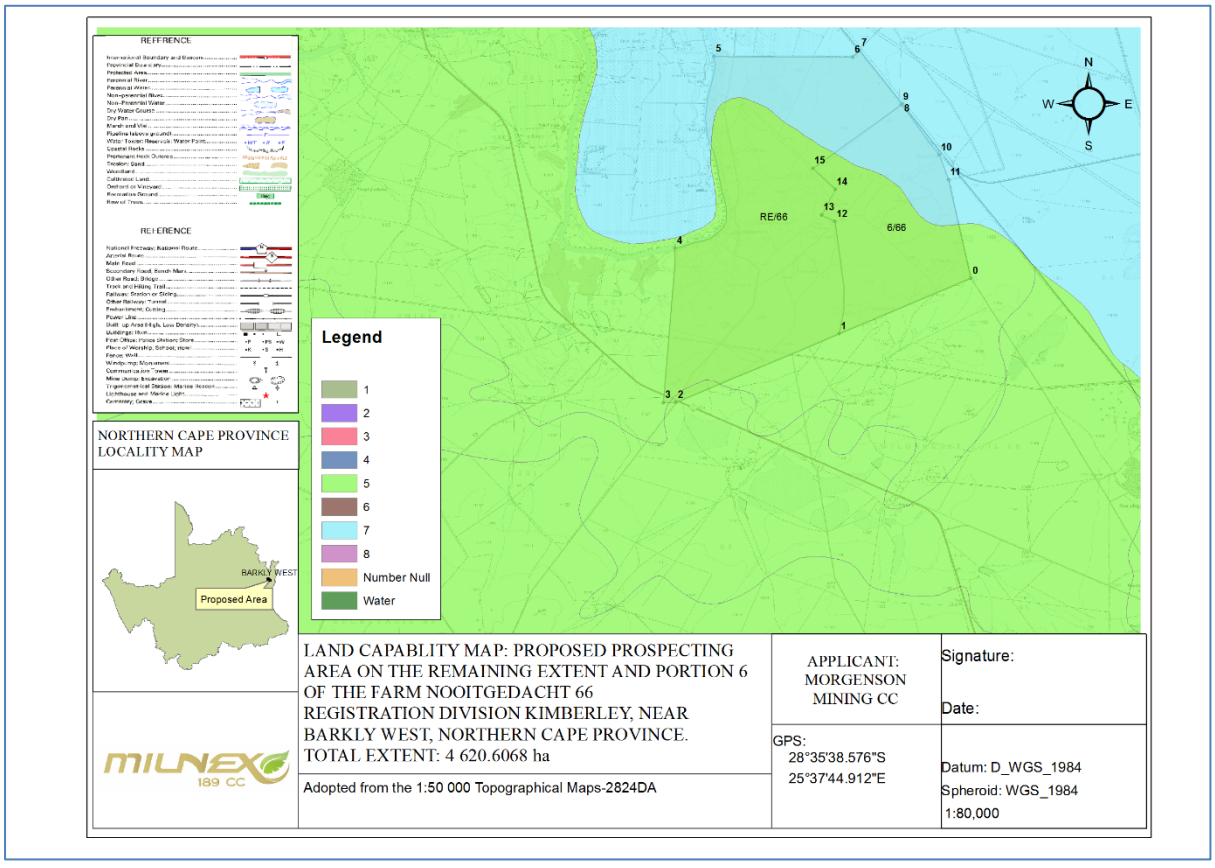



**Figure 3:** Land Capability Map

- **Activity alternatives**

The environmental impact assessment process also needs to consider if the development of an alluvial diamond mine would be the most appropriate land use for the particular site.

Prospecting of other commodities –from the surface and desktop assessment there are no indications that there are other commodities to be mined on the site, except alluvial diamond, diamonds general and diamonds. It should just be kept in mind that this is agricultural land and that the Glacier floors are used for educational purposes .

Agriculture – Due to the site being non-arable in terms of crop production, it may be preferred for grazing although some portions have been transformed for crop production and four centre pivots and a number of crop fields are present in the northern corner of the property.

- **Design and layout alternatives**

The location of activities will be determined based on the location of the prospecting activities, which will only be determined during phase 1 and 2 of the PWP. All the infrastructure will be temporary and/or mobile. The layout follows the limitations of the site and aspects such as, roads, site offices and workshop area as well as fencing– refer **Appendix 3**.

- **Operational alternatives**

Due to the nature of the prospecting activities, no permanent services in terms of water supply, electricity, or sewerage services are required.

The activities will commence with a site investigation and desktop studies, which will comprise of non-invasive techniques. This manner of survey will ensure that the applicant can clearly delineate areas which are suitable for further investigation and no unnecessary surface disturbance will be undertaken.

Based on the outcome of the desktop studies and site investigation, pits will be dug by an excavator for the purpouse of soil sampling. If gravel is found, the applicant wil determine the the composition and quality of the gravel.

The applicant will proceed with this way of prospecting by means of the open cast/trenching method, simultaneously or after pitting depending on the information obtained from the earlier work done. The trenches will be dug to remove and wash the gravel. It will be washed by a 10-18 feet washing pan to determine diamond proceeds per 100 tons of gravel.

All data will be consolidated and processed to determine the diamond bearing resources on the property. This will be a continuous process throughout the prospecting work programme.

No feasible alternatives to the pitting and trenching method currently exists. Impacts associated with the prospecting operations will be managed through the implementation of a management plan, developed as part of the application for authorisation.

- **No-go alternative**

This alternative considers the option of 'do nothing' and maintaining the status quo. The description provided in section H of this report could be considered the baseline conditions (status quo) to persist should the no-go alternative be preferred. The site is currently zoned for agricultural land uses. Should the proposed activity not proceed, the site will remain unchanged and will continue to be used for cattle and game grazing.

## 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.

**Advertisement and Notices**

1. **Newspaper advertisement**

An advertisement was placed in English in the local newspaper (Noordkaap newspaper) on the 30 November 2016 (see **Appendix 6**) notifying the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Milnex 189 CC. I&APs were given the opportunity to raise comments within 30 days of the advertisement.

2. **Site notices**

Site notices were placed on site on the 13 December 2016 in English to inform surrounding communities and immediately adjacent landowners of the proposed development. I&APs were given the opportunity to raise comments. Photographic evidence of the site notices is included in **Appendix 6**. Below are the coordinates where the site notices were placed.

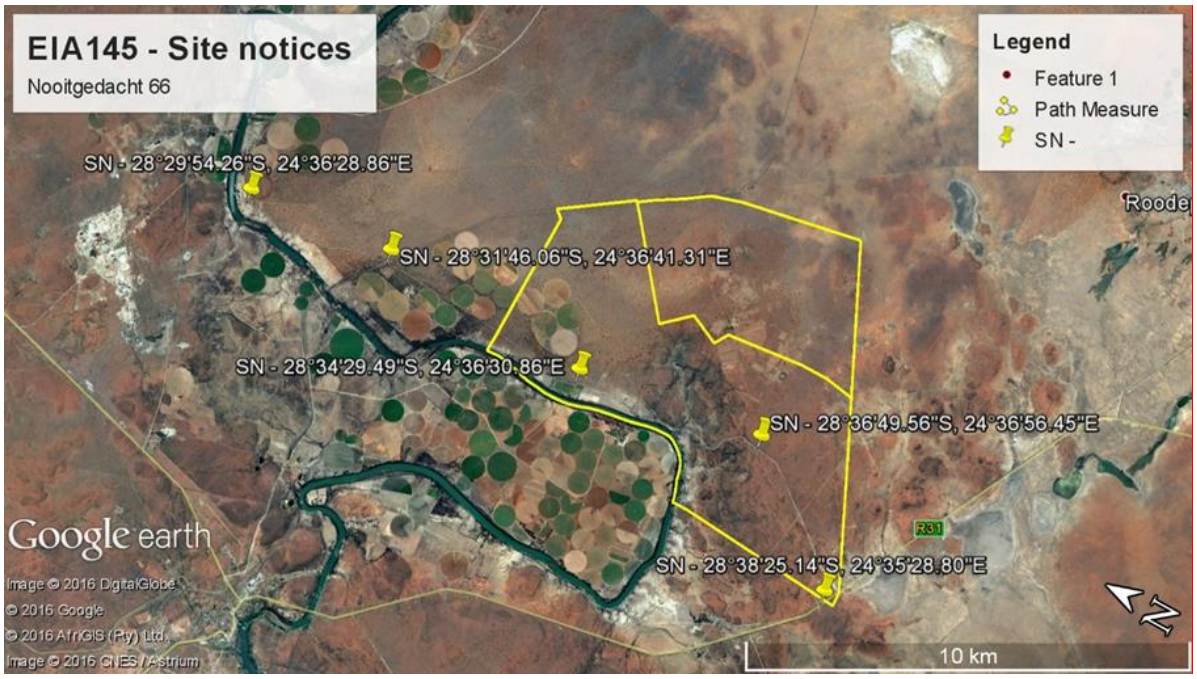



**Figure 4:** Site notices coordinates

3. **Direct notification and circulation of Scoping Report to identified surrounding land owners, occupiers and I&APs**

Identified I&APs, including key stakeholders representing various sectors, are directly informed of the proposed development and the availability of the Scoping Report via registered post on 30 November 2016 and were requested to submit comments by 20 January 2017. A copy of the report is also available at the Milnex offices, Schweizer-Reneke and Potchefstroom, from 7:30 – 17:00, Monday to Friday. For a complete list of stakeholder details and for proof of registered post see Appendix 6. The consultees included:

- Northern Cape Department of Environmental Affairs and Nature Conservation (DEANC)
- DMR Department of Mineral Resources, Northern Cape. (DMR)
- The Department of Water & Sanitation (DWS)
- NC Department of Agriculture, forestry and fisheries (DAFF)
- Department of Agriculture
- Provincial Heritage Resources Agency (PHRA)- Northern Cape
- Department of Roads and Public Works (DRPW)
- Northern Cape Department of Rural Development & Land Reform,
- Frances Baard District Municipality
- WESSA
- Municipal Manager: Sol Plaatjie Local Municipality
- Ward 1 Councilor Sol Plaatjie Local Municipality

It is expected from I&APs to provide their inputs and comments within 30 days after receipt of the notification or Scoping Report.

## 4. Direct notification of surrounding land owners and occupiers

Written notices and the availability of the EIR/EMPR are also provided to all surrounding land owners and occupiers on **20 March 2017.** The surrounding land owners are given the opportunity to raise comments by **24 April 2017**. For a list of surrounding land owners see **Appendix 6**.

## 5. Consultation

All I&AP's were invited to attend the public meeting. The Public Meeting was scheduled for 17 January 2017 at 10:00am – 11:00am at the turn off leading onto the gravel road marked Nooitgedacht from the R31 road.

**Coordinates**
28°38'25.67"S
24°35'29.42"E

The public meeting is an opportunity to share information regarding the proposed development and provide I&APs with an opportunity to raise any issues and provide comments.

The following key stakeholders and surrounding land owners are also directly informed of the public meeting via registered post 30 November 2016:

- Northern Cape Department of Environmental Affairs and Nature Conservation (DEANC)
- DMR Department of Mineral Resources, Northern Cape. (DMR)
- The Department of Water & Sanitation (DWS)
- NC Department of Agriculture, forestry and fisheries (DAFF)
- Department of Agriculture

- Provincial Heritage Resources Agency (PHRA)- Northern Cape
- Department of Roads and Public Works (DRPW)
- Northern Cape Department of Rural Development & Land Reform,
- WESSA
- Municipal Manager: Sol Plaatjie Local Municipality
- Ward 1 Councilor Sol Plaatjie Local Municipality
- Frances Baard District Local Municipality
- Mr. Michael Patrick Hall
- National Government of the Republic of South Africa
- Transnet Ltd
- Eridanus Agriculture Pty Ltd - Mr. Charl Le Roux
- Mr. Benjamin Joseph Nel
- Wildeklawer Pty Ltd - Mr. Louis Daniel Nel de Kock
- Mrs. Cornelia Dorothea de Kock
- Locor Trust
- Üxu & Khwe Vereniging Vir Gemeenskaplike Eiendom
- Droogfontein Communal Prop Acc

## 6. Public meeting

**Land owners:**

Mr. Michael Patrick Hall and his representative Me. Sara Sparks.

**Milnex Representatives:**

Mr. Danie Labuschagne

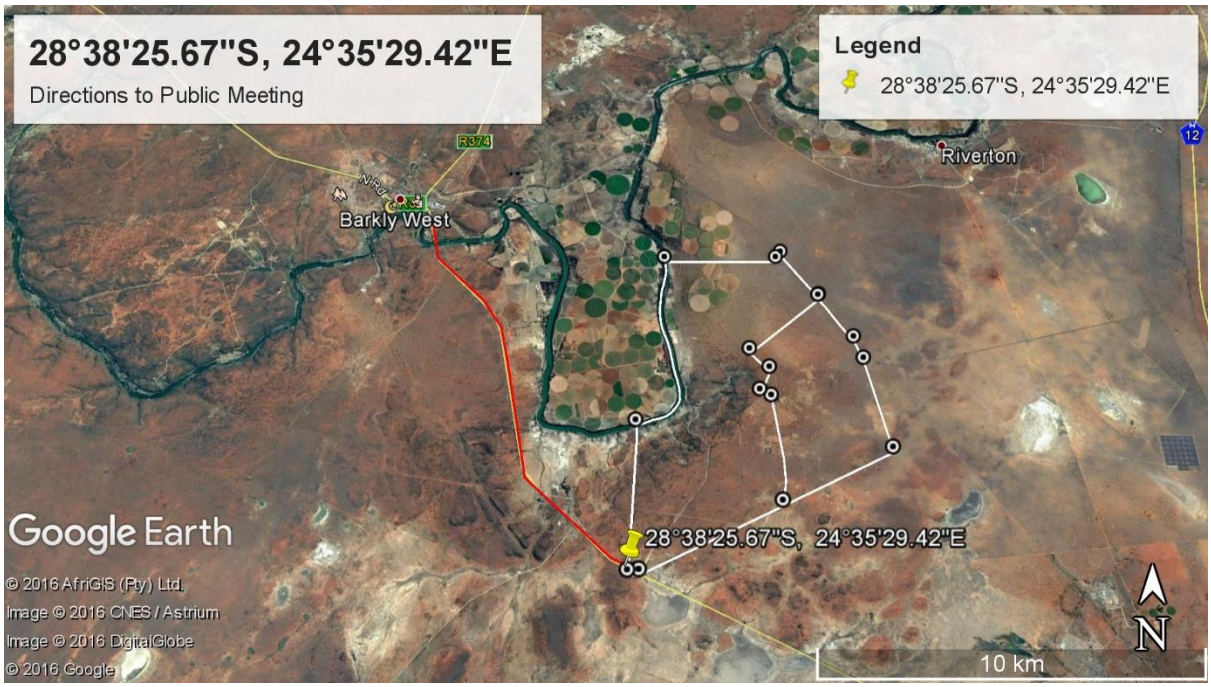



**Figure 5:** Public meeting

## 3. Issues Raised by Interested and Affected Parties

When the comment period ends, comments received will be included in the comments and response table/form (See Appendix 6 for comments and response form).

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

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

| Interested and Affected Parties<br>List the names of persons consulted in this column, and<br>Mark with an X where those who must be consulted were in fact consulted. | | Date Comments Received | Issues raised | EAPs response to issues as mandated by the applicant | Section and paragraph reference in this report where the issue and or response where incorporated |
|---|---|---|---|---|---|
| **Organisation** | **Contact person** | | | | |
| **Land Owner** | | | | | |
| | Mr. Michael Patrick Hall | | In an email dated 16/12/2016, Mr. Hall requested the Dropbox link. | The relevant link was sent to Mr. Hall in an email dated 10/01/2017. | |
| Nooitgedacht RE/66, 6/66 | Me. Sara Sparks (represents Mr. Hall) | | Various emails dating; 20/04/2017,02/05/2017, 03/05/2017, 04/05/2017 sent to and from Me. Sara Sparks. Comments from Me. Sara Sparks were also received.<br><br>In an email dated 19/12/2016, Me. Sparks requested the draft Scoping Report. | Various emails dating; 20/04/2017,02/05/2017, 03/05/2017, 04/05/2017 sent to and from Me. Sara Sparks. Comments from Me. Sara Sparks were answered and emailed to her with the final EIR on 18 May 2017.<br><br>An email, dated 10 January 2017, the relevant document was forwarded to Me. Sparks.<br><br>In an email dated 24/01/2016, the minutes of the meeting was forwarded to Me. Sparks. | |
| **Landowners or lawful occupiers on adjacent properties** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Pniel 281 | National Government of the Republic of South Africa | | No comments received yet | | |
| Farm 2/193 Nooidgedacht 4/66, 7/66 | Transnet Ltd | | No comments received yet | | |
| De Hoop RE/65 | Eridanus Agriculture Pty Ltd<br>Mr. Charl Le Roux | | No comments received yet | | |
| River Bend Estate 5/291 | Mr. Benjamin Joseph Nel | | No comments received yet | | |
| River Bend Estate 1/291<br>River Bend Estate 12/288, 13/288 | Wildeklawer Pty Ltd<br>Mr. Louis Daniel Nel de Kock | | No comments received yet | | |
| | Mrs. Cornelia Dorothea de Kock | | No comments received yet | | |
| River Bend Estate RE/291, 2/291<br>River Bend Estate 24/288 | Locor Trust | | No comments received yet | | |
| Platfontein RE/68<br>Wildebeeste Kuil RE/69<br>Droogfonteinn 2/62 | Üxu & Khwe Vereniging Vir Gemeenskaplike Eiendom | | No comments received yet | | |
| Farm RE/193 | Droogfontein Communal Prop Acc | | No comments received yet | | |
| **The Municipality in which jurisdiction the development is located** | | | | | |
| Sol Plaatjie Local Municipality | Municipal Manager Mr Goolam Akharwaray | | No comments received yet | | |
| **Municipal councilor of the ward in which the site is located** | | | | | |
| Siyancuma Local Municipality | Ward 2 Councillor | | No comments received yet | | |
| Sol Plaatjie Local Municipality | Ward 1 Councillor | | | | |
| **Organs of state having jurisdiction** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Northern Cape Department of Environmental Affairs and Nature Conservation (DEANC) | Mrs. Doreen Werth | | No comments received yet | | |
| DMR Department of Mineral Resources, Northern Cape. (DMR) | DD Mine Environmental Management:<br>Mr Selohela Oliphant | | Letter dated 30/11/2016 states the acknowledgement of the application for an Environmental Authorisation lodged on the 23rd November 2016. The application has been assigned to Machalla Ramaboea. | | |
| Department of Water & Sanitation (DWS) | Mr. Abe Abrahams | | No comments received yet | | |
| DWS Upington | Mr G. van Dyk | | No comments received yet | | |
| Department of Roads and Public Works (DRPW) | HOD: Ms. Ruth Palm<br>Mr Tshiamo Pitso | | No comments received yet | | |
| Ngwao-Boswa Ya Kapa Bokone (NBKB) Provincial Heritage Resources Authority of the Northern Cape | Chairperson: Mr. Stanley Mckenzie | | No comments received yet | | |
| Northern Cape Department of Rural Development & Land Reform, | Land Claims Commissioner: Regional Offices<br><br>Chief Director: Ms Mangalane Du Toit<br><br>Ryan Oliver | | Email received 06/12/2016 containing the requested documents were received. | Emails dated 05/12/2016 is proof of land claims consultation. | |
| NC Department of Agriculture, Forestry and Fisheries (DAFF) | To whom it may concern<br>Chief Forester Mrs J. Mans | | No comments received yet | | |
| **Other–** | | | | | |
| Frances Baard District Local Municipality | Municipal Manager: Mr. Z.M. Bogatsu | | No comments received yet | | |
| WESSA | Mr. John Wesson | | No comments received yet | | |
| I&AP and previous/current right holder - Supermix Mining | Me. Roelien Oosthuizen | | In an email dated 11/05/2017, Me. Roelien Oosthuizen stated the following: | An email was sent on the 18th of May acknowledging their objection. | |

| | | | | | |
|---|---|---|---|---|---|
| | | | Dear Mr. Danie Labuschagne<br><br>With reference to our conversation this morning 11 May 2017 on behalf of Supermix Mining. We wish to notify that we became aware of your application today via Mr. Mike Hall the farm owner.<br><br>We wish to object to your application as it overlaps our conversion application which is in process with reference number (NC) 218 MRC.<br><br>Regards<br><br>Roelien | | |

## iv) The Environmental attributes associated with the sites

### (1) Baseline Environment

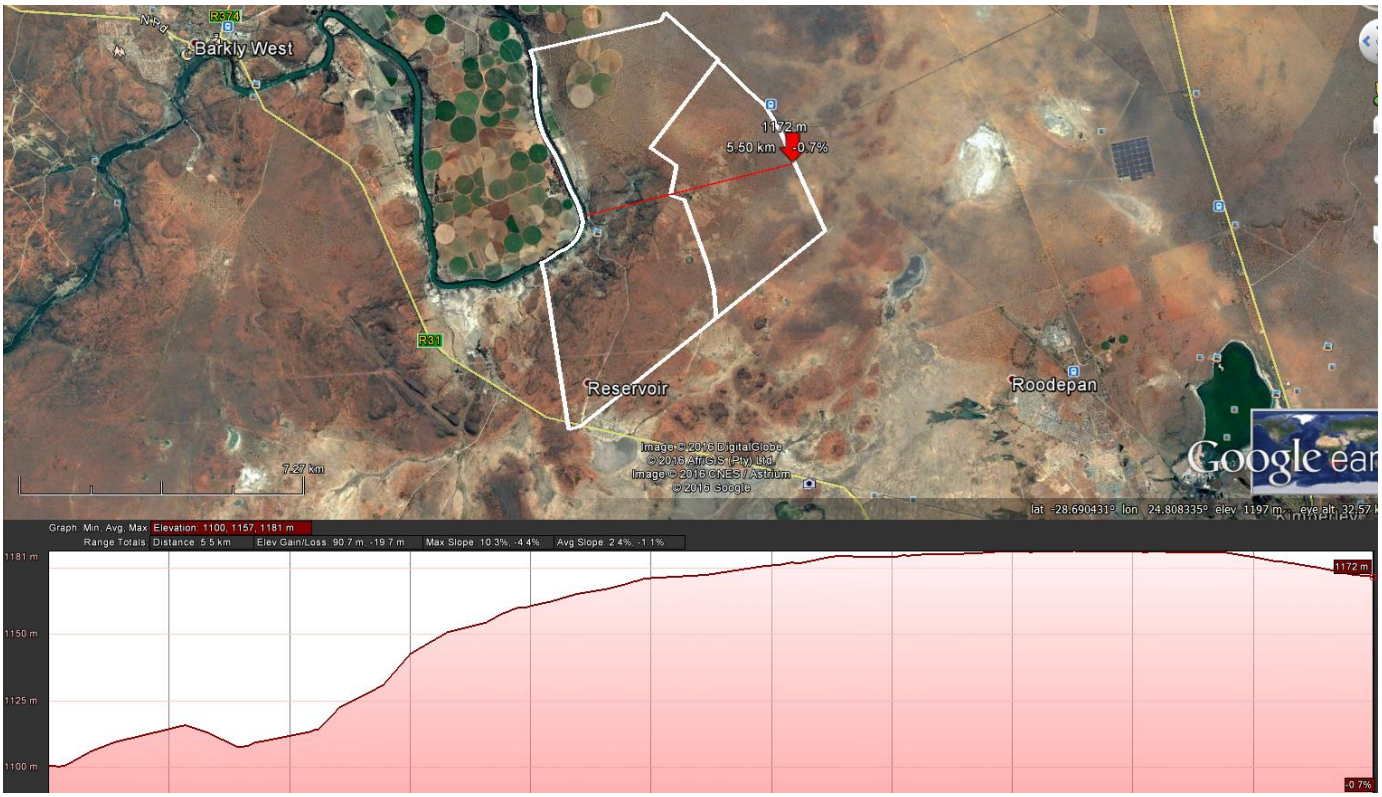
The baseline environment is described with specific reference to geotechnical conditions, ecological habitat and landscape features, Soil, land capability and agricultural potential, climate and the visual landscape.

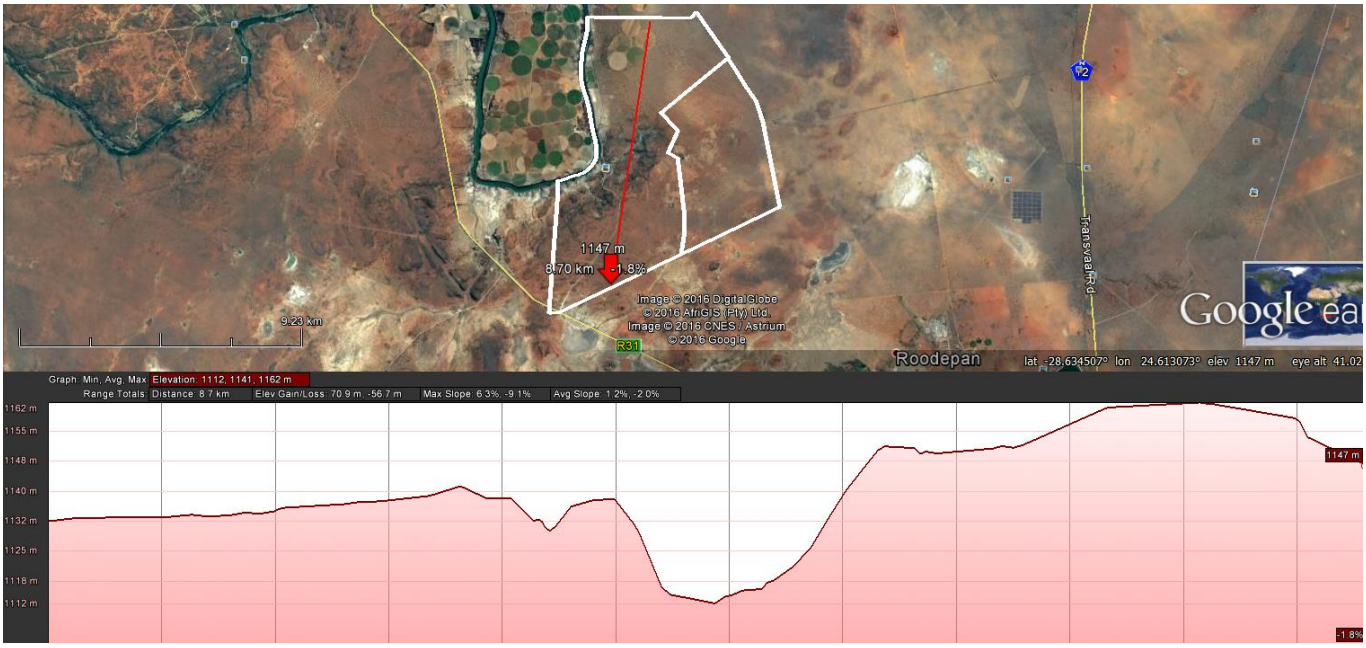
### (a) Type of environment affected by the proposed activity.

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

## Topography

The topography of the area is sloping mainly from east to west towards the river (see profile below), with an elevation of approximately 1100 - 1190 meters above mean sea level.






## Geology and Soils

The area is underlain by the following geological types. Outcrops of the andesitic lavas of the Ventersdorp Supergroup, which is mostly overlain by calcrete, occur in isolated patches as rocky hills. Outcrops of tillite of the Dwyka Formation and shale of the Prince Albert Formation (Karoo Sequence) occur in the north-north-western part of the study area. The largest part of the study area is underlain by Aeolian sand and sometimes alluvial gravels of tertiary to recent age covering Dwyka tillite. Surface limestones occur sporadically in the area. During the 1920s relatively rich diamond deposits were found in the ancient gravel filled water course of the Vaal River within area. The heaps of mixed gravel still present in the area attest to the disturbance to which it was subjected.

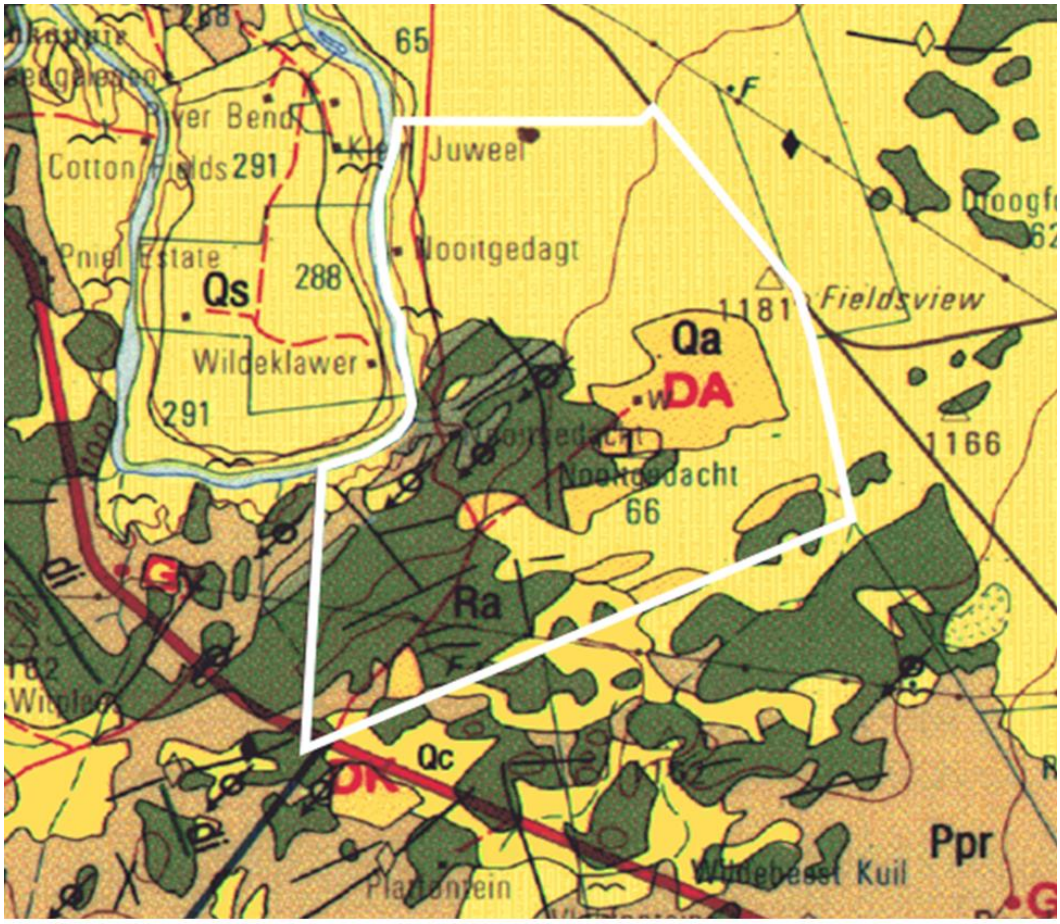
The lavas are green to grey-green in colour. The non-amygdaloidal varieties occur within the study area. The amygdaloidal, which comprise quartz, agate, chalcedony and carnelian are a major source of the Vaal Rover agates. Stratigraphically the larvas belong to the Allenridge formation and represents the uppermost volcanic stage of the Ventersdorp Supergroup. Quartzites of the Bothaville formation which underlies the Allenridge formation, rarely outcrop within the study area and are usually exposed where alluvial diggings have removed the surficial deposits.
The older gravels within the study area occur in channels or so-called “sluits”. One prominent “sluit” is found within the study area, however there exists no evidence in the literature to suggest that the channels are sites of eroded kimberlite dykes.

The area forms further part of the old Palaeo River Valley which flowed from north to south and the Vaal River. The country rocks are lavas of the Ventersdorp Supergroup and remnants of the Dwyka Tillite and Shale. The anticipated deposits are situated in channels and are covered in calcrete in some places. The deposits normally consist of thick medium to coarse grained fluvial gravels of mixed lithological composition. (Lava, Dolomite, Fe-shale, Chert, Quartzite, Agate, Quartz, etc.)

The deposit is further an alluvial gravel deposit situated on bedrock of shale and greywacke of the Dwyka formation. The gravel is underlain by quartzite and shale of the schmidtsdrif formation of the Transvaal

Sequence, as well as carboniferous shale and tillite of the Dwyka Formation of the Karoo Sequence Rock Sequence. Rock types of both sequences found on the deposit are horizontally or near horizontally bedded, and are not conductive to pothole formation. Outcrops of rocks of the Transvaal sequence occur along the western and southern boundaries of the deposit. Deflation Gravel, Sand, Scree, Pebbly sand, Sandy Gravel, Gravel, Boulder gravel and Bedrock are found.

It should also be mentioned that the Geology and the Glacier floors are used for educational purposes.




Qa Alluvial diamondiferous gravel
Alluviale diamantdraende gruis

Qc Calcrete, calcified pandune and surface limestone
Kalkreet, verkalkte panduin en oppervlakkalksteen

Alluvium and scree
Alluvium en glooiingspuin

Qs Sand: Red and grey aeolian dune sand
Sand: Rooi en grys eoliese duinsand

Kimberlite pipe ( ♦ ), fissure ( —◇— )
Kimberliet pyp ( ♦ ), –spleet ( —◇— )

Jd Dolerite: dolerite dyke shown as ( —— )
Doleriet: dolerietgang aangetoon deur ( —— )

Pa Mudstone, sandstone
Moddersteen, sandsteen

Ppr Shale
Skalie

Pt Shale, siltstone, sandstone
Skalie, sliksteen, sandsteen

Pw White-weathering carbonaceous shale
Witverwerende koolstofhoudende skalie

C–Pd Tillite, sandstone, mudstone, shale
Tilliet, sandsteen, moddersteen, skalie

di Diabase dyke ( —— )
Diabaasgang ( —— )

Vgf Coarsely crystalline recrystallised dolomite with interbedded chert and limestone
Grofkristallyne hergekristalliseerde dolomiet met tussengelaagde chert en kalksteen

Vgu Fine-grained dolomite and stromatolitic limestone with interbedded chert; banded-iron-formation marker at the top ( ◁—— )
Fynkorrelrige dolomiet en stromatolitiese kalksteen met tussengelaagde chert; gestreepte ysterformasiemerker aan die bokant ( ◁—— )

Vk Quartz-porphyry dyke ( —— )
Kwartsporfiergang ( —— )

Vsb Oolitic, pisolitic and stromatolitic limestone with interbedded dolomite, siltstone and shale
Oöliti ese, pisolitiese en stromatolitiese kalksteen met tussengelaagde dolomiet, sliksteen en skalie

Vsc Shale with interbedded dolomite and limestone
Skalie met tussengelaagde dolomiet en kalksteen

Vsm Dolomite with stromatolitic limestone, quartzite, shale, flagstone and chert
Dolomiet met stromatolitiese kalksteen, kwartsiet, skalie, plaveisteen en chert

Vv Siltstone, shale, quartzite, gritstone and conglomerate
Sliksteen, skalie, kwartsiet, grintsteen en konglomeraat

Ra Andesite, in places amygdaloidal and/or porphyritic; quartzite and conglomerate lens near bottom ( ◁—— )
Andesiet, op plekke amandelhoudend en/of porfiries; kwartsiet-en-konglomeraatlens naby onderkant ( ◁—— )

Rb Quartzite, conglomerate
Kwartsiet, konglomeraat

Rm Quartz-porphyry
Kwartsporfier

Rr Andesite, dacite, volcanic breccia, tuff, chert
Andesiet, dasiet, vulkaniese breksie, tuf, chert

ZA Granite, gneiss, amphibolite, pegmatite
Graniet, gneis, amfiboliet, pegmatiet

STRUCTURE SYMBOLS
STRUKTUURSIMBOLE

+ Horizontal bed
Horisontale laag

10 Strike and dip of bed, dip in degrees
Strekking en helling van laag, helling in grade

f Fault
Verskuiwing

Undifferentiated linear features
Ongedifferensieerde lineêre verskynsels

Linear features inferred from Landsat images
Lineêre verskynsels afgelei van Landsatbeelde

Lineament inferred from aeromagnetic data
Lineament afgelei vanaf lugfhagnetiese data

Glacial pavement and direction of ice movement
Gletservloer en rigting van ysbeweging

ECONOMIC DATA
EKONOMIESE GEGEWENS

Mine in production
Myn in produksie

Mine not in production
Myn nie in produksie nie

DA Diamond (alluvial)
Diamant (alluviaal)

Ls Limestone
Kalksteen

DK Diamond (in kimberlite)
Diamant (in kimberliet)

Na Salt
Sout

GPp Apophyllite
Apofilliet

QB Building Sand
Bousand

Gy Gypsum
Gips

St Stone aggregate
Klipaggregaat

He Helium
Helium

To Torbanite/Oil shale
Torbaniet/Olieskalie

## Ecological habitat and landscape features

### Flora

It is noted that protected tree species under the National Forests Act No. 84 of 1998 are listed in Table 4.9. In terms of a part of section 51(1) of Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.

In cases where the trees will need to be cut, disturbed, damaged or destroyed or possessed, collected, removed, transported, exported, purchased, sold or donated a flora permit will be applied for with the Northern Cape Department of Environmental Affairs & Nature Conservation.

The proposed area falls within vegetation unit SVk 4 and Aza 5, which is known as the Kimberley Thornveld and Highveld Alluvial Vegetation. (Mucina and Rutherford, 2006). **See figure 6 below and appendix 7**

Highveld Alluvial Vegetation

According to Mucina and Rutherford (2006:640), the Highveld Alluvial Vegetation covers the Free State, North-West, Mpumalanga and Gauteng Provinces as well as Lesotho and Swaziland: with Alluvial drainage lines and floodplains along rivers embedded within the Grassland Biome and marginal (eastern) units of the Kalahari (Savanna Biome), such as along the upper Riet, Harts, upper Modder, upper Caledon, Vet, Sand, Vals, Wilge, Mooi, middle and upper Vaal Rivers etc. and their numerous tributaries. Altitude ranging from 1 000 – 1 500 m.

The area has a relative flat topography supporting riparian thickets mostly dominated by Acacia karroo, accompanied by seasonally flooded grasslands and disturbed herblands often dominated by alien plants.

This has a conservation which is Least threatened with a 31% target. Nearly 10% statutorily conserved in Barberspan, Bloemhof dam, Christiana, Faan Mentjies, Sandveld, Schoonspruit, Soetdoringand Wolwespruit Nature Reserves. More than a quarter has been transformed for cultivation and by building of dams. These areas are prone to invasion by a number of weeds, encouraged by the high nutrient status of soils and ample water supply. The undergrowth of the alluvial riparian thickets and the accompanying grasslands suffer from heavy overgrazing in many places (Mucina and Rutherford, 2006:640).

Kimberley Thornveld

According to Mucina and Rutherford (2006:516), the Kimberley Thornveld vegetation covers the North West, Free State and Northern Cape Provinces: Most of the Kimberley, Hartswater, Bloemhof and Hoopstad Districts as well as substantial parts of the Warrenton, Christiana, Taung, Boshof and to some extent the Barkley West District. This thornveld is situated on an altitude of 1050m – 1400m.

The area often has slightly irregular plains with a well-developed tree layer with *Acacia Erioloba*, *A. tortillis, A. karoo* and *Boscia albitrunca* and a well-developed shrub layer with occasional dense stands of *Tarchonanthus camphoratus* and *A. mellifera*. Grass layer open with much uncovered soil.

Mucina and Rutherford (2006:517) also states that the conservation of this thornveld type, is Least Threatened with a target of 16%. Only 2% of this thornveld is statutorily conserved in Vaalbos National Park and in Sanveld, Bloemhof Dam and S.A. Lombard Nature Reserve. As much as 18% is already transformed, mostly by cultivation. Low erosion is associated with this type of thornveld. The area is mostly used for cattle farming or game ranching. Overgrazing leads to encroachment of *Acacia mellifera subsp. detinens*.

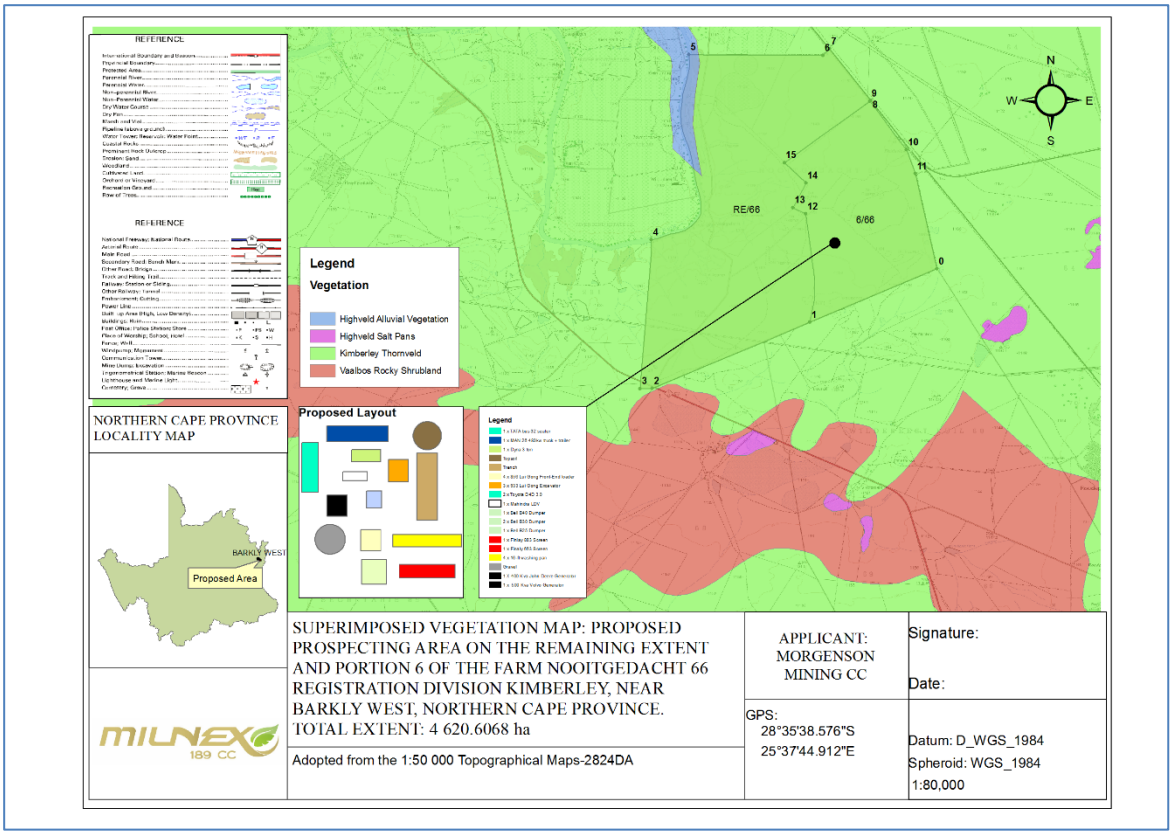



**Figure 6:** Vegetation Unit Map

The above mentioned is confirmed by an Ecological Impact Assessment conducted by Dr. P.J. du Preez in May 2017 (Appendix 11). His results will be presented below:

The project site is on the farm Nooitgedaght 66 between Kimberley and Barkley-West. The project site and the surrounding area was assessed for any sensitive ecosystems including drainage lines and wetlands. It was found that the areas close to the Vaal River is in a transformed state due to the agricultural activities, frequent flooding, as well as construction of buildings and road infrastructure. Some diamond mine excavations exist on the property – more or less in the middle of the farm. The rest of the farm has a natural vegetation cover and a few pans and man-made dams occur. The project site is situated in the Kimberley Thornveld (SVk 4) vegetation type. According to Mucina & Rutherford (2006), this vegetation type has a conservation status of "Least Threatened" and according to BGIS the site is situated near a NFEPA listed ecosystem but not in a threatened ecosystem.

According to SANBI's POSA species list some protected trees, Red Data and protected species, as listed in terms of the National Forest Act (Act 84 of 1998), the Northern Cape Nature Conservation Act (Act 9 of 2009) and the National Threatened species list (SANBI 2016) might occur on the site. During the site assessment extensive stands of Camel Thorn 39 (*Vachelia erioloba*) and a few Shepherd's Trees (*Boscia albitrunca*), both protected trees, were found. The areas along the Vaal River belongs to the Highveld Alluvial vegetation (AZa 5) but is in a transformed state due to the impact by vehicles and the presence of spoil material from previous mine activities, dam and canal construction as well as road infrastructure and buildings. The natural vegetation along the Vaal River has been destroyed to a large extent.

The dense stands of Camel Thorn (*Vachelia erioloba*), the pan on the eastern boundary and drainage lines as well as the riparian vegetation along the Vaal River can be regarded as sensitive ecosystems. The dense Camel Thorn savanna is in a pristine condition and of the few sites where a dense stand of Camel thorn still occurs. It must be protected. Other dominant plant found on site include, Vaalbos (*Tarchonanthus*

*camphoratus*), Umbrella thorn (*Vachelia tortilis*), Common Karee (*Searsia lancea*) and Raisin Bush (*Grewia flava*) as well as the grasses *Aristida congesta,* and *Eragrostis lehmanniana*. Other plants noted are *Enneapogon cenchroides, Searsia lancea, Vachelia [Acacia] karroo, Prosopis glandulosa.* From an ecological perspective the old mine site is a degraded site as well as the areas outside the sensitive ecosystem are suitable for the proposed development as long as the prospecting and mining activities do not compromise the integrity of the sensitive ecosystems.

Along the Vaal River a degraded riparian vegetation occur. The natural shrubs and trees were removed during the construction of the Vaalharts Dam and canal. Some alien plant species such as Bluegums (*Eucalyptus camuldulensis*) and Weeping Willows (*Salix babylonica*), Kikuyu grass (*Pennisetum clandistinum*), and exotic weeds such as Scottish Thistle (*Cirsium vulgare*), Water hyacinth (*Eichhornia crassipes*), Verbena (*Verbena bonariensis*) dominate the riparian vegetation. Some reeds (*Phragmites australis)* and bulrush (*Typha capensis*) occur at the water edge. Other indigenous riparian shrubs are *Searsia lancea, Searsia pyroides, Diospyros lycioides* and *Lycium hirsutum.*

**Fauna**

Mammals

According to Dr. P.J. du Preez (2017) (Appendix 11) the potential diversity of mammals within the study area is low because it is a diamond mine and all natural habitats have been transformed. There are several factors which will reduce the actual number of species present within the project site. The presence of humans and roads, the destruction of natural vegetation, noise etc., has had a major impact on the natural animal populations in the project area.
Listed mammals which may occur in the area include the White-tailed Mouse *Mystromys albicaudatus* (Endangered), and Black-footed Cat *Felis nigripes* (Vulnerable), South African hedgehog *Atelerix frontalis* (SA RDB NT).

During the site visit the following faunal species were confirmed within the project site:

- Single rodent burrows (most likely Four-striped Grass Mouse (*Rabdomys pumilo*).
- Relative large burrows (likely to have been made and utilized by Aardwolf – *Proteles cristatus* and/or Aardvark – *Orycteropus afer*).
- Yellow Mongoose was spotted.

None of these species noted within the project site are listed and or protected species.

Two warthogs were observed by Mr. Danie Labuschagne.

Birds

According to Dr. P.J. du Preez (2017) (Appendix 11) of the 305 bird species that have been recorded in the region many occur on the property because of the habitat diversity of the area.

Reptiles and Amphibians

According to Dr. P.J. du Preez (2017) (Appendix 11) of the 25 reptilian species that have been recorded with the region none of these species are listed as Red Data species.

Fifteen amphibian species have been recorded within the region and of these 15 species eight species were recorded within close proximity of the project site. One near threatened species namely the Giant Bullfrog (*Pyxicephalus adspersus*) has been recorded for the quarter degree grid square (QDGS). Although this

species was not found on site (not a suitable habitat), it is still likely for this species to occur near the project site as potential suitable habitat (pans and drainage lines) is available south of the project site.

## Protected Areas

According to the data for protected areas the portions do not fall within a formally protected area, nor threatened ecosystems.

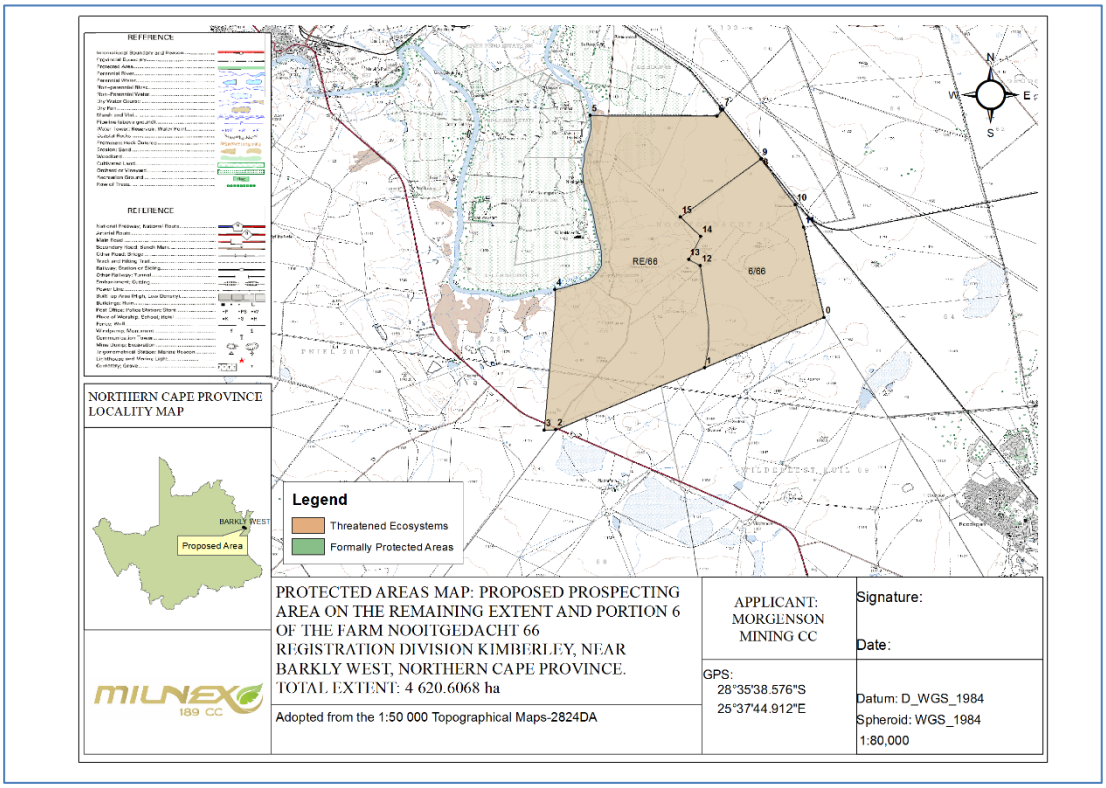


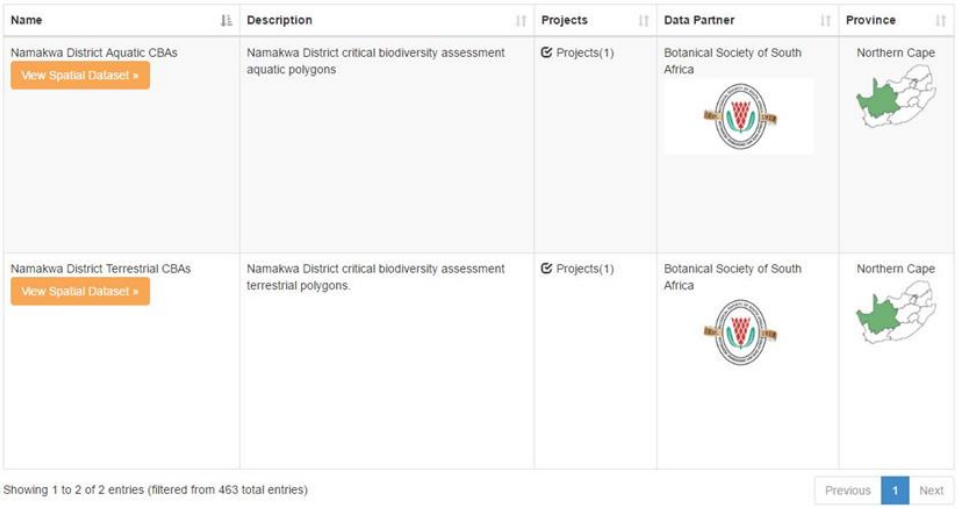

**Figure 7**: Protected Areas Map

The above is also confirmed by Dr. P.J. du Preez (2017) (Appendix 11): "There is no protected species present on the project site."

## Critical Biodiversity Area

According to B-GIS "Critical biodiversity areas (CBAs) are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services", therefore the purpose of CBA's is simply to indicate spatially the location of critical or important areas for biodiversity in the landscape.

According to the figure 8, the Namakwa District is the only district municipalities which have CBA maps in the Northern Cape. Thus, there is no CBD for Frances Baard District Municipality within whose jurisdiction the proposed prospecting right application falls.



| Name | Description | Projects | Data Partner | Province |
|---|---|---|---|---|
| Namakwa District Aquatic CBAs<br>View Spatial Dataset » | Namakwa District critical biodiversity assessment aquatic polygons | Projects(1) | Botanical Society of South Africa | Northern Cape |
| Namakwa District Terrestrial CBAs<br>View Spatial Dataset » | Namakwa District critical biodiversity assessment terrestrial polygons. | Projects(1) | Botanical Society of South Africa | Northern Cape |

Showing 1 to 2 of 2 entries (filtered from 463 total entries)

Previous 1 Next

**Figure 8:** Critical Biodiversity Area map.

## Sensitive area for Mine

The proposed portions fall within the Highest (Class B) biodiversity importance area at risk for mining.

Highest biodiversity importance (B)

These areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being. The Biodiversity priority areas is as follows:

- Critically endangered and endangered ecosystems
- Critical Biodiversity Areas (or equivalent areas) from provincial spatial biodiversity plans
- River and wetland Freshwater Ecosystem Priority Areas (FEPAs), and a 1km buffer around these FEPAs
- Ramsar Sites

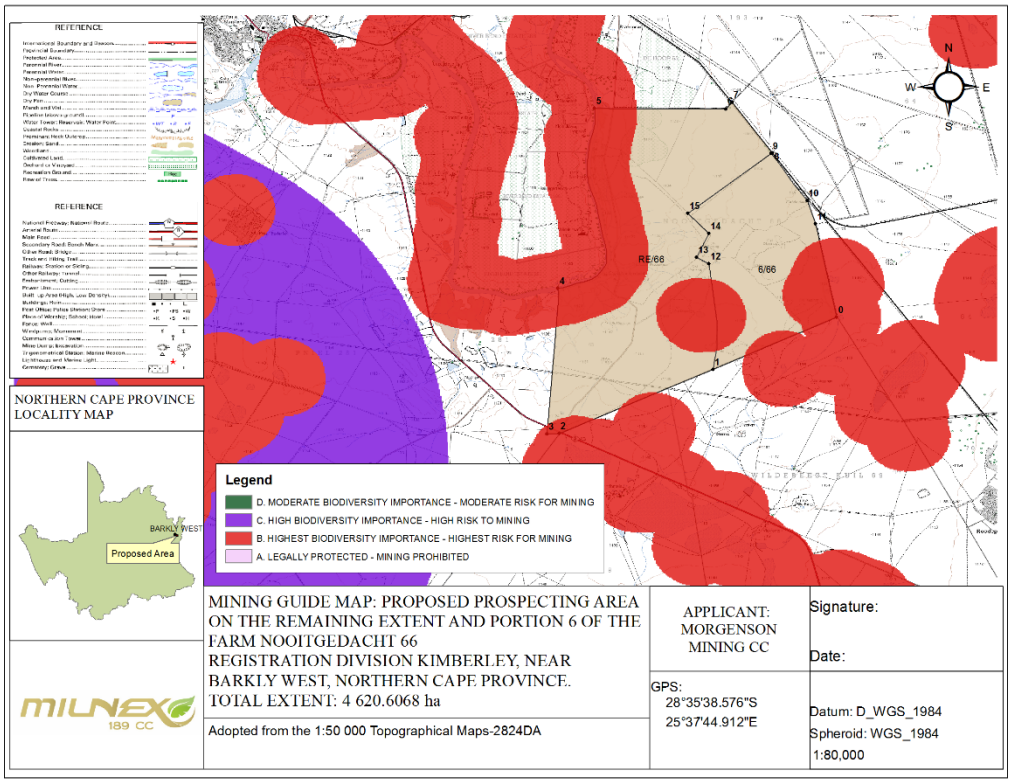



**Figure 9:** Sensitive area for mine

Dr. P.J. du Preez (2017) (Appendix 11) aslo states in his report that besides the wetland no sensitive plant community occur on the project site.

The project site cannot be regarded as a threat to these above-mentioned sensitive systems due to the following reasons:

- The NFEPA map does not indicate that there are NFEPA listed systems on Nooitgedagt except for the Vaal River.
- The Critical Biodiversity map indicates that the site falls outside any Critical Biodiversity areas (BGIS).
- Areas outside the 32m buffer zones, dense Camel Thorn savanna and dolerite outcrops can be mined.

It can thus be concluded the project site where prospecting might take place is not on any sensitive ecosystems and neither does it pose a threat to a sensitive ecosystem (Dr. P.J. du Preez, 2017).

## Wetland Areas

Map below depicts all wetland areas on the proposed area. The proposed area consists of a floodplain wetland, Unchannelled valley-bottom wetland, Seep and Depression. The wetland vegetation type falls within the Eastern Kalahari Bushveld Group 3.

According to the 2013 SANBI Biodiversity Series 22 a:

Floodplain wetland is a wetland area on the mostly flat or gently-sloping land adjacent to and formed by an alluvial river channel under its present climate and sediment load, which is subject to periodic inundation by overtopping of the channel bank. They generally occur on a plain and are typically characterised by a suite of geomorphological features associated with river-derived depositional processes, including point bars,

scroll bars, oxbow lakes and levees. Floodplain wetlands must be considered as wetland ecosystems that are distinct from but associated with the adjacent river channel itself, which must be classified as a 'river'.

Unchannelled valley-bottom wetland is a valley-bottom wetland without a river channel running through it. They are characterised by their location on valley floors, an absence of distinct channel banks, and the prevalence of diffuse flows.

Seep is a wetland area located on gently to steeply sloping land and dominated by colluvial (i.e. gravity-driven), unidirectional movement of water and material down-slope. Seeps are often located on the side-slopes of a valley but they do not, typically, extend onto a valley floor. Seeps are characterised by their association with geological formations (lithologies) and topographic positions that either cause groundwater to discharge to the land surface or rain-derived water to 'seep' down-slope as subsurface interflow.

Depression is a wetland or aquatic ecosystem with closed (or near-closed) elevation contours, which increases in depth from the perimeter to a central area of greatest depth and within which water typically accumulates. Although they may at times have a river flowing into or out of them, depressions are especially characterised by their closed (or at least near-closed) contour shape, which makes them relatively easy to identify on topographic maps.

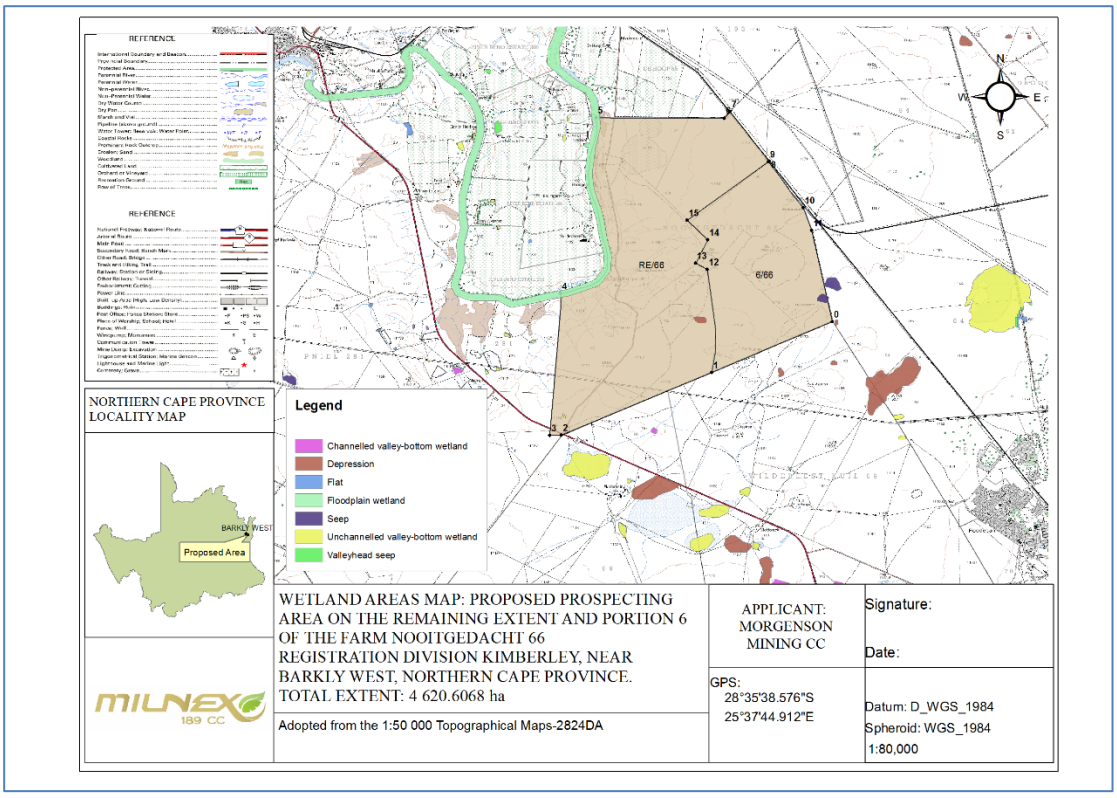



**Figure 10:** Wetland types present on site

## River Ecosystem Status

The status of the river in question is largely modified (Class D) in this area. The figure below depicts the river ecosystem status.

The impacts of the proposed prospecting activities on the Vaal River and other applicable water resources will be assessed and the results thereof will be submitted to the Department.

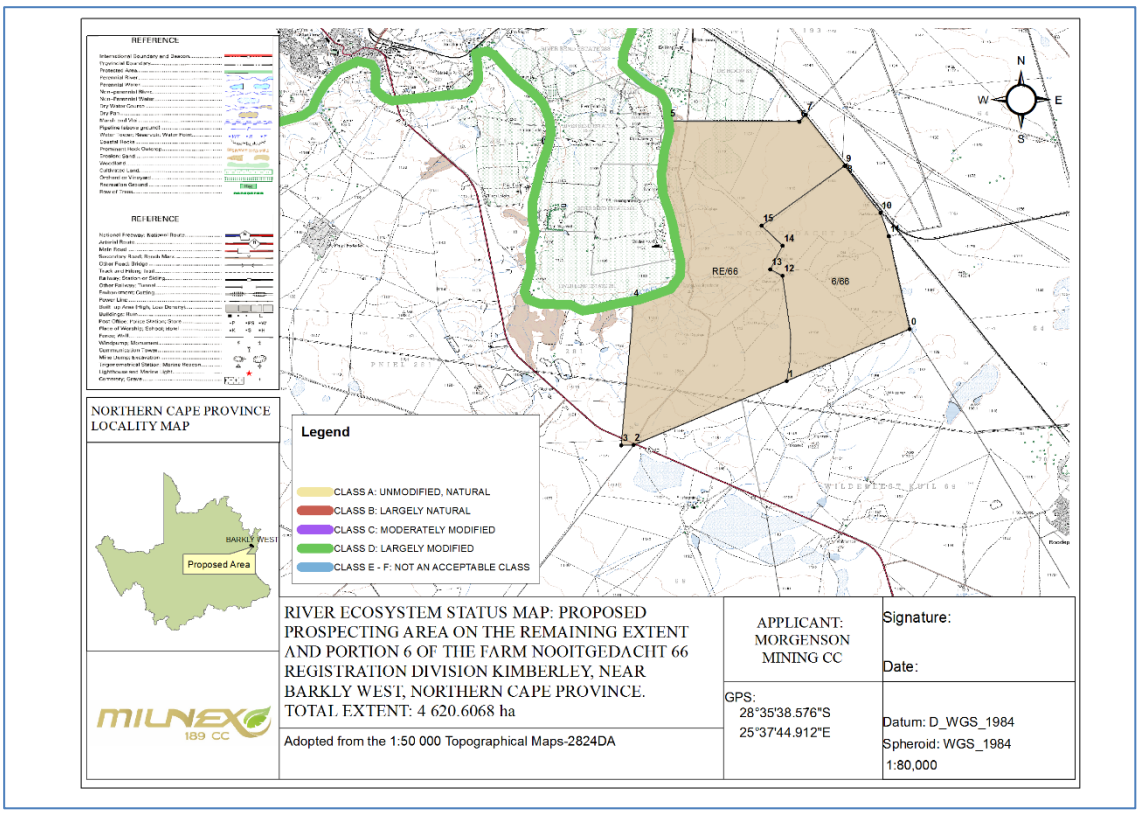



**Figure 11:** River Ecosystem Status

## Description of the socio-economic environment

### Socio-economic conditions

Sol Plaatje Municipality (SPM) has a total population of 248,042 people living in its jurisdiction area according to the 2011 Census, growing at an average rate of 2,04% per annum since 2001 (growth rate in 2001 was -0,65%). More than 61% (54% in 2001) of the population belongs to the African population group, 27% (32% in 2001) to the Coloured population group, 1% (1% in 2001) to the Indian population group, 8% (13% in 2001) to the White population group and 3% (0% in 2001) to other population groups. In 2011 there were approximately 60 299 households (50 529 in 2001) in Sol Plaatje Municipality, with an average household size of 3.9 (3,98 in 2001) people.

According to census 2011 the official unemployment rate is 31.9% and the official youth (15-34 years) unemployment rate is 41.7%. The number of people living in poverty is 31.2%, which is well below the national average of 39,9% as well as the provincial and district averages of 43,4% and 39,1% respectively.

Sol Plaatje Municipality is a “small player” in the national economy but a “big player” in the provincial and regional economy. SPM contributed almost 30% to the total GDP of the province. However, in terms of the national economy, SPM contributed only 0,7% and the NC Province 2,4%.

This municipality has a very narrow economic base as the tertiary sector is the largest economic sector, it contributing more than 80% towards the GVA while the primary sector only contributes 9,7% and the secondary sector 7,9%. Thus SPM relies heavily on the tertiary sector which is consumptive and not productive and job creative. Should one then relate this to the education level of persons in the area where only 10% have post-matric and 90% matric or less with an unemployment rate of 33% which is mainly in the

category of persons with matric or less. A need exists for innovative ways to diversify the economy. The main job creating sectors are the primary and secondary sectors which employ the most unskilled workers.

Cultural and heritage aspects

There is a Heritage Assessment being conducted, please see Appendix 11. The results thereof will be submitted to the department and will be included in a revised document.

Famed glacial pavements reflecting an Ice Age 300 million years ago, on which, in relatively recent times, perhaps 1000 years ago, Later Stone Age Khoe-San people made rock engravings. Therefor a Heritage Impact Assessment will be conducted.

However, heritage resources including archaeological and paleontological sites over 100 years old, graves older than 60 years, structure older than 60 years are protected by the National Heritage Resources Act no 25 of 1999. Therefore if such resources are found during the prospecting or development activities, they shall not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA must be contacted immediately and work must stop.

### (b) Description of the current land uses.

The site survey revealed that land uses on and in the immediate vicinity of the proposed development are essentially comprised of mined areas, degraded land, waterbodies, cultivation and natural land.

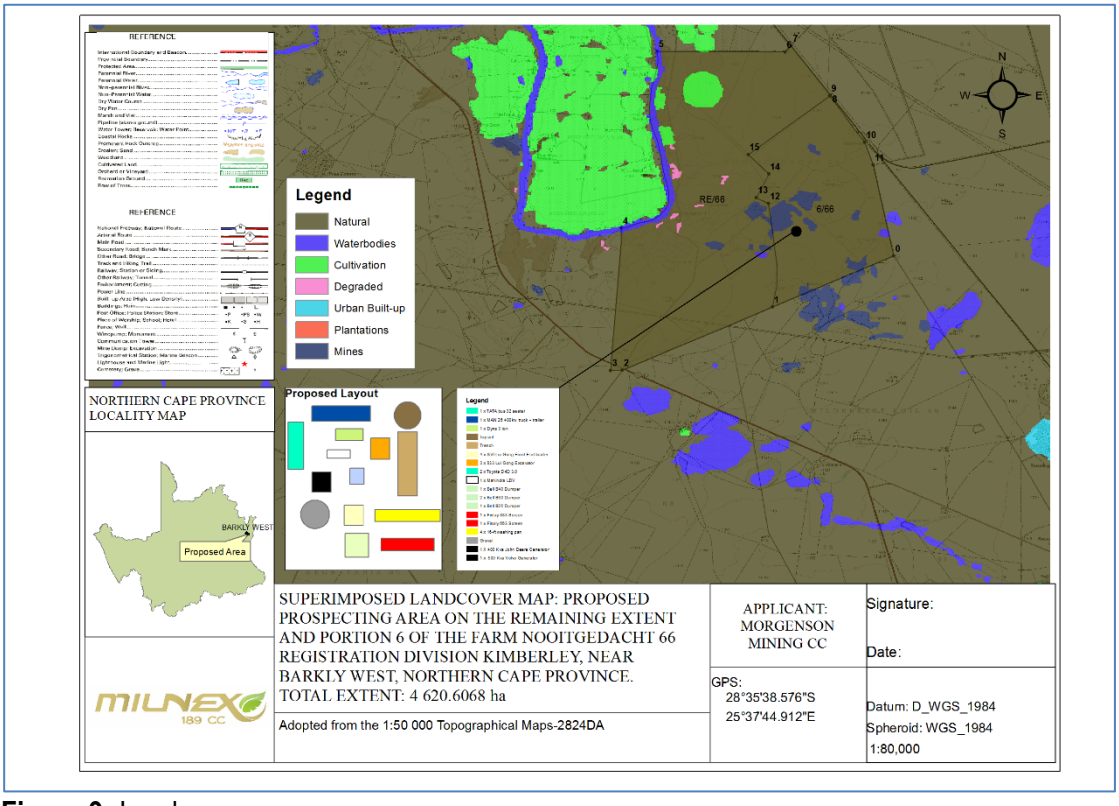



**Figure 9:** Land cover

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

The proposed area consists of cultivated land, rows of trees, diggings, non-perennial pans, various non-perennial streams (tributaries) and areas of Historical Glacial Movements. Also, the Vaal River flows adjacent to the RE/66. No prospecting may occur within the river. Where applicable a Water Use License Application will be launched for conducting prospecting operations. All infrastructure will be temporary and/or mobile.

### (d) Environmental and current land use map.

(Show all environmental, and current land use features)

A Locality map is attached in **Appendix 3**.

### 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).

**Significance of potential impacts**

The following sections present the outcome of the significance rating exercise. The results suggest that the prospecting activities will have an impact on the natural vegetation and the agricultural activities, if not properly mitigated.

**INITIAL CLEARANCE AND SITE PREPARATION PHASE**

***Direct impacts:*** During this phase minor negative impacts are foreseen over the short term. The latter refers to a period of weeks. The site preparation may result in the loss or fragmentation of indigenous natural fauna and flora, loss or fragmentation of habitats, soil erosion, hydrology, and temporary noise disturbance, generation of waste, visual intrusions, increase in heavy vehicle traffic, and risk to safety, livestock and farm infrastructure, and increased risk of veld fires. The abovementioned impacts are discussed in more detail below:

Loss, destruction or fragmentation of indigenous natural fauna and flora:

Highveld Alluvial Vegetation

According to Mucina and Rutherford (2006:640), the Highveld Alluvial Vegetation covers the Free State, North-West, Mpumalanga and Gauteng Provinces as well as Lesotho and Swaziland: with Alluvial drainage lines and floodplains along rivers embedded within the Grassland Biome and marginal (eastern) units of the Kalahari (Savanna Biome), such as along the upper Riet, Harts, upper Modder, upper Caledon, Vet, Sand, Vals, Wilge, Mooi, middle and upper Vaal Rivers etc. and their numerous tributaries. Altitude ranging from 1 000 – 1 500 m.

The area has a relative flat topography supporting riparian thickets mostly dominated by Acacia karroo, accompanied by seasonally flooded grasslands and disturbed herblands often dominated by alien plants.

This has a conservation which is Least threatened with a 31% target. Nearly 10% statutorily conserved in Barberspan, Bloemhof dam, Christiana, Faan Mentjies, Sandveld, Schoonspruit, Soetdoringand Wolwespruit Nature Reserves. More than a quarter has been transformed for cultivation and by building of dams. These areas are prone to invasion by a number of weeds, encouraged by the high nutrient status of soils and ample water supply. The undergrowth of the alluvial riparian thickets and the accompanying grasslands suffer from heavy overgrazing in many places (Mucina and Rutherford, 2006:640).

Kimberley Thornveld

According to Mucina and Rutherford (2006:516), the Kimberley Thornveld vegetation covers the North West, Free State and Northern Cape Provinces: Most of the Kimberley, Hartswater, Bloemhof and Hoopstad Districts as well as substantial parts of the Warrenton, Christiana, Taung, Boshof and to some extent the Barkley West District. This thornveld is situated on an altitude of 1050m – 1400m.

The area often has slightly irregular plains with a well-developed tree layer with *Acacia Erioloba*, *A. tortillis, A. karoo* and *Boscia albitrunca* and a well-developed shrub layer with occasional dense stands of *Tarchonanthus camphoratus* and *A. mellifera*. Grass layer open with much uncovered soil.

Mucina and Rutherford (2006:517) also states that the conservation of this thornveld type, is Least Threatened with a target of 16%. Only 2% of this thornveld is statutorily conserved in Vaalbos National Park and in Sanveld, Bloemhof Dam and S.A. Lombard Nature Reserve. As much as 18% is already transformed, mostly by cultivation. Low erosion is associated with this type of thornveld. The area is mostly used for cattle farming or game ranching. Overgrazing leads to encroachment of *Acacia mellifera subsp. detinens*.

The table below was adjusted to that of Dr. P.J du Preez (2017).

| **Loss or fragmentation of indigenous natural fauna and flora** | **Pre-mitigation impact rating** | **Post mitigation impact rating** |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Site (1) | Site (1) |
| Probability | Definite (4) | Definite (4) |
| Duration | Long term (3) | Long term (3) |
| Magnitude | High (3) | Low (1) |
| Reversibility | Irreversible (4) | Irreversible (4) |
| Irreplaceable loss of resources | Significant loss of resource (3) | Significant loss of resource (3) |
| Cumulative impact | Medium cumulative impacts (3), since the pitting and trenching will only be 1.575ha at any given time in extent per year.<br><br>Dr. P.J du Preez (2017): | |

| | | |
|---|---|---|
| | If mitigation measures are not strictly followed the following could occur:<br>• erosion of areas and continued erosion of the development area with associated siltation and/or erosion of lower-lying wetlands located outside of the project site.<br>• contamination of drainage lines, lower-lying rivers or wetlands located outside of the project site.<br>• alteration of occupancy by terrestrial fauna beyond the project site, possible reduction of available habitat and food availability to terrestrial fauna.<br>• spread and establishment of invasive species. | |
| **Significance** | **Negative high (54)** | **Negative low (18)** |
| Can impacts be mitigated? | If the development is approved, contractors must ensure that no mammalian species are disturbed, trapped, hunted or killed. If the development is approved, every effort should be made to confine the footprint to the blocks allocated for the development and have the least possible edge effects on the surrounding area. The EMPr also provides numerous mitigation measures – refer to section (f) of the EMPr.<br><br>The potential impacts associated with damage to and loss of farmland should be effectively mitigated. The aspects that should be covered include:<br>• The site should be fenced off prior to commencement of construction activities;<br>• The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be confined to the fenced off area and minimised where possible;<br>• An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase. The ECO will be contracted externally and will conduct inspections on a continuous basis;<br>• All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase;<br>• The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. Specifications for the rehabilitation are provided throughout the EMPr – section (f) of the EMPr.<br>• The implementation of the Rehabilitation Programme should be monitored by the ECO.<br><br>Dr. P.J du Preez (2017): | |

| | |
|---|---|
| | • After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows.<br>• Protected plant species must be relocated if possible.<br>• Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor.<br>• Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated footprint area.<br>• Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMPr, if possible.<br>• Remove all invasive vegetation before and after construction and continuously up to decommissioning.<br>• If filling material is to be used, this should be sourced from areas free of invasive species.<br>• Topsoil (the upper 25 cm of soil) is an important natural resource; where it must be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise the handling of topsoil.<br>• Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan.<br>• Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly.<br>• Prevent leakage of oil or other chemicals, and strictly prohibit littering of any kind.<br>• Monitor the establishment of all invasive species and remove as soon as detected, whenever possible before regenerative material can be formed. |

- Increase in vehicle traffic – Loss of vegetation, increase in runoff and erosion, disturbance or possible mortality incidents of terrestrial fauna, possible contamination of soil and groundwater by oil- or fuel spillages, possible establishment and spread of undesirable weeds and alien invasive species that could further damage ecosystem functionality.

| Increase in vehicle traffic | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Site (1) | Site (1) |
| Probability | Definite (4) | Probable (3) |

| | | |
|---|---|---|
| Duration | Long term (3) | Long term (3) |
| Magnitude | High (3) | Low (2) |
| Reversibility | Partly reversible (2) | Reversible (1) |
| Irreplaceable loss of resources | Marginal (2) | No loss of resource (1) |
| Cumulative impact | Medium cumulative impact (3). If damage to roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.<br><br>Dr. P.J du Preez (2017):<br><br>• Possible pollution of surrounding areas if no mitigation is implemented.<br>• Contamination of groundwater which is an extremely important source of water supply for the region.<br>• Possible spread of alien invasive species beyond the site if no mitigation is implemented. | |
| **Significance** | **Negative medium impacts (45)** | **Negative low (24)** |
| Can impacts be mitigated? | Dr. P.J du Preez (2017):<br><br>• Restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed.<br>• Parking areas should be regularly inspected for oil spills and covered with an impermeable or absorbent layer (with the necessary storm water control) if oil and fuel spillages are highly likely to occur.<br>• Strict speed limits must be set and adhered to.<br>• Driving between dusk and dawn should be permissible to emergency situations only.<br>• Prevent spillage of any, oils or other chemicals, strictly prohibit other pollution.<br>• Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed, destroy all material to prevent re-establishment. | |

- Loss destruction or fragmentation of habitats – Given the medium probability of resident threatened species occurring at the footprint site, the low probability of any significant conservation corridor or buffer zone at the footprint site. If it deems necessary a Water Use License Application will be lodged. The site proposed for development could be viewed as moderate sensitive in the region.

| Loss or fragmentation of habitats | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Site (1) | Site (1) |
| Probability | Definite (4) | Definite (4) |
| Duration | Medium term (2) | Medium term (2) |
| Magnitude | Medium (2) | Low (1) |
| Reversibility | Partly reversible (2) | Partly reversible (2) |
| Irreplaceable loss of resources | Marginal loss of resource (2) | Marginal loss of resource (2) |
| Cumulative impact | Medium cumulative impacts (3), since the pitting and trenching will only be 1.575ha in extent per year. | |
| **Significance** | **Negative low (28)** | **Negative low (14)** |
| Can impacts be mitigated? | Exotic and invasive plant species should not be allowed to establish, if the development is approved. Where exotic and invasive plant species are found at the site continuous eradication should take place. If the development is approved, every effort should be made to confine the footprint to the blocks allocated for development – section (f) of the EMPr also provides numerous mitigation measures related to fauna and flora. | |

- Loss of topsoil – Topsoil may be lost due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, disposal of spoils from excavations etc.) The effect will be the loss of soil fertility on disturbed areas after rehabilitation. This will result in grazing and cultivation potential being lost.

| Loss of topsoil | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Geographical extent | Site (1) | Site (1) |
| Probability | Possible (2) | Unlikely (1) |
| Duration | Medium term (2) | Medium term (2) |
| Magnitude | High (3) | Medium (2) |
| Reversibility | Partly reversible (2) | Partly reversible (2) |
| Irreplaceable loss of resources | Marginal (2) | Marginal (2) |
| Cumulative impact | Medium cumulative impacts (3) | |
| **Significance** | **Negative medium (36)** | **Negative low (22)** |
| Can impacts be mitigated? | The following mitigation or management measures are provided:<br>• If an activity will mechanically disturb below surface in any way, then any available topsoil should first be stripped from the entire surface and stockpiled for re-spreading during rehabilitation.<br>• Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them.<br>• Dispose of all subsurface spoils from excavations where they will not impact on undisturbed land. | |

| | |
|---|---|
| | • During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.<br>• Erosion must be controlled where necessary on top soiled areas.<br><br>Establish an effective record keeping system for each area where soil is disturbed for constructional purposes. These records should be included in environmental performance reports, and should include all the records below.<br>• Record the GPS coordinates of each area.<br>• Record the date of topsoil stripping.<br>• Record the GPS coordinates of where the topsoil is stockpiled.<br>• Record the date of cessation of constructional (or operational) activities at the particular site.<br>• Photograph the area on cessation of constructional activities.<br>• Record date and depth of re-spreading of topsoil.<br>• Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.<br><br>Section (f) of the EMPr also provide mitigation measures related to topsoil management. |

- Soil erosion – Soil erosion due to alteration of the land surface run-off characteristics. Alteration of run-off characteristics may be caused by construction related land surface disturbance, vegetation removal and the establishment of roads. Erosion will cause loss and deterioration of soil resources. This will result in grazing and cultivation potential being lost.

| **Soil erosion** | **Pre-mitigation impact rating** | **Post mitigation impact rating** |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Geographical extent | Site (1) | Site (1) |
| Probability | Possible (2) | Unlikely (1) |
| Duration | Medium term (2) | Medium term (2) |
| Magnitude | Medium (2) | Medium (2) |
| Reversibility | Partly reversible (2) | Partly reversible (2) |
| Irreplaceable loss of resources | Marginal (2) | Marginal (2) |
| Cumulative impact | Negligible cumulative impact (1). | |
| **Significance** | **Negative low (20)** | **Negative low (18)** |
| Can impacts be mitigated? | The following mitigation or management measures are provided: Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. | |

| | |
|---|---|
| | Include periodical site inspection in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence any erosion on site or downstream – refer to section (f) of the EMPr.. |

- Temporary noise disturbance - Preparation activities will result in the generation of noise over a period of months. Sources of noise are likely to include vehicles, the use of machinery such as back actors and people working on the site. The noise impact is unlikely to be significant; but activities should be limited to normal working days and hours (6:00 – 18:00).

| Temporary noise disturbance | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Local (2) | Local (2) |
| Probability | Definite (4) | Probable (3) |
| Duration | Short term (1) | Short term (1) |
| Magnitude | Medium (2) | Low (1) |
| Reversibility | Completely reversible (1) | Completely reversible (1) |
| Irreplaceable loss of resources | No loss of resource (1) | No loss of resource (1) |
| Cumulative impact | The impact would result in negligible to no cumulative effects (1). | |
| **Significance** | **Negative low (20)** | **Negative low (9)** |
| Can impacts be mitigated? | Yes, management actions related to noise pollution are included in section (f) of the EMPr. | |

- Generation of waste - general waste, construction waste, sewage and grey water - The workers on site are likely to generate general waste such as food wastes, packaging, bottles, etc. Construction waste is likely to consist of packaging, scrap metals, waste cement, etc If any). The applicant will need to ensure that general and construction waste is appropriately disposed of i.e. taken to the nearest licensed landfill. Sufficient ablution facilities will have to be provided, in the form of portable/VIP toilets. No pit latrines, French drain systems or soak away systems shall be allowed.

| Generation of waste | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Local/district (2) | Local/district (2) |
| Probability | Definite (4) | Definite (4) |
| Duration | Short term (1) | Short term (1) |
| Magnitude | Low (1) | Low (1) |
| Reversibility | Partly reversible (2) | Partly reversible (2) |
| Irreplaceable loss of resources | No loss of resource (1) | No loss of resource (1) |
| Cumulative impact | Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts if services become unstable or unavailable, which in turn would negatively impact on the local community. | |
| **Significance** | **Negative medium (13)** | **Negative low (13)** |

| | |
|---|---|
| Can impacts be mitigated? | Yes, it is therefore important that all management actions and mitigation measures included in section (f) of the EMPr are implemented. |

- Impacts on heritage objects – There is a Heritage Assessment being conducted, please see Appendix 11. The results thereof will be submitted to the department and will be included in a revised document.

  Famed glacial pavements reflecting an Ice Age 300 million years ago, on which, in relatively recent times, perhaps 1000 years ago, Later Stone Age Khoe-San people made rock engravings. Therefor a Heritage Impact Assessment will be conducted.
- However, heritage resources including archaeological and paleontological sites over 100 years old, graves older than 60 years, structure older than 60 years are protected by the National Heritage Resources Act no 25 of 1999. Therefore if such resources are found during the prospecting or development activities, they shall not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA must be contacted immediately and work must stop.

| **Impacts on heritage objects** | **Pre-mitigation impact rating** | **Post mitigation impact rating** |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Site (1) | Site (1) |
| Probability | Possible (2) | Possible (2) |
| Duration | Short term (1) | Short term (1) |
| Magnitude | Medium (2) | Low (1) |
| Reversibility | Irreversible (4) | Irreversible (4) |
| Irreplaceable loss of resources | Marginal loss of resource (2) | Marginal loss of resource (2) |
| Cumulative impact | Low cumulative impact (2). Should these impacts occur, there may be a cumulative impact on the preservation of heritage objects in the area. | |
| **Significance** | **Negative low (24)** | **Negative low (12)** |
| Can impacts be mitigated? | If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. Also refer to section (f) of the EMPr. | |

***Indirect impacts:*** The nuisance aspects generally associated with the installation of infrastructure or ground preparation will also be applicable to this development, which relates primarily to the increase in vehicle traffic associated with prospecting practices, the influx of job seekers to the area, risk to safety, livestock and farm infrastructure, and increased risk of veld fires.

- Increase in vehicle traffic – The movement of heavy vehicles during the clearance of vegetation and topsoil has the potential to damage local farm roads and create dust and safety impacts for other road users in the area. Access will be obtained from gravel road off the R31. While the volume of traffic along this road is low, the movement of heavy vehicles along this road is likely to damage the road surface and impact on other road users. The contractor should be required to ensure that damage to

the road is repaired periodically. The movement of additional heavy vehicle traffic is will add significantly to the current traffic load on the road. The impact on the R31 is therefore likely to be moderate.

| Increase in vehicle traffic | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Local (2) | Local (2) |
| Probability | Probable (3) | Probable (3) |
| Duration | Short term (1) | Short term (1) |
| Magnitude | High (3) | Medium (2) |
| Reversibility | Completely reversible (1) | Completely reversible (1) |
| Irreplaceable loss of resources | No loss of resource (1) | No loss of resource (1) |
| Cumulative impact | Medium cumulative impact (3). If damage to roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage. | |
| **Significance** | **Negative medium impacts (33)** | **Negative low (11)** |
| Can impacts be mitigated? | The potential impacts associated with heavy vehicles can be effectively mitigated. The mitigation measures include:<br>• The contractor must ensure that damage caused by construction on the gravel road of the R31 is repaired. The costs associated with the repair must be borne by the contractor;<br>• Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers;<br>• All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.<br>Also refer section (f) of the EMPr. For mitigation measures related to traffic. | |

- Risk to safety, livestock and farm infrastructure - The presence on and movement of workers on and off the site poses a potential safety threat to local famer's and farm workers in the vicinity of the site threat. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged or stock theft linked either directly or indirectly to the presence of farm workers on the site.

| Risk to safety, livestock and farm infrastructure | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |

| | | |
|---|---|---|
| Extent | Local (2) | Local (2) |
| Probability | Probable (3) | Probable (3) |
| Duration | Short term (1) | Short term (1) |
| Magnitude | Medium (2) | Low (1) |
| Reversibility | Completely reversible (1) | Completely reversible (1) |
| Irreplaceable loss of resources | No loss of resource (1) | No loss of resource (1) |
| Cumulative impact | Low cumulative effects (2), provided losses are compensated for. | |
| **Significance** | **Negative low (20)** | **Negative low (11)** |
| Can impacts be mitigated? | Key mitigation measures include:<br>• Morgenson Mining CC should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;<br>• The construction area should be fenced off prior to the commencement of the construction phase. The movement of construction workers on the site should be confined to the fenced off area;<br>• Contractors appointed by Morgenson Mining CC should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties;<br>• Morgenson Mining CC should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below);<br>• The Environmental Management Programme (EMPr) should outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested;<br>• Contractors appointed Morgenson Mining CC must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.<br>• Contractors appointed by Morgenson Mining CC must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of | |

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| | Conduct. All dismissals must be in accordance with South African labour legislation;<br>• The housing of construction workers on the site should be strictly limited to security personnel (if any). |

- Increased risk of veld fires - The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could in turn pose a threat to livestock, crops, wildlife and farmsteads in the area. In the process, farm infrastructure may also be damaged or destroyed and human lives threatened. The potential risk of grass fires was heightened by the windy conditions in the area, especially during the dry, windy winter months from May to October. In terms of potential mitigation measures, a fire-break should be constructed around the perimeter of the site prior to the commencement of the construction phase. In addition, fire-fighting equipment should be provided on site during the construction phase.

| **Increased risk of veld fires** | **Pre-mitigation impact rating** | **Post mitigation impact rating** |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Region (3) | Local (2) |
| Probability | Probable (3) | Probable (3) |
| Duration | Medium term (2) | Short term (1) |
| Magnitude | High (3) | Low (1) |
| Reversibility | Completely reversible (1) | Completely reversible (1) |
| Irreplaceable loss of resources | No loss of resource (1) | No loss of resource (1) |
| Cumulative impact | Negligible cumulative effects (1), provided losses are compensated for. | |
| **Significance** | **Negative medium (33)** | **Negative low (9)** |
| Can impacts be mitigated? | The mitigation measures include:<br>• A fire-break should be constructed around the perimeter of the site prior to the commencement of the construction phase;<br>• Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas;<br>• Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months;<br>• Contractor to provide adequate firefighting equipment on-site, including a fire fighting vehicle;<br>• Contractor to provide fire-fighting training to selected construction staff;<br>• No construction staff, with the exception of security staff, to be accommodated on site over night;<br>• As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction | |

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| | workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the firefighting costs borne by farmers and local authorities. |

**OPERATIONAL PHASE**

***Direct impacts:*** During the operational phase the study area will serve as an prospecting area and the impacts are generally associated with soil erosion, change in land use, impacts associated with the, increase in storm water runoff, increased consumption of water, visual intrusion, the generation of general waste, leakage of hazardous materials, and the change in the sense of place. The operational phase will also have a direct positive impact through the provision of permanent employment opportunities and facilitating a positive economic growth. The abovementioned impacts are discussed in more detail below:

Loss of vegetation - Loss of vegetation and/or species of conservation concern, loss of and alteration of microhabitats, altered vegetation cover, site-specific altered distribution of rainfall and resultant runoff patterns, general increase in runoff from hard surfaces and/or bare areas and associated accelerated erosion, reduction of habitat and resource availability for terrestrial fauna, possible increase of detrimental effects during periods of extreme weather events, e.g. increased flooding, severe erosion or dust due to lower buffering capacity of sparser vegetation

The table below was adjusted to that of Dr. P.J du Preez (2017).

| Loss or fragmentation of indigenous natural fauna and flora | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Site (1) | Site (1) |
| Probability | Definite (4) | Definite (4) |
| Duration | Long term (3) | Long term (3) |
| Magnitude | High (3) | Low (1) |
| Reversibility | Irreversible (4) | Irreversible (4) |
| Irreplaceable loss of resources | Significant loss of resource (3) | Significant loss of resource (3) |
| Cumulative impact | Medium cumulative impacts (3), since the pitting and trenching will only be 1.575ha at any given time in extent per year.<br><br>Dr. P.J du Preez (2017):<br><br>If mitigation measures are not strictly followed the following could occur:<br>• erosion of areas and continued erosion of the development area with associated siltation and/or erosion of lower-lying wetlands located outside of the project site.<br>• contamination of drainage lines, lower-lying rivers or wetlands located outside of the project site. | |

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|---|---|---|
| | • alteration of occupancy by terrestrial fauna beyond the project site, possible reduction of available habitat and food availability to terrestrial fauna.<br>• spread and establishment of invasive species. | |
| **Significance** | **Negative high (54)** | **Negative low (18)** |
| Can impacts be mitigated? | If the development is approved, contractors must ensure that no mammalian species are disturbed, trapped, hunted or killed. If the development is approved, every effort should be made to confine the footprint to the blocks allocated for the development and have the least possible edge effects on the surrounding area. The EMPr also provides numerous mitigation measures – refer to section (f) of the EMPr.<br><br>The potential impacts associated with damage to and loss of farmland should be effectively mitigated. The aspects that should be covered include:<br>• The site should be fenced off prior to commencement of construction activities;<br>• The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be confined to the fenced off area and minimised where possible;<br>• An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase. The ECO will be contracted externally and will conduct inspections on a continuous basis;<br>• All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase;<br>• The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. Specifications for the rehabilitation are provided throughout the EMPr – section (f) of the EMPr.<br>• The implementation of the Rehabilitation Programme should be monitored by the ECO.<br><br>Dr. P.J du Preez (2017):<br><br>• After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows.<br>• Protected plant species must be relocated if possible.<br>• Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor. | |

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| | • Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated footprint area.<br>• Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMPr, if possible.<br>• Remove all invasive vegetation before and after construction and continuously up to decommissioning.<br>• If filling material is to be used, this should be sourced from areas free of invasive species.<br>• Topsoil (the upper 25 cm of soil) is an important natural resource; where it must be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise the handling of topsoil.<br>• Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan.<br>• Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly.<br>• Prevent leakage of oil or other chemicals, and strictly prohibit littering of any kind.<br>• Monitor the establishment of all invasive species and remove as soon as detected, whenever possible before regenerative material can be formed. |

- Increase in vehicle traffic – Loss of vegetation, increase in runoff and erosion, disturbance or possible mortality incidents of terrestrial fauna, possible contamination of soil and groundwater by oil- or fuel spillages, possible establishment and spread of undesirable weeds and alien invasive species that could further damage ecosystem functionality.

| Increase in vehicle traffic | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Site (1) | Site (1) |
| Probability | Definite (4) | Probable (3) |
| Duration | Long term (3) | Long term (3) |
| Magnitude | High (3) | Low (2) |
| Reversibility | Partly reversible (2) | Reversible (1) |
| Irreplaceable loss of resources | Marginal (2) | No loss of resource (1) |
| Cumulative impact | Medium cumulative impact (3). If damage to roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be | |

| | | |
|---|---|---|
| | borne by road users who were no responsible for the damage.<br><br>Dr. P.J du Preez (2017):<br><br>• Possible pollution of surrounding areas if no mitigation is implemented.<br>• Contamination of groundwater which is an extremely important source of water supply for the region.<br>• Possible spread of alien invasive species beyond the site if no mitigation is implemented. | |
| **Significance** | **Negative medium impacts (45)** | **Negative low (24)** |
| Can impacts be mitigated? | Dr. P.J du Preez (2017):<br><br>• Restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed.<br>• Parking areas should be regularly inspected for oil spills and covered with an impermeable or absorbent layer (with the necessary storm water control) if oil and fuel spillages are highly likely to occur.<br>• Strict speed limits must be set and adhered to.<br>• Driving between dusk and dawn should be permissible to emergency situations only.<br>• Prevent spillage of any, oils or other chemicals, strictly prohibit other pollution.<br>• Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed, destroy all material to prevent re-establishment. | |

- Soil erosion – The largest risk factor for soil erosion will be during the operational phase when the prospecting activity ensues and soil is left bare until rehabilitation is initiated. Erosion will be localised within the site. This will ultimately lead to the irretrievable commitment of this resource. The measurable effect of reducing erosion by utilizing mitigation measures may reduce possible erosion significantly.

| Soil erosion | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Local/Regional (2) | Local/Regional (2) |
| Probability | Definite (4) | Unlikely (1) |
| Duration | Long term (3) | Long term (3) |
| Magnitude | High (3) | Medium (2) |
| Reversibility | Partly reversible (2) | Partly reversible (2) |

| | | |
|---|---|---|
| Irreplaceable loss of resources | Significant loss of resource (3) | Marginal loss of resource (2) |
| Cumulative impact | Medium cumulative impact (3). Should these impacts occur, there will be a cumulative impact on the air and water resources in the study area in terms of pollution. | |
| **Significance** | **Negative High (51)** | **Negative Low (26)** |
| Can impacts be mitigated? | Yes, to avoid soil erosion it will be a good practice to not remove all the vegetation at once but to only clear the area as it becomes necessary and to implement concurrent rehabilitation.<br><br>Also refer to section (f) of the EMPr. | |

- Change in land-use – The use of the area for the operation of the prospecting activity will result in the area not being used for livestock grazing anymore. The impact on farm income due to the loss of grazing will be more than offset by the income from Morgenson Mining CC.

| Change in land use | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Province (3) | Local (2) |
| Probability | Definite (4) | Definite (4) |
| Duration | medium term (2) | medium term (2) |
| Magnitude | High (3) | Medium (2) |
| Reversibility | Barely reversible (3) | Partly reversible (2) |
| Irreplaceable loss of resources | Significant loss of resource (3) | Marginal loss of resource (2) |
| Cumulative impact | Medium cumulative impacts (3). | |
| **Significance** | **Negative high (54)** | **Negative medium (30)** |
| Can impacts be mitigated? | The proponent should establish a Rehabilitation Fund to be used to rehabilitate the area once the proposed facility has been decommissioned. The fund should be funded by revenue generated during the operational phase of the project. The motivation for the establishment of a Rehabilitation Fund is based on the experience in the mining sector where many mines on closure have not set aside sufficient funds for closure and decommissioning.<br><br>Also refer to section (f) of the EMPr. | |

- Generation of alternative land use income – Income generated through the alluvial diamond mine will provide the farming enterprise with increased cash flow and rural livelihood, and thereby improve the financial sustainability of farming on site.

| Generation of alternative land use income | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Positive | Positive |
| Geographical extent | Site (1) | Site (1) |
| Probability | Definite (4) | Definite (4) |

| | | |
|---|---|---|
| Duration | Long term (3) | Long term (3) |
| Magnitude | Medium (2) | Medium (2) |
| Reversibility | Completely reversible (1) | Completely reversible (1) |
| Irreplaceable loss of resources | No loss of resources (1) | No loss of resources (1) |
| Cumulative impact | Low cumulative impact (2). | |
| **Significance** | **Positive Low (24)** | **Positive Low (24)** |
| Can impacts be mitigated? | No mitigation required. | |

- Increase in storm water runoff – The development will potentially result in an increase in storm water run-off that needs to be managed to prevent soil erosion, especially where vegetation will be cleared. Not all the vegetation should be removed at once. Only the specific trench being excavated at the specific time should be cleared.

| **Increase in storm water runoff** | **Pre-mitigation impact rating** | **Post mitigation impact rating** |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Local (2) | Local (2) |
| Probability | Probable (3) | Unlikely (1) |
| Duration | Long term (3) | Long term (3) |
| Magnitude | Medium (2) | Low (1) |
| Reversibility | Partly reversible (2) | Partly reversible (2) |
| Irreplaceable loss of resources | Marginal loss of resource (2) | Marginal loss of resource (2) |
| Cumulative impact | Medium cumulative impact (3) - Should these impacts occur, there will be a cumulative impacts on the wider area. | |
| **Significance** | **Negative medium (30)** | **Negative low (13)** |
| Can impacts be mitigated? | Yes. It is therefore important that all management actions and mitigation measures included in section (f) of the EMPr. are implemented to ensure that these impacts do not occur | |

- Increased consumption of water - Approximately 10 000-17 000 liters of water per hour will be required for the washing of the gravel in the rotary per pan. The water will be sourced from groundwater sources.

| **Increased consumption of water** | **Pre-mitigation impact rating** | **Post mitigation impact rating** |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Region (3) | Region (3) |
| Probability | Definite (4) | Definite (4) |
| Duration | Long term (3) | Long term (3) |
| Magnitude | High (3) | Medium (2) |
| Reversibility | Irreversible (4) | Irreversible (4) |
| Irreplaceable loss of resources | Marginal loss of resources (2) | Marginal loss of resources (2) |
| Cumulative impact | High cumulative impacts (4) - An additional demand on water sources could result in a significant cumulative impact with regards to the availability of water. | |

| **Significance** | **Negative high (60)** | **Negative medium (40)** |
|---|---|---|
| Can impacts be mitigated? | Yes, management actions and mitigation measures related to the use of water are included in section (f) of the EMPr. | |

- Generation of waste – Approximately 15 Workers will be present on site from 6:00 – 18:00, Monday to Saturday. Sources of general waste will be waste food, packaging, paper, etc. General waste will be stored on the site and removed on a weekly basis by a contractor.

| **Generation of waste** | **Pre-mitigation impact rating** | **Post mitigation impact rating** |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Local (2) | Local (2) |
| Probability | Definite (4) | Definite (4) |
| Duration | Long term (3) | Long term (3) |
| Magnitude | Low (1) | Low (1) |
| Reversibility | Partly reversible (2) | Partly reversible (2) |
| Irreplaceable loss of resources | No loss of resource (1) | No loss of resource (1) |
| Cumulative impact | Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts with regards to the availability of landfill space. | |
| **Significance** | **Negative low (15)** | **Negative low (15)** |
| Can impacts be mitigated? | Yes, management actions related to waste management are included in section (f) of the EMPr. | |

- Leakage of hazardous materials - The proposed prospecting activity will make use of machinery that use fuel and oil. Leakage of these oils and fuel can contaminate water supplies and must be prevented by constructing oil and diesel permeable bunds to ensure that any spills are suitably attenuated and not released into the environment.

| **Leakage of hazardous materials** | **Pre-mitigation impact rating** | **Post mitigation impact rating** |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Local (2) | Local (2) |
| Probability | Possible (2) | Unlikely (1) |
| Duration | Long term (3) | Long term (3) |
| Magnitude | High (3) | Medium (2) |
| Reversibility | Partly reversible (2) | Partly reversible (2) |
| Irreplaceable loss of resources | Marginal loss of resource (2) | Marginal loss of resource (2) |
| Cumulative impact | The impact would result in negligible to no cumulative effects (1) | |
| **Significance** | **Negative medium (36)** | **Negative low (22)** |
| Can impacts be mitigated? | Yes. It is therefore important that all management actions and mitigation measures included in the section (f) of EMPr are implemented to ensure that these impacts do not occur. | |

- Noise disturbance - Prospecting activities will result in the generation of noise over a period of 3-5 years. Sources of noise are likely to include vehicles, the use of machinery such as backactors, rotary pans and people working on the site, as well as occasional blasting. The noise impact is unlikely to be significant as the closest homestead is more than 800m from the site; but prospecting activities should be limited to normal working days and some Saturdays and hours (6:00 – 18:00).

| Temporary noise disturbance | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Local (2) | Local (2) |
| Probability | Definite (4) | Probable (3) |
| Duration | Medium term (2) | Medium term (2) |
| Magnitude | Medium (2) | Low (1) |
| Reversibility | Completely reversible (1) | Completely reversible (1) |
| Irreplaceable loss of resources | No loss of resource (1) | No loss of resource (1) |
| Cumulative impact | The impact would result in negligible to no cumulative effects (1). | |
| **Significance** | **Negative low (22)** | **Negative low (10)** |
| Can impacts be mitigated? | Yes, management actions related to noise pollution are included in section (f) of the EMPr. | |

***Indirect impacts:*** The operational phase will have an indirect negative impact through the change in the sense of place and an indirect positive impact through the provision of additional electrical infrastructure.

- Potential impact on tourism – The tourism sector is regarded as an important economic sector in the NCP and SPLM. The tourism potential of the area is linked to the areas natural resources, including the relatively undisturbed scenery and landscape. The impact of the proposed prospecting of diamond alluvial on the areas sense of place with mitigation is likely to be low. In addition, the site will be visible from the R31. The impact of the proposed mine on the tourism potential of the area and the SPLM and NCP is therefore likely to be low.

| Potential impacts on tourism | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Site (1) | Site (1) |
| Probability | Possible (2) | Possible (2) |
| Duration | Medium term (2) | Medium term (2) |
| Magnitude | medium (2) | Low (1) |
| Reversibility | Partially reversible (2) | Partially reversible (2) |
| Irreplaceable loss of resources | N/A | N/A |
| Cumulative impact | N/A | |
| **Significance** | **Negative low (14)** | **Negative low (8)** |
| Can impacts be mitigated? | No mitigation required | |

**DECOMMISIONING PHASE (MINE CLOSURE AND REHABILITATION)**

**Direct impacts:** Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live. If infrastructures are removed after a 3/5 year

period, the site will be returned to its natural state. Therefore the physical environment will benefit from the closure of the prospecting area.

- Rehabilitation of the physical environment – The physical environment will benefit from the closure of the prospecting area since the site will be restored to its natural state.

| Rehabilitation of the physical environment | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Positive | Positive |
| Extent | Site (1) | Site (1) |
| Probability | Possible (2) | Probable (3) |
| Duration | Long term (3) | Long term (3) |
| Magnitude | Low (1) | Medium (2) |
| Reversibility | N/A | N/A |
| Irreplaceable loss of resources | N/A | N/A |
| Cumulative impact | The impact would result in negligible to no cumulative effects (1) | |
| **Significance** | **Negative low (7)** | **Negative low (16)** |
| Can impacts be mitigated? | No mitigation measures required. | |

- Loss of employment - Given the relatively large number of people employed during the operational phase, the decommissioning of the facility has the potential to have a negative social impact on the local community.

| Loss of employment | Pre-mitigation impact rating | Post mitigation impact rating |
|---|---|---|
| Status (positive or negative) | Negative | Negative |
| Extent | Local (2) | Local (2) |
| Probability | Possible (2) | Possible (2) |
| Duration | Medium term (2) | Short term (1) |
| Magnitude | High (3) | Medium (2) |
| Reversibility | Partly reversible (2) | Partly reversible (2) |
| Irreplaceable loss of resources | No loss of resource (1) | No loss of resource (1) |
| Cumulative impact | The impact would result in negligible to no cumulative effects (1) | |
| **Significance** | **Negative medium (30)** | **Negative low (18)** |
| Can impacts be mitigated? | The following mitigation measures are recommended:<br>• All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning;<br>• Morgenson Mining CC should establish an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. | |

**Indirect impacts:** No indirect impacts are anticipated from the decommissioning phase of the proposed development.

### 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).

**Method of environmental assessment**

The environmental assessment aims to identify the various possible environmental impacts that could results from the proposed development. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in the Table below.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

**Impact Rating System**

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the following project phases:

- Construction
- Operation
- Decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact the following criteria is used:

**Table:** *The rating system*

| **NATURE** | | |
|---|---|---|
| Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity. | | |
| **GEOGRAPHICAL EXTENT** | | |
| This is defined as the area over which the impact will be experienced. | | |
| 1 | Site | The impact will only affect the site. |
| 2 | Local/district | Will affect the local area or district. |
| 3 | Province/region | Will affect the entire province or region. |

| | | |
|---|---|---|
| 4 | International and National | Will affect the entire country. |
| **PROBABILITY** | | |
| This describes the chance of occurrence of an impact. | | |
| 1 | Unlikely | The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence). |
| 2 | Possible | The impact may occur (Between a 25% to 50% chance of occurrence). |
| 3 | Probable | The impact will likely occur (Between a 50% to 75% chance of occurrence). |
| 4 | Definite | Impact will certainly occur (Greater than a 75% chance of occurrence). |
| **DURATION** | | |
| This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity. | | |
| 1 | Short term | The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years). |
| 2 | Medium term | The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years). |
| 3 | Long term | The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years). |
| 4 | Permanent | The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite. |
| **INTENSITY/ MAGNITUDE** | | |
| Describes the severity of an impact. | | |
| 1 | Low | Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible. |
| 2 | Medium | Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity). |
| 3 | High | Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation. |
| 4 | Very high | Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and |

| | | |
|---|---|---|
| | | remediation often unfeasible due to extremely high costs of rehabilitation and remediation. |
| **REVERSIBILITY** | | |
| This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity. | | |
| 1 | Completely reversible | The impact is reversible with implementation of minor mitigation measures. |
| 2 | Partly reversible | The impact is partly reversible but more intense mitigation measures are required. |
| 3 | Barely reversible | The impact is unlikely to be reversed even with intense mitigation measures. |
| 4 | Irreversible | The impact is irreversible and no mitigation measures exist. |
| **IRREPLACEABLE LOSS OF RESOURCES** | | |
| This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity. | | |
| 1 | No loss of resource | The impact will not result in the loss of any resources. |
| 2 | Marginal loss of resource | The impact will result in marginal loss of resources. |
| 3 | Significant loss of resources | The impact will result in significant loss of resources. |
| 4 | Complete loss of resources | The impact is result in a complete loss of all resources. |
| **CUMULATIVE EFFECT** | | |
| This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question. | | |
| 1 | Negligible cumulative impact | The impact would result in negligible to no cumulative effects. |
| 2 | Low cumulative impact | The impact would result in insignificant cumulative effects. |
| 3 | Medium cumulative impact | The impact would result in minor cumulative effects. |
| 4 | High cumulative impact | The impact would result in significant cumulative effects |
| **SIGNIFICANCE** | | |
| Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula:<br><br>(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.<br><br>The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating. | | |
| Points | Impact significance rating | Description |

| | | |
|---|---|---|
| 6 to 28 | Negative low impact | The anticipated impact will have negligible negative effects and will require little to no mitigation. |
| 6 to 28 | Positive low impact | The anticipated impact will have minor positive effects. |
| 29 to 50 | Negative medium impact | The anticipated impact will have moderate negative effects and will require moderate mitigation measures. |
| 29 to 50 | Positive medium impact | The anticipated impact will have moderate positive effects. |
| 51 to 73 | Negative high impact | The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact. |
| 51 to 73 | Positive high impact | The anticipated impact will have significant positive effects. |
| 74 to 96 | Negative very high impact | The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws". |
| 74 to 96 | Positive very high impact | The anticipated impact will have highly significant positive effects. |

### 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)

- Increased ambient noise levels and disturbance of wildlife, breeding and cattle resulting from geophysic surveys site fly-overs and increased traffic movement during all prospecting phases.
- Potential water and soil pollution impacts resulting from hydrocarbon spills and soil erosion which may impact on environmental resources utilized by communities, landowners and other stakeholders.
- Potential water and soil pollution impacts resulting from hydrocarbon spills and soil erosion which may impact on ecosystem functioning.
- Potential decrease in water levels due to abstraction. Only if boreholes are drilled, but such is not planned. Water will be abstracted from the river.
- Increased vehicle activity with in the area resulting in the possible destruction and disturbance of fauna/flora and the loss of biodiversity.
- Poor access control to farms which may impact on cattle movement, breeding and grazing practices.
- Influx of persons (job seekers) to site as a result of increased activity and the possible resultant increase in opportunistic crime.
- Potential visual impacts caused by prospecting activities.
- Prospecting will be undertaken by specialist sub - contractors and it is not anticipated that employment opportunities for local and / or regional communities will result from the prospecting activities.
- Prospecting activities may result in localised visual impacts.

### 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).

Negative impacts on vegetation, soil and the water resources associated with the prospecting activity have been identified through the Scoping & EIR process. Mitigation measures as set out in the

Environmental Management Programme (EMPr) attached in Part B must be implemented in order to minimise these potential impacts.

Noise
Land owners and adjacent land owners in proximity to the site will be informed of the planned dates of the prospecting activities. Site activities must take place during the day (06:00 – 18:00) to avoid night time noise disturbances and night time collisions with fauna.

Visual impact
Dust suppression measures must be implemented.

Soil

- Disturbances to soil should be limited as far as possible.
- Topsoil should be stockpiled in a proper manor and no alien invasive species should be allowed to grow on the stockpiles.
- Erosion control measures should be implemented if necessary.
- Oils and lubricants must be stored in lined containment structures.
- Drip trays should be used where necessary.
- Waste bins should be provided and waste should be removed and disposed of at a licensed landfill site.
- Rehabilitation should be done concurrently.

Water

- Before any water is abstracted, a geo-hydro study should be conducted in order to determine the specific yield.
- Oils and lubricants must be stored in lined containment structures.
- Drip trays should be used where necessary.
- Erosion control measures should be implemented if necessary.

## ix) Motivation where no alternative sites were considered.

As discussed in the previous section, based on outcomes of previous studies in the vicinity of the proposed site, the possibility to encounter further Diamond Reserves on the remaining extent and Portion 6 of the farm Nooitgedacht 66 were identified.

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

The site is preferred due to its possibility of having diamond reserves, the property is also only suitable for low potential grazing land due to the climate conditions.

## d) 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 erer 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.)**

## Process for the identification of key issues

The methodology for the identification of key issues aims, as far as possible, to provide a user-friendly analysis of information to allow for easy interpretation.

- Checklist: The checklist consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts.
- Matrix: The matrix analysis provides a holistic indication of the relationship and interaction between the various activities, development phases and the impact thereof on the environment. The method aims at providing a first order cause and effect relationship between the environment and the proposed activity. The matrix is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts. The matrix also indicates the specialist studies, which will be submitted as part of the Environmental Impact Report in order to address the potentially most significant impacts.

## Checklist analysis

The site visit was conducted to ensure a proper analysis of the site specific characteristics of the study area. The table below provides a checklist, which is designed to stimulate thought regarding possible consequences of specific actions and so assist scoping of key issues. It consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts. The table highlights certain issues, which are further analysed in matrix format.

**Table:** Environmental checklist

| QUESTION | YES | NO | Un-sure | Description |
|---|---|---|---|---|
| **1. Are any of the following located on the site earmarked for the development?** | | | | |
| I. A river, stream, dam or wetland | ✕ | | | The proposed area consists of cultivated land, rows of trees, diggings, non-perennial pans, various non-perennial streams (tributaries) and areas of Glacial Movements. Also, the Vaal River flows adjacent to the RE/66. No prospecting may occur within the river. Where applicable a Water Use License Application will be launched for conducting prospecting operations. |
| II. A conservation or open space area | | ✕ | | None. |
| III. An area that is of cultural importance | | | ✕ | |
| IV. Site of geological significance | ✕ | | | Historical Glacial Movement areas are present |
| V. Areas of outstanding natural beauty | | ✕ | | None. |
| VI. Highly productive agricultural land | ✕ | | | Portions have been transformed for crop production. Four centre pivots and a number of crop fields are present in the northern corner of the property. |
| VII. Floodplain | | ✕ | | None. |
| VIII. Indigenous forest | | ✕ | | None. |
| IX. Grass land | | ✕ | | None. |

| | | | | |
|---|---|---|---|---|
| X. Bird nesting sites | ✕ | | | Bird nests are expected. |
| XI. Red data species | ✕ | | | Species listed as conservation worthy in terms of the National Forest Act (NFA) – Vachelia erioloba and Boscia albitrunca. |
| XII. Tourist resort | | ✕ | | None. |
| **2. Will the project potentially result in potential?** | | | | |
| I. Removal of people | | ✕ | | None. |
| II. Visual Impacts | ✕ | | | The visual impact will be managed |
| III. Noise pollution | | ✕ | | The noise impact is unlikely to be significant. |
| IV. Construction of an access road | | ✕ | | None. Access will be obtained from gravel road off the R31. |
| V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air. | | ✕ | | None. |
| VI. Accumulation of large workforce (>50 manual workers) into the site. | | ✕ | | Approximately 15 employment opportunities will be created during the construction and operational phase of the project. |
| VII. Utilisation of significant volumes of local raw materials such as water, wood etc. | ✕ | | | 16 washing pans which utilise approximately 18 000 L per hour each from which 30% is re-used. |
| VIII. Job creation | ✕ | | | Approximately 15 employment opportunities will be created during the construction and operational phase of the project. |
| IX. Traffic generation | | ✕ | | None. |
| X. Soil erosion | | ✕ | | Only areas earmarked for prospecting will be cleared. The prospecting will be phased and the topsoil stockpiled separately. Concurrent rehabilitation will take place. The soil also has a low erosion potential. |
| XI. Installation of additional bulk telecommunication transmission lines or facilities | | ✕ | | None. |
| **3. Is the proposed project located near the following?** | | | | |
| I. A river, stream, dam or wetland | ✕ | | | Yes, Vaal River |
| II. A conservation or open space area | | ✕ | | |
| III. An area that is of cultural importance | | ✕ | | None. |
| IV. A site of geological significance | ✕ | | | Historical Glacial Movement areas. |
| V. An area of outstanding natural beauty | | ✕ | | None. |
| VI. Highly productive agricultural land | | ✕ | | Various centre pivots are found across the river. |
| VII. A tourist resort | | ✕ | | |
| VIII. A formal or informal settlement | | ✕ | | None. |

Matrix analysis

The matrix describes the relevant listed activities, the aspects of the development that will apply to the specific listed activity, a description of the environmental issues and potential impacts, the significance and magnitude of the potential impacts, and the mitigation of the potential impacts. The matrix also highlights areas of particular concern, which requires more in depth assessment. Each

cell is evaluated individually in terms of the nature of the impact, duration and its significance – should no mitigation measures be applied. This is important since many impacts would not be considered insignificant if proper mitigation measures were implemented. The matrix also provides an indication if mitigation measures are available.

In order to conceptualise the different impacts the matrix specify the following:

- **Stressor**: Indicates the aspect of the proposed activity, which initiates and cause impacts on elements of the environment.
- **Receptor**: Highlights the recipient and most important components of the environment affected by the stressor.
- **Impacts**: Indicates the net result of the cause-effect between the stressor and receptor.
- **Mitigation**: Impacts need to be mitigated to minimise the effect on the environment.

**Matrix Analysis**

| LISTED ACTIVITY (The Stressor) | ASPECTS OF THE DEVELOPMENT /ACTIVITY | POTENTIAL IMPACTS | | | SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS | | | MITIGATION OF POTENTIAL IMPACTS | SPECIALIST STUDIES / INFORMATION |
|---|---|---|---|---|---|---|---|---|---|
| | | | Receptors | Impact description | Minor | Major | Duration | Possible Mitigation | |
| **CONSTRUCTION PHASE** | | | | | | | | | |
| *Listing Notice GNR 984, Activity 15:"The clearance of an area of 20 hectares or more, of indigenous vegetation."* | Site clearing and preparation<br>Areas earmarked for prospecting will need to be cleared, topsoil will be stockpiled separately. | BIOPHYSICAL ENVIRONMENT | Fauna & Flora | • Loss or fragmentation of indigenous natural vegetation.<br>• Loss of sensitive species.<br>• Loss or fragmentation of habitats. | | - | M | Yes | - |
| | | | Air | • Air pollution due to the increase of traffic of construction vehicles. | | | S | Yes | - |
| | | | Soil | • Soil degradation, including erosion.<br>• Loss of topsoil.<br>• Disturbance of soils and existing land use (soil compaction). | | - | S | Yes | - |
| | | | Geology | • It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa. | | - | S | Yes | - |
| | | | Existing services infrastructure | • Generation of waste that need to be accommodated at a licensed landfill site.<br>• Generation of sewage that need to be accommodated by the local sewage plant. | | - | S | Yes | - |
| | | | Ground water | • Pollution due to construction vehicles. | | | S | Yes | - |
| | | | Surface water | • Increase in storm water run-off.<br>• Pollution of water sources due to soil erosion.<br>• Destruction of watercourses (pans/dams/streams). | | - | S | Yes | - |
| | | SOCIAL/ECONOMIC ENVIRONMENT | Local unemployment rate | • Job creation.<br>• Business opportunities.<br>• Skills development. | | + | S | Yes | - |
| | | | Visual landscape | • Potential visual impact on residents of farmsteads and motorists in close proximity to proposed facility. | - | | S | Yes | - |
| | | | Traffic volumes | • Increase in construction vehicles. | | - | S | Yes | - |
| | | | Health & Safety | • Air/dust pollution.<br>• Road safety.<br>• Increased risk of veld fires. | | - | S | Yes | - |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Noise levels | • The generation of noise as a result of construction vehicles, the use of machinery such as drills and people working on the site. | - | | S | Yes | - |
| | | | Tourism industry | • Since there are no tourism facilities in close proximity to the site, the proposed activities will not have an impact on tourism in the area. | N/A | N/A | N/A | N/A | - |
| | | | Heritage resources | • Removal or destruction of archaeological and/or paleontological sites.<br>• Removal or destruction of buildings, structures, places and equipment of cultural significance.<br>• Removal or destruction of graves, cemeteries and burial grounds. | | - | S | Yes | - |
| *Listing Notice GNR 984, Activity 15:"The clearance of an area of 20 hectares or more, of indigenous vegetation."* | Site clearing and preparation<br>Areas earmarked for prospecting will need to be cleared, topsoil will be stockpiled separately.<br>This will inevitably result in the removal of indigenous vegetation located on the site. | BIOPHYSICAL ENVIRONMENT | Fauna & Flora | • Loss or fragmentation of indigenous natural vegetation.<br>• Loss of sensitive species.<br>• Loss or fragmentation of habitats. | | - | L | Yes | - |
| | | | Air quality | • Air pollution due to the increase of traffic. | | | S | Yes | - |
| | | | Soil | • Soil degradation, including erosion.<br>• Disturbance of soils and existing land use (soil compaction).<br>• Loss of agricultural potential (low significance relative to agricultural potential of the site). | | - | S | Yes | - |
| | | | Geology | • It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa. | N/A | NA | NA | N/A | - |
| | | | Existing services infrastructure | • Generation of waste that need to be accommodated at a licensed landfill site.<br>• Generation of sewage that need to be accommodated by the local sewage plant. | - | - | S | Yes | - |
| | | | Ground water | • Pollution due to construction vehicles. | | | S | Yes | - |
| | | | Surface water | • Increase in storm water run-off.<br>• Pollution of water sources due to soil erosion.<br>• Destruction of watercourses (pans/dams/streams). | - | | S | Yes | - |
| | | SOCIAL/ECONOMIC ENVIRONMENT | Local unemployment rate | • Job creation.<br>• Skills development. | | + | S | N/A | - |
| | | | Visual landscape | • Potential visual impact on residents of farmsteads and motorists in close proximity to proposed facility due to dust. | - | | S | Yes | - |
| | | | Traffic volumes | • Increase in construction vehicles. | - | | S | Yes | - |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Health & Safety | • Air/dust pollution.<br>• Road safety. | | - | S | Yes | - |
| | | | Noise levels | • The generation of noise as a result of construction vehicles, and people working on the site. | - | | S | Yes | - |
| | | | Tourism industry | • Since there are no tourism facilities in close proximity to the site, the proposed activity will not have an impact on tourism in the area. | N/A | N/A | N/A | N/A | - |
| | | | Heritage resources | • Removal or destruction of archaeological and/or paleontological sites.<br>• Removal or destruction of buildings, structures, places and equipment of cultural significance.<br>• Removal or destruction of graves, cemeteries and burial grounds. | N/A | N/A | N/A | N/A | - |
| **OPERATIONAL PHASE** | | | | | | | | | |
| Listing Notice GNR 984, Activity 19: "The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resource4s Development Act (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)" | The key components of the proposed project are described below:<br>• Supporting Infrastructure - A control facility with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 50m² or less. Other supporting infrastructure includes a site office and workshop area.<br>• Roads – Access will be obtained from gravel road off R31. All site roads will require a width of approximately 10m.<br>• Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm. | BIOPHYSICAL ENVIRONMENT | Fauna & Flora | • Fragmentation of habitats.<br>• Establishment and spread of declared weeds and alien invader plants (operations). | | - | M | Yes | - |
| | | | Air quality | • Air pollution due to the mining activity, crusher plant and transport of the gravel to the designated areas. | N/A | N/A | N/A | N/A | - |
| | | | Soil | • Soil degradation, including erosion.<br>• Disturbance of soils and existing land use (soil compaction).<br>• Loss of agricultural potential (low significance relative to agricultural potential of the site). | | - | M | Yes | - |
| | | | Geology | • Collapsible soil.<br>• Seepage (shallow water table).<br>• Active soil (high soil heave).<br>• Erodible soil.<br>• The presence of undermined ground.<br>• Instability due to soluble rock.<br>• Steep slopes or areas of unstable natural slopes.<br>• Areas subject to seismic activity.<br>• Areas subject to flooding. | | - | L | Yes | - |
| | | | Existing services infrastructure | • Generation of waste that need to be accommodated at a licensed landfill site.<br>• Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant.<br>• Increased consumption of water. Approximately 17 000 L per hour | | - | M | Yes | - |
| | | | Ground water | • Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can contaminate water supplies. | | - | L | Yes | - |
| | | | Surface water | • Increase in storm water runoff. The development will potentially result in an increase in storm water run-off that needs to be managed to prevent soil erosion.<br>• Destruction of watercourses (pans/dams/streams). | | - | L | Yes | - |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | • Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can contaminate water supplies. | | | | | |
| | | SOCIAL/ECONOMIC ENVIRONMENT | Local unemployment rate | • Job creation. Security guards will be required for 24 hours every day of the week and general laborers will also be required for the cleaning of the panels.<br>• Skills development. | | + | M | Yes | - |
| | | | Visual landscape | • Change in land-use/sense of place. The site is characterized by open veldt with a rural agricultural sense of place. The use of the area for the prospecting activity will result in the area not being used for livestock grazing anymore until rehabilitated. | | - | M | Yes | - |
| | | | Traffic volumes | • Increase in vehicles collecting gravel for distribution. | - | | S | Yes | - |
| | | | Health & Safety | • Air/dust pollution.<br>• Road safety. | | - | M | N/A | - |
| | | | Noise levels | • The proposed development will result in noise pollution during the operational phase. | - | - | M | Yes | - |
| | | | Tourism industry | • Since there are no tourism facilities in close proximity to the site, the decommissioning activities will not have an impact on tourism in the area. | | - | M | N/A | - |
| | | | Heritage resources | • It is not foreseen that the proposed activity will impact on heritage resources or vice versa. | N/A | N/A | N/A | N/A | - |
| **DECOMMISSIONING PHASE** | | | | | | | | | |
| - | <u>Mine closure</u><br>During the mine closure the Mine and its associated infrastructure will be dismantled.<br><br><u>Rehabilitation of biophysical environment</u><br>The biophysical environment will be rehabilitated. | BIOPHYSICAL ENVIRONMENT | Fauna & Flora | • Re-vegetation of exposed soil surfaces to ensure no erosion in these areas. | + | | L | Yes | - |
| | | | Air quality | • Air pollution due to the increase of traffic of construction vehicles. | - | | S | Yes | - |
| | | | Soil | • Backfilling of all voids<br>• Placing of topsoil on backfill | + | | L | Yes | - |
| | | | Geology | • It is not foreseen that the decommissioning phase will impact on the geology of the site or vice versa. | N/A | N/A | N/A | N/A | - |
| | | | Existing services infrastructure | • Generation of waste that need to be accommodated at the local landfill site.<br>• Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant.<br>• Increase in construction vehicles. | - | | S | Yes | - |
| | | | Ground water | • Pollution due to construction vehicles. | - | | S | Yes | - |
| | | | Surface water | • Increase in storm water run-off.<br>• Pollution of water sources due to soil erosion.<br>• Destruction of watercourses (pans/dams/streams). | - | | S | Yes | - |
| | | SOCIAL/ECONOMIC ENVIRONMENT | Local unemployment rate | • Loss of employment. | | - | L | Yes | - |
| | | | Visual landscape | • Potential visual impact on visual receptors in close proximity to proposed facility. | - | | S | Yes | - |
| | | | Traffic volumes | • Increase in construction vehicles. | - | | S | Yes | - |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Health & Safety | • Air/dust pollution.<br>• Road safety.<br>• Increased crime levels. The presence of mine workers on the site may increase security risks associated with an increase in crime levels as a result of influx of people in the rural area. | - | | | Yes | - |
| | | | Noise levels | • The generation of noise as a result of construction vehicles, the use of machinery and people working on the site. | - | | S | Yes | - |
| | | | Tourism industry | • Since there are no tourism facilities in close proximity to the site, the decommissioning activities will not have an impact on tourism in the area. | N/A | N/A | N/A | N/A | - |
| | | | Heritage resources | • It is not foreseen that the decommissioning phase will impact on any heritage resources. | N/A | N/A | N/A | N/A | - |

(N/A) No impact (+) Positive Impact (-) Negative Impact (S) Short Term (M) Medium Term (L) Long Term

## e) Summary of specialist reports.

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

| LIST OF STUDIES UNDERTAKEN | RECOMMENDATIONS OF SPECIALIST REPORTS | SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable) | REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED. |
|---|---|---|---|
| Ecological Impact Assessment Report | The following is recommended:<br>General<br>• An Environmental Control Officer (ECO) must be appointed to oversee that the aspects stipulated in the Environmental Permit be carried out properly. The ECO will be contracted externally and will conduct inspections on a continuous basis;<br>• Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to;<br>• The areas to be cleared as well as the construction area should be clearly demarcated;<br>• All construction vehicles should adhere to clearly defined and demarcated roads;<br>• Dust suppression and erosion management should be an integrated component of the construction approach;<br>• No dumping of building waste or spoil material from the development should take place on areas other than a licenced landfill site; | **X** | v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts P37-41 and 49-51.<br><br>ix) Impacts to be mitigated in their respective phases P82-124 |

| | | | |
|---|---|---|---|
| | • All hazardous materials should be stored appropriately to prevent contamination of the project site. Any accidental chemical, fuel and oil spills that occur at the project site should be cleaned up appropriately as related to the nature of the spill;<br><br>Flora<br>• Weed control measures must be applied to eradicate any noxious weeds (category 1a &1b species) on disturbed areas.<br>• There should be a preconstruction walk-through of the development footprint/project site in order to locate individuals of plant species of conservation concern. Camel Thorn and Shepherd's Trees occur on the project site. A search and rescue exercise must be done to locate them. Any translocatable protected species must be relocated to a suitable and similar habitat where these plants can grow without any disturbance;<br>• In case Camel Thorn or Shepherd's tree are found permits must be obtained from DAFF to remove these individuals. The contractor must apply for these permits in a phased manner as mining proceeds.<br><br>Fauna<br>• Any fauna threatened by the construction and operation activities should be removed to safety by the ECO or appropriately qualified environmental officer.<br>• All construction vehicles should adhere to a low speed limit (<30km/h) to avoid collisions with susceptible species such as snakes and tortoises.<br>• If trenches need to be dug for electrical cabling or other purposes, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are exposed should contain soil ramps allowing fauna to escape the trench. | | |
| Heritage Impact Assessment | There is a Heritage Assessment being conducted, please see Appendix 11. The results thereof will be submitted to the department and will be included in a revised document - Francois CoetzeeHeritage Specialist | **There is a Heritage Assessment being conducted, please see Appendix 11.** | |

| | | | |
|---|---|---|---|
| | | **The results thereof will be submitted to the department and will be included in a revised document.** | |

Specialist Report is attached as **Appendix 11**

## f) Environmental impact statement

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

This section provides a summary of the assessment and conclusions drawn from the proposed prospecting area. In doing so, it draws on the information gathered as part of the environmental impact assessment process and the knowledge gained by the environmental consultant during the course of the process and presents an informed opinion on the environmental impacts associated with the proposed project. The following conclusions can be drawn for the proposed prospecting activity:

- Potential impacts on biodiversity: It is expected that some vegetation might be lost but through implementing mitigation measures, no adverse impacts are expected. It should be kept in mind that the whole 4620.6068ha will not be cleared. The main focus will be the previous worked out areas.

- Potential impacts on the river: Due to the water being abstracted from the river.

- Potential impacts on land use: The farm is currently utilised for agricultural and for educational purposes. The activity which will be subject to concurrent rehabilitation will have an impact on the land use. Also, all activities will be corresponded to the land owner before commencing.

- Potential social impacts: The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks.

- Potential negative impacts: (noise, dust, soil degradation, storm water, traffic, health and safety) associated with the operation of the facility are expected to be of low-high impact, of medium terms and site specific. These can be mitigated or negated through the implementation of practical and appropriate mitigation measures.

- Positive impacts: The prospecting of alluvial diamonds and diamonds general will have socio-economic benefit to the area.

All possible negative impacts and risks that have been identified in this report can be effectively mitigated and managed by implementing the migratory measures as set out in the Environmental Management Programme (EMPr) attached in Part B. It is therefore recommended that the environmental authorisation for the prospecting right be granted.

### (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 indicating any areas that should be avoided, including buffers .Attach as **Appendix 4**

Refer to Locality Map attached in **Appendix 3**.

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

- Increased noise levels
- Potential water and soil pollution impacts.
- Potential loss of fauna and flora.
- Increased vehicle activity.
- Increased dust levels.
- Increase in water consumption and possible depletion of groundwater resources.
- Potential visual impacts.

All possible negative impacts and risks that have been identified in this report can be effectively mitigated and managed by implementing the mitigation measures as set out in the Environmental Management Programme (EMPr) attached in Part B.

## g) 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 for inclusion as conditions of authorisation.**

Management objectives include:

- Ensure that the prospecting activity does not cause pollution to the environment or harm to persons.
- Minimise production of waste.
- All prospecting activities must be conducted in a manner that minimises noise impact, litter, environmental degradation and health hazards i.e. injuries.
- The mine must be kept neat and tidy during waste handling to prevent unsightliness and accidents.

Expected outcomes include:

- Minimum impacts on the environment as a result of alluvial diamond prospecting.
- Compliance with legislative requirements.
- Mine is neat and tidy and well managed.

## h) Final proposed alternatives.

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

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. Due to the expected mineral resources, Morgenson Mining CC in would like to potentially prospect for Diamonds Alluvial & Diamonds General on the remaining extent and Portion 6 of the farm Nooitgedacht 66, therefore there will be no other alternative (i.e. to facilitate the movement of machinery, equipment, infrastructure).

### i) Aspects for inclusion as conditions of Authorisation.

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

- The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMPr and all other relevant environmental legislation.
- A copy of the EMP should be made available onsite at all times.
- Implementation of the proposed mitigation measures set out in the EMPr.

### j) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

The uncertainties in results are mostly related to the availability of information, time available to gather the relevant information as well as the sometimes subjective nature of the assessment methodology. In terms of addressing the key issues the EAP is satisfied that there is sufficient information to conduct the significance rating and provide the environmental authority with sufficient information to make an informed decision. If the authority feels that specialists studies need to be conducted, such will be corresponded to the applicant.

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

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

Based on the outcomes of other diamond mines in the area the possibility to encounter further Diamond Reserves were identified.

The proposed prospecting area is targeted as, historically, several alluvial diamonds and diamond general occurrences are known in the area, and a number of these have been exploited in the past. There are also various alluvial diamond operations within the vicinity of the prospecting area.

No other properties have been secured by the applicant and the site is therefore regarded as the preferred site, and alternatives are not considered.

The option of not approving the activities will result in a significant loss to valuable diamond deposits being exploited. And all economic benefits will be lost.

### ii) Conditions that must be included in the authorisation

- The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMPr and all other relevant environmental legislation.
- A copy of the EMP should be made available onsite at all times.
- Implementation of the proposed mitigation measures set out in the EMPr.

The EMPr should be binding on all managers and contractors operating/utilizing the site.

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

## (2) Rehabilitation requirements

Rehabilitation & Closure Plan is attached as **appendix 8**

## l) Period for which the Environmental Authorisation is required.

For a minimum of 10 years.

## m) Undertaking

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

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

## n) Financial Provision

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

**CALCULATION OF THE QUANTUM**

Applicant: **Morgenson Mining CC** **Ref No.:** **NC30/5/1/1/2/11894PR**
Evaluator: **Date:** **18-May-17**

| No. | Description | Unit | A Quantity | B Master Rate | C Multiplication factor | D Weighting factor 1 | E=A*B*C*D Amount (Rands) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 1 | Dismantling of processing plant and related structures | m3 | 600 | 13.7 | 1 | 1 | 8220 |
| 2 (A) | Demolition of steel buildings and structures | m2 | | 190.3 | 1 | 1 | 0 |
| 2(B) | Demolition of reinforced concrete buildings and structures | m2 | 0 | 280.46 | 1 | 1 | 0 |
| 3 | Rehabilitation of access roads | m2 | 0 | 34.05 | 1 | 1 | 0 |
| 4 (A) | Demolition and rehabilitation of electrified railway lines | m | 0 | 330.5 | 1 | 1 | 0 |
| 4 (A) | Demolition and rehabilitation of non-electrified railway lines | m | 0 | 180.3 | 1 | 1 | 0 |
| 5 | Demolition of housing and/or administration facilities | m2 | 0 | 380.6 | 1 | 1 | 0 |
| 6 | Opencast rehabilitation including final voids and ramps | ha | 0.7875 | 193716.3 | 0.52 | 1 | 79326.82485 |
| 7 | Sealing of shafts adits and inclines | m3 | 0 | 102.17 | 1 | 1 | 0 |
| 8 (A) | Rehabilitation of overburden and spoils | ha | 0 | 133017.19 | 1 | 1 | 0 |
| 8 (B) | Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential) | ha | 0.5 | 165670.5 | 1 | 1 | 82835.25 |
| 8 ( C ) | Rehabilitation of processing waste deposits and evaporation ponds (polluting potential) | ha | 0 | 481185.7 | 1 | 1 | 0 |
| 9 | Rehabilitation of subsided areas | ha | 0 | 111381.9 | 1 | 1 | 0 |
| 10 | General surface rehabilitation | ha | 0.5 | 105372.05 | 1 | 1 | 52686.025 |
| 11 | River diversions | ha | 0 | 105372.05 | 1 | 1 | 0 |
| 12 | Fencing | m | 70 | 120.2 | 1 | 1 | 8414 |
| 13 | Water management | ha | 0 | 40065.4 | 1 | 1 | 0 |
| 14 | 2 to 3 years of maintenance and aftercare | ha | 0.5 | 14022.9 | 1 | 1 | 7011.45 |
| 15 (A) | Specialist study | Sum | | | | 1 | 0 |
| 15 (B) | Specialist study | Sum | | | | 1 | 0 |
| | | | | | Sub Total 1 | | 238493.5499 |

| | | | | |
|---|---|---|---|---|
| 1 | Preliminary and General | 28619.22598 | weighting factor 2: 1 | 28619.22598 |
| 2 | Contingencies | 23849.35499 | | 23849.35499 |
| | | | Subtotal 2 | 290962.13 |
| | | | VAT (14%) | 40734.70 |
| | | | **Grand Total** | **331697** |

It is envisaged that 200 pits will be dug. It may be less depending on results.

4620.6068 ha – 5m x 3m x 5m (200 pits). It is planned that only 50 pits will be excavated in the first year, but it may be more if the process is quicker than planned for. It should be kept in mind that no more than 200 pits will be excavated.

The total area to be disturbed a year will be- 50 pits x (5m x 3m) = 0.075Ha per year.

4620.6068 ha - 50m x 30m x 5m trench (50 trenches). It is planned that only 10 trenches will be excavated in the first year, but it may be more if the process is quicker than planned for. It should be kept in mind that no more than 50 trenches will be excavated.

The total area to be disturbed a year will be- 10 trenches x (50m x30m) = 1.5 Ha per year. No more than 1.575 ha will be left as un-rehabilitated in two years. Rehabilitation will be done concurrently.

## i) Explain how the aforesaid amount was derived.

The closure cost estimate provided above is aligned with the Guideline Document for the Evaluation of Quantum of Closure related Financial Provision Provided by a Mine, by the DMR (January, 2005). The amount was calculated by Milnex 189 CC.

**ii) Confirm that this amount can be provided for 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).

**Financial Guarantee**

The financial guarantee for the rehabilitation for land disturbed by Morgenson Mining CC was submitted together with the application for a prospecting right.

**Rehabilitation Fund**

Morgenson Mining CC will also make provision for rehabilitation during closure by establishing a rehabilitation trust.

## o) Deviations from the approved scoping report and plan of study.

### i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks.
(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation).

### ii) Motivation for the deviation.

## p) Other Information required by the competent Authority

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

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

The following impacts may be regarded as community impacts:

- Increased noise levels
- Potential water and soil pollution impacts.
- Potential loss of fauna and flora.
- Increased vehicle activity.
- Increased dust levels.
- Increase in water consumption and possible depletion of groundwater resources.
- Potential visual impacts.

Indirect socio-economic benefits are expected to be associated with the creation of employment.

**(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act. (**Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act 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).

There is a Heritage Assessment being conducted, please see Appendix 11. The results thereof will be submitted to the department and will be included in a revised document.

Special attention should be given to the identification of possible cultural or heritage resources on site. However, heritage resources including archaeological and paleontological sites over 100 years old, graves older than 60 years, structure older than 60 years are protected by the National Heritage Resources Act no 25 of 1999. Therefore if such resources are found during the prospecting or development activities, they shall not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA must be contacted immediately and work must stop.

**q) 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)**.

From a local perspective the remaining extent and Portion 6 of the farm Nooitgedacht 66 are preferred based on the outcomes of other diamond mines in the area to encounter further Diamond Reserves.

# 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).

It is hereby confirmed that the requirements for the provision of the details and expertise of the EAP are contained in Part A, section 1(a) as required. The Curriculum Vitae for the responsible EAP is contained in **Appendix 1 and 2**.

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

It is hereby confirmed that the requirements to describe the aspects of the activity that are required by the draft EMP is already included in Part A, section 1(h).

**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)

Refer to Locality Map, attached as in **Appendix 4**.

d) **Description of Impact management objectives including management statements**

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

Closure objectives for the alluvial diamond and general diamond mine will aim to ensure that the residual post-closure impacts be minimized and be acceptable to relevant parties. To achieve these closure objectives, the following will be implemented:

- All prospecting related infrastructure, foundations and concrete areas will be decommissioned, removed from the site and appropriately disposed of. Reclaimable structures such as metal, electrical installations or equipment will be sold for re-use or as scrap.
- All disturbed areas within the site not already vegetated will be re-vegetated with appropriate indigenous, ecologically adapted species appropriate to the area and the final land use as soon as possible after operation ceases. Progress of vegetation growth/establishment, stability and drainage/erosion will be monitored and, in the event of adverse trends being identified, corrective measures will be implemented.

- Vegetation monitoring will consider, inter alia, the establishment of perennial ground cover and infestation by alien invasive plant species. The encroachment of indigenous vegetation into the area will be used as an indication of a stable, self-sustaining vegetation cover with little risk of retrogressing to a situation where are and water pollution may occur.

Alien invasive management plan

The following are the identified mitigation measures under table 4.2 of the report.

- To replace bare soil at impacted areas with vegetation and functioning as similar as possible to the adjacent natural veld and riparian zones to an ecosystem functioning as self-sufficient as possible.
- Possible additional impacts by using exotic plant species are avoided as a pre-caution.
- Rationale: This aim almost approaches restoration and the idea is that the area immediate to the proposed impacts would approach self-sufficient and impacted areas a little further away be self-sufficient as soon as possible.

Monitoring is the responsibility of the environmental conservation officer (ECO) or equivalent or contracted specialist.

**Table 4.2** Guidelines to monitoring actions during the rehabilitation process

| | |
|---|---|
| 1 | Regularly inspect the impacted zones to note the indigenous vegetation properly establish at hitherto clearings and formerly impacted areas. |
| 2 | Regularly inspect the impacted zones for unwanted damming of water or over-increase of wetness in any particular area as a consequence of land use changes, the relevant impacts or the rehabilitation effort. |
| 3 | Regularly inspect the impacted zones to note establishment of alien invasive species |
| 4 | Monitor and inspect the wetlands if impacts are nearby for release of any unwanted sediments into the wetland system take place. |
| 5 | Regularly inspect and observe if any oil leakages or any other hydrocarbon spillages occur and monitor the servicing of vehicles or other equipment or the identification of any vehicles from which these spillages originate. |

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

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

The prospecting activities applied for will not result in acid mine drainage. These activities and methods can be seen as a clean process.

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

Not applicable for this project

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

Not applicable for this project

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

Not applicable for this project

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

10 000 - 18 000 L per hour required per rotary pan to operate at the wash plant.

viii) **Has a water use licence has been applied for?**

A water use license application will be applied for, if required.

### ix) Impacts to be mitigated in their respective phases

### Measures to rehabilitate the environment affected by the undertaking of any listed activity

| ACTIVITIES<br><br>**(E.g. For prospecting -** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc…etc…etc**<br><br>**E.g. For mining**,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.) | PHASE<br><br>(of operation in which activity will take place.<br><br>State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure). | SIZE AND SCALE of disturbance<br><br>(volumes, tonnages and hectares or m²) | MITIGATION MEASURES<br><br>(describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants) | COMPLIANCE WITH STANDARDS<br><br>(A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities) | TIME PERIOD FOR IMPLEMENTATION<br><br>Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required.<br>With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-..<br>Upon cessation of the individual activity<br>Or.<br>Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be. |
|---|---|---|---|---|---|
| Clearance of vegetation | Pitting and trenching phase- (construction and operation phase) | 4620.6068 ha – 5m x 3m x 5m pit (200 pits), 50m x 30m x 5m trench (50 trenches) | 1. Site clearing must take place in a phased manner, as and when required.<br>2. Areas which are not to be prospected on within two months must not be cleared to reduce erosion risks.<br>3. The area to be cleared must be clearly demarcated and this footprint strictly maintained.<br>4. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site.<br>5. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. | Compliance with Duty of Care as detailed within NEMA | Duration of operations on the prospecting activities. |

| | | | | | |
|---|---|---|---|---|---|
| | | | Dr.P.J du Preez (2017):<br><br>1. After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows.<br>2. Protected plant species must be relocated if possible.<br>3. Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor.<br>4. Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated footprint area.<br>5. Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMPr, if possible.<br>6. Remove all invasive vegetation before and after construction and continuously up to decommissioning.<br>7. If filling material is to be used, this should be sourced from areas free of invasive species.<br>8. Topsoil (the upper 25 cm of soil) is an important natural resource; where it must be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re- | | |

| | | | | | |
|---|---|---|---|---|---|
| | | | applied, minimise the handling of topsoil.<br>9. Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan.<br>10. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly.<br>11. Prevent leakage of oil or other chemicals, and strictly prohibit littering of any kind.<br>12. Monitor the establishment of all invasive species and remove as soon as detected, whenever possible before regenerative material can be formed.<br>13. Restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed.<br>14. Parking areas should be regularly inspected for oil spills and covered with an impermeable or absorbent layer (with the necessary storm water control) if oil and fuel spillages are highly likely to occur.<br>15. Strict speed limits must be set and adhered to. | | |

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| | | | 16. Driving between dusk and dawn should be permissible to emergency situations only.<br>17. Prevent spillage of any, oils or other chemicals, strictly prohibit other pollution.<br>18. Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed, destroy all material to prevent re-establishment. | | |
| Construction of roads | Pitting and trenching phase- (construction and operation phase) | +- 500m | 1. Planning of access routes to the site for construction/prospecting purposes shall be done in conjunction with the Contractor and the Landowner. All agreements reached should be documented and no verbal agreements should be made. The Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a "NO ENTRY for prospecting vehicles" sign.<br>2. Construction routes and required access roads must be clearly defined.<br>3. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance.<br>4. Soils compacted by construction/prospecting activities shall be deep ripped to loosen compacted layers and re-graded to even running levels.<br>5. The contractor must ensure that damage caused by related traffic to the gravel access road off the R31 is repaired continuously. The costs | Compliance with Duty of Care as detailed within NEMA | Duration of operations on the prospecting activities. |

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| | | | associated with the repair must be borne by the contractor;<br>6. Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport the gravel are fitted with tarpaulins or covers;<br>7. All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. | | |
| Prospecting of Alluvial Diamonds – Soils and geology | Pitting and trenching phase- (construction and operation phase) | 4620.6068 ha – 5m x 3m x 5m pit (200 pits), 50m x 30m x 5m trench (50 trenches) | 1. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil (If topsoil exists), and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.<br>2. Care must be taken not to mix topsoil and subsoil during stripping.<br>3. The topsoil must be conserved on site in and around the pit/trench area.<br>4. Subsoil and overburden in the prospecting area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.<br>5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or | Compliance with Duty of Care as detailed within NEMA | Duration of operations on the mine |

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| | | | geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms, trenches or low brick walls around their bases.<br>6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.<br>7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager.<br>8. The impact on the geology will be permanent. There is no mitigation measure. | | |
| Prospecting Alluvial Diamonds – excavations and blasting | Pitting and trenching phase- (construction and operation phase) | 4620.6068 ha – 5m x 3m x 5m pit (200 pits), 50m x 30m x 5m trench (50 trenches) | 1. The prospecting activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.<br>2. Mine, pans, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed in to the system.<br>3. Truck traffic should be routed away from noise sensitive areas, where possible.<br>4. Noise levels must be kept within acceptable limits. | Compliance with Duty of Care as detailed within NEMA | Duration of operations on the prospecting area |

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| | | | 5. Noisy operations should be combined so that they occur where possible at the same time.<br>6. Mine workers to wear necessary ear protection gear.<br>7. Noisy activities to take place during allocated hours.<br>8. Noise from labourers must be controlled.<br>9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from the site.<br>10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport.<br>11. Implementation of enclosure and cladding of processing plants.<br>12. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine. | | |

## e) Impact Management Outcomes

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

| **ACTIVITY** (whether listed or not listed). **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**. | **POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)** | **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 etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** • **Remedy through rehabilitation..** | **STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.** |
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| Clearance of vegetation | Loss or fragmentation of habitats | Fauna & flora | Pitting and trenching phase-(construction and operation phase) | **Existing vegetation** 1. Vegetation removal must be limited to the prospecting area. 2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step. 3. No vegetation to be used for firewood. 4. Exotic and invasive plant species should not be allowed to establish, if the development is approved. **Rehabilitation** 5. All damaged areas shall be rehabilitated upon completion of the contract. 6. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. 7. All natural areas impacted during construction/prospecting must be rehabilitated with | Minimisation of impacts to acceptable limits |

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| | | | | locally indigenous grasses typical of the representative botanical unit.<br>8. Rehabilitation must take place in a phased approach as soon as possible.<br>9. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding.<br>10. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.<br>11. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged.<br><br>**Demarcation of prospecting area**<br>12. All plants not interfering with prospecting operations shall be left undisturbed clearly marked and indicated on the site plan.<br>13. The prospecting area must be well demarcated and no construction/prospecting activities must be allowed outside of this demarcated footprint.<br>14. Vegetation removal must be phased in order to reduce impact of construction/prospecting.<br>15. Site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.<br>16. Strict and regular auditing of the prospecting process to ensure containment of the prospecting and laydown areas.<br>17. Soils must be kept free of petrochemical solutions that may be kept on site during construction/prospecting. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. | |

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| | | | | **Utilisation of resources**<br>18. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.<br><br>**Exotic vegetation**<br>19. Alien vegetation on the site will need to be controlled.<br>20. The Contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.<br>21. The spread of exotic species occurring throughout the site should be controlled.<br><br>**Herbicides**<br>22. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used.<br>23. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.<br>**Fauna**<br>24. Rehabilitation to be undertaken as soon as possible after the prospecting activities have been completed.<br>25. No trapping or snaring to fauna on the construction/prospecting site should be allowed.<br>26. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development. | |

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| | | | | Dr.P.J du Preez (2017):<br><br>1. After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows.<br>2. Protected plant species must be relocated if possible.<br>3. Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor.<br>4. Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated footprint area.<br>5. Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMPr, if possible.<br>6. Remove all invasive vegetation before and after construction and continuously up to decommissioning.<br>7. If filling material is to be used, this should be sourced from areas free of invasive species.<br>8. Topsoil (the upper 25 cm of soil) is an important natural resource; where it must be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise the handling of topsoil.<br>9. Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan. | |

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| | | | | 10. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly.<br>11. Prevent leakage of oil or other chemicals, and strictly prohibit littering of any kind.<br>12. Monitor the establishment of all invasive species and remove as soon as detected, whenever possible before regenerative material can be formed.<br>13. Restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed.<br>14. Parking areas should be regularly inspected for oil spills and covered with an impermeable or absorbent layer (with the necessary storm water control) if oil and fuel spillages are highly likely to occur.<br>15. Strict speed limits must be set and adhered to.<br>16. Driving between dusk and dawn should be permissible to emergency situations only.<br>17. Prevent spillage of any, oils or other chemicals, strictly prohibit other pollution.<br>18. Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed, destroy all material to prevent re-establishment. | |
| Prospecting Alluvial Diamonds and diamonds general – excavations | Loss of topsoil | Soil | Pitting and trenching phase-(construction and operation phase) | 1. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil, and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. | Minimisation of impacts to acceptable limits |

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| | | | | Topsoil must be reused where possible to rehabilitate disturbed areas.<br>2. Care must be taken not to mix topsoil and subsoil during stripping.<br>3. The topsoil must be conserved on site in and around the pit/trench area.<br>4. Subsoil and overburden in the prospecting area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.<br>5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.<br>6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.<br>7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager.<br><br>Establish an effective record keeping system for each area where soil is disturbed for prospecting purposes. These records should be included in environmental performance reports, and should include all the records below.<br>• Record the GPS coordinates of each area.<br>• Record the date of topsoil stripping.<br>• Record the GPS coordinates of where the topsoil is stockpiled.<br>• Record the date of cessation prospecting activities at the particular site. | |

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| | | | | • Photograph the area on cessation of prospecting activities.<br>• Record date and depth of re-spreading of topsoil.<br>• Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.<br><br>Dr.P.J du Preez (2017):<br><br>1. After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows.<br>2. Protected plant species must be relocated if possible.<br>3. Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor.<br>4. Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated footprint area.<br>5. Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMPr, if possible.<br>6. Remove all invasive vegetation before and after construction and continuously up to decommissioning.<br>7. If filling material is to be used, this should be sourced from areas free of invasive species.<br>8. Topsoil (the upper 25 cm of soil) is an important natural resource; where it must be stripped, | |

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| | | | | never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise the handling of topsoil.<br>9. Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan.<br>10. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly.<br>11. Prevent leakage of oil or other chemicals, and strictly prohibit littering of any kind.<br>12. Monitor the establishment of all invasive species and remove as soon as detected, whenever possible before regenerative material can be formed.<br>13. Restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed.<br>14. Parking areas should be regularly inspected for oil spills and covered with an impermeable or absorbent layer (with the necessary storm water control) if oil and fuel spillages are highly likely to occur.<br>15. Strict speed limits must be set and adhered to.<br>16. Driving between dusk and dawn should be permissible to emergency situations only.<br>17. Prevent spillage of any, oils or other chemicals, strictly prohibit other pollution.<br>18. Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed, destroy all material to prevent re-establishment. | |

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| | Erosion | Soil<br>Air<br>Water | Pitting and trenching phase-(construction and operation phase) | 1. An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.<br>2. Periodical site inspection should be included in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence of any erosion on site or downstream.<br>3. Wind screening and stormwater control should be undertaken to prevent soil loss from the site.<br>4. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion.<br>5. Other erosion control measures that can be implemented are as follows:<br>o Brush packing with cleared vegetation<br>o Mulch or chip packing<br>o Planting of vegetation<br>o Hydroseeding/hand sowing<br>6. Sensitive areas need to be identified prior to construction/prospecting so that the necessary precautions can be implemented.<br>7. All erosion control mechanisms need to be regularly maintained.<br>8. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces.<br>9. Retention of vegetation where possible to avoid soil erosion.<br>10. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.<br>11. Re-vegetation of disturbed surfaces should occur immediately after construction/prospecting activities are completed. This should be done through seeding with indigenous grasses. | Minimisation of impacts to acceptable limits |

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| | | | | 12. No impediment to the natural water flow other than approved erosion control works is permitted.<br>13. To prevent stormwater damage, the increase in stormwater run-off resulting from construction/prospecting activities must be estimated and the drainage system assessed accordingly.<br>14. Stockpiles not used in three (3) months after stripping must be seeded or backfilled to prevent dust and erosion. | |
| | Air Pollution | Air | Pitting and trenching phase-(construction and operation phase) | **Dust control**<br>1. Wheel washing and damping down of un-surfaced and un-vegetated areas.<br>2. Retention of vegetation where possible will reduce dust travel.<br>3. Clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas.<br>4. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust.<br>5. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities.<br>6. A speed limit of 30km/h must not be exceeded on site.<br>7. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.<br>8. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled.<br><br>**Odour control**<br>9. Regular servicing of vehicles in order to limit gaseous emissions. | Minimisation of impacts to acceptable limits |

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| | | | | 10. Regular servicing of onsite toilets to avoid potential odours.<br><br>**Rehabilitation**<br>11. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks.<br><br>**Fire prevention**<br>12. No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires.<br>13. The Contractor shall have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process. | |
| | Noise | | Pitting and trenching phase-(construction and operation phase) | 1. The prospecting activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.<br>2. Mine, crushers, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed in to the system.<br>3. Truck traffic should be routed away from noise sensitive areas, where possible.<br>4. Noise levels must be kept within acceptable limits.<br>5. Noisy operations should be combined so that they occur where possible at the same time.<br>6. Mine workers to wear necessary ear protection gear. | Minimisation of impacts to acceptable limits |

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| | | | | 7. Noisy activities to take place during allocated hours.<br>8. Noise from labourers must be controlled.<br>9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from the site.<br>10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport.<br>11. Implementation of enclosure and cladding of processing plants.<br>12. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine. | |
| | Impact on potential cultural and heritage artefacts | Heritage | Pitting and trenching phase-(construction and operation phase) | 1. Any finds must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999) and to DEA.<br>2. Local museums as well as the South African Heritage Resource Agency (SAHRA) should be informed if any artefacts are uncovered in the affected area.<br>3. The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken. | Minimisation of impacts to acceptable limits |

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| | | | | 4. Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits shall be obtained from the SAHRA should the proposed site affect any world heritage sites or if any heritage sites are to be destroyed or altered. | |
| Waste management | | Pollution | Pitting and trenching phase-(construction and operation phase) | **Litter management**<br>1. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.<br>2. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill.<br>3. Good housekeeping practices should be implemented to regularly maintain the litter and rubble situation on the construction site.<br>4. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling.<br>5. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.<br>6. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly.<br>7. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours.<br>8. Where a registered waste site is not available close to the construction site, the Contractor shall | Minimisation of impacts to acceptable limits |

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| | | | | provide a method statement with regard to waste management.<br>9. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.<br>10. Under no circumstances may solid waste be burnt on site.<br>11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.<br><br>**Hazardous waste**<br>12. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of offsite at a licensed landfill site, where practical. Incineration may be used where relevant.<br>13. Contaminants to be stored safely to avoid spillage.<br>14. Machinery must be properly maintained to keep oil leaks in check.<br>15. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills shall immediately be cleaned up and all affected areas rehabilitated.<br><br>**Sanitation**<br>16. The Contractor shall install mobile chemical toilets on the site.<br>17. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed.<br>18. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly.<br>19. Toilets should be no closer than 50m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the Engineer. | |

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| | | | | 20. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility.<br>21. The construction of "Long Drop" toilets is forbidden, but rather toilets connected to the sewage treatment plant.<br>22. Potable water must be provided for all construction staff.<br><br>**Remedial actions**<br>23. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.<br>24. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.<br>25. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil.<br>26. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.<br>27. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.<br>28. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.<br>29. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal. | |
| Water Use and Quality | Water pollution | Water | Pitting and trenching phase-(construction | **Water Use**<br>1. Develop a sustainable water supply management plan to minimise the impact to natural systems by | |

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| | | | and operation phase) | managing water use, avoiding depletion of aquifers and minimising impacts to water users.<br>2. Water must be reused, recycled or treated where possible.<br><br>**Water Quality**<br>3. The quality and quantity of effluent streams discharged to the environment including stormwater should be managed and treated to meet applicable effluent discharge guidelines.<br>4. Discharge to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria outside a scientifically established mixing zone.<br>5. Efficient oil and grease traps or sumps should be installed and maintained at refueling facilities, workshops, fuel storage depots, and containment areas and spill kits should be available with emergency response plans.<br><br>**Stormwater**<br>6. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants.<br>7. Silt fences should be used to prevent any soil entering the stormwater drains.<br>8. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration.<br>9. Promote a water saving mind set with construction/prospecting workers in order to Contractor ensure less water wastage.<br>10. Hazardous substances must be stored at least 40m from any water bodies on site to avoid pollution. | |

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| | | | | 11. The installation of the stormwater system must take place as soon as possible to attenuate stormwater from the construction phase as well as the operation phase.<br>12. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.<br>13. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.<br>14. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.<br><br>**Groundwater resource protection**<br>15. Process solution storage ponds and other impoundments designed to hold non fresh water or non-treated process effluents should be lined and be equipped with sufficient wells to enable monitoring of water levels and quality.<br><br>**Sanitation**<br>16. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers).<br>17. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.<br><br>**Concrete mixing**<br>18. Concrete contaminated water must not enter soil or any natural drainage system as this disturbs the natural acidity of the soil and affects plant growth. | |

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| | | | | **Public areas**<br>19. Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis.<br>20. The Contractor should take steps to ensure that littering by construction/prospecting workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines.<br>**21.** No washing or servicing of vehicles on site. | |

## f) Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

| **ACTIVITY**<br>Whether listed or not listed.<br><br>**(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**. | **POTENTIAL IMPACT**<br><br>**(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)** | **MITIGATION TYPE**<br><br>**(modify, remedy, control, or stop) through**<br>**(e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)**<br><br>**E.g.**<br>• **Modify through alternative method.**<br>• **Control through noise control**<br>• **Control through management and monitoring**<br>**Remedy through rehabilitation..** | **TIME PERIOD FOR IMPLEMENTATION**<br><br>Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required.<br>With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-..<br>Upon cessation of the individual activity<br>or.<br>Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be. | **COMPLIANCE WITH STANDARDS**<br><br>(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) |
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| Clearance of vegetation | Loss or fragmentation of habitats | **Existing vegetation**<br>1. Vegetation removal must be limited to the prospecting site.<br>2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step. | Duration of operation | The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA |

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| | | 3. No vegetation to be used for firewood.<br>4. Exotic and invasive plant species should not be allowed to establish, if the development is approved.<br><br>**Rehabilitation**<br>5. All damaged areas shall be rehabilitated upon completion of the contract.<br>6. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.<br>7. All natural areas impacted during construction/prospecting must be rehabilitated with locally indigenous grasses typical of the representative botanical unit.<br>8. Rehabilitation must take place in a phased approach as soon as possible.<br>9. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding.<br>10. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.<br>11. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged.<br><br>**Demarcation of prospecting area**<br>12. All plants not interfering with prospecting operations shall be left undisturbed clearly marked and indicated on the site plan.<br>13. The prospecting area must be well demarcated and no construction activities must be allowed outside of this demarcated footprint.<br>14. Vegetation removal must be phased in order to reduce impact of construction/prospecting. | | and Duty of Care as prescribed by NEMA. |

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| | | 15. Site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.<br>16. Strict and regular auditing of the prospecting process to ensure containment of the prospecting and laydown areas.<br>17. Soils must be kept free of petrochemical solutions that may be kept on site during construction/prospecting. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.<br><br>**Utilisation of resources**<br>18. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.<br><br>**Exotic vegetation**<br>19. Alien vegetation on the site will need to be controlled.<br>20. The Contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.<br>21. The spread of exotic species occurring throughout the site should be controlled.<br><br>**Herbicides**<br>22. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used. | | |

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| | | 23. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.<br><br>**Fauna**<br>24. Rehabilitation to be undertaken as soon as possible after prospecting has been completed.<br>25. No trapping or snaring to fauna on the construction/prospecting site should be allowed.<br>26. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development.<br><br>Dr.P.J du Preez (2017):<br><br>1. After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows.<br>2. Protected plant species must be relocated if possible.<br>3. Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor.<br>4. Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated footprint area.<br>5. Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMPr, if possible. | | |

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| | | 6. Remove all invasive vegetation before and after construction and continuously up to decommissioning.<br>7. If filling material is to be used, this should be sourced from areas free of invasive species.<br>8. Topsoil (the upper 25 cm of soil) is an important natural resource; where it must be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise the handling of topsoil.<br>9. Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan.<br>10. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly.<br>11. Prevent leakage of oil or other chemicals, and strictly prohibit littering of any kind.<br>12. Monitor the establishment of all invasive species and remove as soon as detected, whenever possible before regenerative material can be formed.<br>13. Restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed.<br>14. Parking areas should be regularly inspected for oil spills and covered with an impermeable or absorbent layer (with the necessary storm water control) if oil and fuel spillages are highly likely to occur.<br>15. Strict speed limits must be set and adhered to.<br>16. Driving between dusk and dawn should be permissible to emergency situations only. | | |

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| | | 17. Prevent spillage of any, oils or other chemicals, strictly prohibit other pollution.<br>18. Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed, destroy all material to prevent re-establishment. | | |
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| Prospecting of Alluvial Diamonds – excavations | Loss of topsoil | 1. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil, and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction/prospecting and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.<br>2. Care must be taken not to mix topsoil and subsoil during stripping.<br>3. The topsoil must be conserved on site in and around the pit/trench area.<br>4. Subsoil and overburden in the prospecting area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.<br>5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.<br>6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.<br>7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage | Duration of operation | The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA. |

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| | | occurs should be attained and given to the project manager.<br><br>Establish an effective record keeping system for each area where soil is disturbed for prospecting purposes. These records should be included in environmental performance reports, and should include all the records below.<br>• Record the GPS coordinates of each area.<br>• Record the date of topsoil stripping.<br>• Record the GPS coordinates of where the topsoil is stockpiled.<br>• Record the date of cessation prospecting activities at the particular site.<br>• Photograph the area on cessation of prospecting activities.<br>• Record date and depth of re-spreading of topsoil.<br>• Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.<br><br>Dr.P.J du Preez (2017):<br><br>1. After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows.<br>2. Protected plant species must be relocated if possible.<br>3. Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor. | | |

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| | | 4. Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated footprint area.<br>5. Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMPr, if possible.<br>6. Remove all invasive vegetation before and after construction and continuously up to decommissioning.<br>7. If filling material is to be used, this should be sourced from areas free of invasive species.<br>8. Topsoil (the upper 25 cm of soil) is an important natural resource; where it must be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise the handling of topsoil.<br>9. Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan.<br>10. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly.<br>11. Prevent leakage of oil or other chemicals, and strictly prohibit littering of any kind.<br>12. Monitor the establishment of all invasive species and remove as soon as detected, whenever possible before regenerative material can be formed.<br>13. Restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning | | |

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| | | points and parking areas. No off-road driving beyond designated areas may be allowed.<br>14. Parking areas should be regularly inspected for oil spills and covered with an impermeable or absorbent layer (with the necessary storm water control) if oil and fuel spillages are highly likely to occur.<br>15. Strict speed limits must be set and adhered to.<br>16. Driving between dusk and dawn should be permissible to emergency situations only.<br>17. Prevent spillage of any, oils or other chemicals, strictly prohibit other pollution.<br>18. Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed, destroy all material to prevent re-establishment. | | |
| | Erosion | 1. An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.<br>2. Periodical site inspection should be included in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence of any erosion on site or downstream.<br>3. Wind screening and stormwater control should be undertaken to prevent soil loss from the site.<br>4. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion.<br>5. Other erosion control measures that can be implemented are as follows:<br>o Brush packing with cleared vegetation<br>o Mulch or chip packing<br>o Planting of vegetation<br>o Hydroseeding/hand sowing | Duration of operation | The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA. |

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| | | 6. Sensitive areas need to be identified prior to construction/prospecting so that the necessary precautions can be implemented.<br>7. All erosion control mechanisms need to be regularly maintained.<br>8. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces.<br>9. Retention of vegetation where possible to avoid soil erosion.<br>10. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.<br>11. Re-vegetation of disturbed surfaces should occur immediately after construction/prospecting activities are completed. This should be done through seeding with indigenous grasses.<br>12. No impediment to the natural water flow other than approved erosion control works is permitted.<br>13. To prevent stormwater damage, the increase in stormwater run-off resulting from construction/prospecting activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Engineer for approval and must include the location and design criteria of any temporary stream crossings.<br>14. Stockpiles not used in three (3) months after stripping must be seeded/backfilled to prevent dust and erosion. | | |
| | Air Pollution | **Dust control**<br>14. Wheel washing and damping down of un-surfaced and un-vegetated areas.<br>15. Retention of vegetation where possible will reduce dust travel.<br>16. Clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. | Duration of operation | The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA. |

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| | | 17. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust.<br>18. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities.<br>19. A speed limit of 30km/h must not be exceeded on site.<br>20. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.<br>21. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled.<br><br>**Odour control**<br>22. Regular servicing of vehicles in order to limit gaseous emissions.<br>23. Regular servicing of onsite toilets to avoid potential odours.<br><br>**Rehabilitation**<br>24. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks.<br><br>**Fire prevention**<br>25. No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires.<br>26. The Contractor shall have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process. | | |

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| | Noise | 1. The prospecting activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.<br>2. Pans, power plants, crushers, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed in to the system.<br>3. Truck traffic should be routed away from noise sensitive areas, where possible.<br>4. Noise levels must be kept within acceptable limits.<br>5. Noisy operations should be combined so that they occur where possible at the same time.<br>6. Mine workers to wear necessary ear protection gear.<br>7. Noisy activities to take place during allocated hours.<br>8. Noise from labourers must be controlled.<br>9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from the site.<br>10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport.<br>11. Implementation of enclosure and cladding of processing plants.<br>12. Applying regular and thorough maintenance schedules to equipment and processes. An increase | Duration of operation | The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA. |

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| | | in noise emission levels very often is a sign of the imminent mechanical failure of a machine. | | |
| | Impact on potential cultural and heritage artefacts | 1. Any finds must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999) and to DEA.<br>2. Local museums as well as the South African Heritage Resource Agency (SAHRA) should be informed if any artefacts are uncovered in the affected area.<br>3. The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken.<br>4. Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits shall be obtained from the SAHRA should the proposed site affect any world heritage sites or if any heritage sites are to be destroyed or altered. | Duration of operation | The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA. |
| Waste Management | | **Litter management**<br>1. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction/prospecting site.<br>2. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill.<br>3. Good housekeeping practices should be implemented to regularly maintain the litter and rubble situation on the construction/prospecting site.<br>4. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. | Duration of operation | The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA. |

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| | | 5. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.<br>6. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly.<br>7. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours.<br>8. Where a registered waste site is not available close to the construction/prospecting site, the Contractor shall provide a method statement with regard to waste management.<br>9. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.<br>10. Under no circumstances may solid waste be burnt on site.<br>11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.<br><br>**Hazardous waste**<br>12. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of offsite at a licensed landfill site, where practical. Incineration may be used where relevant.<br>13. Contaminants to be stored safely to avoid spillage.<br>14. Machinery must be properly maintained to keep oil leaks in check.<br>15. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction/prospecting and any spills shall immediately be cleaned up and all affected areas rehabilitated. | | |

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| | | **Sanitation**<br>16. The Contractor shall install mobile chemical toilets on the site.<br>17. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed.<br>18. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly.<br>19. Toilets should be no closer than 50m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the Engineer.<br>20. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility.<br>21. The construction of "Long Drop" toilets is forbidden, but rather toilets connected to the sewage treatment plant.<br>22. Potable water must be provided for all construction staff.<br><br>**Remedial actions**<br>23. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.<br>24. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.<br>25. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil. | | |

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| | | 26. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.<br>27. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.<br>28. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.<br>29. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal. | | |
| Water Use and Quality | Water pollution | **Water Use**<br>1. Develop a sustainable water supply management plan to minimise the impact to natural systems by managing water use, avoiding depletion of aquifers and minimising impacts to water users.<br>2. Water must be reused, recycled or treated where possible.<br><br>**Water Quality**<br>3. The quality and quantity of effluent streams discharged to the environment including stormwater should be managed and treated to meet applicable effluent discharge guidelines.<br>4. Discharge to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria outside a scientifically established mixing zone.<br>5. Efficient oil and grease traps or sumps should be installed and maintained at refueling facilities, workshops, fuel storage depots, and containment areas and spill kits should be available with emergency response plans. | | |

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| | | **Stormwater**<br>6. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants.<br>7. Silt fences should be used to prevent any soil entering the stormwater drains.<br>8. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration.<br>9. Promote a water saving mind set with construction/prospecting workers in order to Contractor ensure less water wastage.<br>10. New stormwater construction must be developed strictly according to specifications from engineers in order to ensure efficiency.<br>11. Hazardous substances must be stored at least 20m from any water bodies on site to avoid pollution.<br>12. The installation of the stormwater system must take place as soon as possible to attenuate stormwater from the construction phase as well as the operation phase.<br>13. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.<br>14. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.<br>15. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas. | | |

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| | | **Groundwater resource protection**<br>16. Process solution storage ponds and other impoundments designed to hold non fresh water or un-treated process effluents should be lined and be equipped with sufficient wells to enable monitoring of water levels and quality.<br><br>**Sanitation**<br>17. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers).<br>18. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.<br><br>**Concrete mixing**<br>19. Concrete contaminated water must not enter soil or any natural drainage system as this disturbs the natural acidity of the soil and affects plant growth.<br><br>**Public areas**<br>20. Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis.<br>21. The Contractor should take steps to ensure that littering by construction workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines.<br>22. No washing or servicing of vehicles on site. | | |

## i) Financial Provision

### (1) Determination of the amount of Financial Provision.

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

The location of the various pits and trenches could not have been determined at this stage, this will be determined during phase 1 and phase 2. Mapping of the prospecting activities could thus not be undertaken.

The closure objectives are to:

- Final landforms must be resilient to perturbation and also be self-sustaining to obviate/limit further/ongoing interventions and maintenance by Morgenson Mining CC
- The remaining impacts be of an acceptable nature with minimal deterioration over time.
- The final outcome of the mine site rehabilitation would be productive systems, where required sustaining either cattle or wildlife.
- Environmental and human quality of life, including health and safety requirements in general, would not be compromised; and
- Closure is achieved in an efficient and cost-effective manner as possible and with minimum socioeconomic changes.

The above goal is underpinned by more specific objectives listed below.

1. **Upfront planning/development**
   To provide overall guidance and direction to closure planning and/or the implementation of progressive closure measures over the remaining over the prospecting life.

2. **Physical stability**
   To ensure that surface infrastructure and prospecting residue and/or disturbances that are present at processing plant decommissioning will be removed and/or stabilised in a manner that these will not compromise post-closure land use and be sustainable long-term landforms.

- Closure, removal and disposal of all surface infrastructure that has no beneficial post-closure use.
- Shaping and vegetating the remaining earth embankments, trenches, etc. to stabilise slopes and integrate with surrounding topography.

3. **Environmental quality**
   To ensure that local environmental quality is not adversely affected by possible physical effects arising from prospecting operations and the prospecting site after closure. This will be achieved by:

- Avoiding and/or limiting the following during prospecting operations which could result in adverse effects that could not be readily addressed and/or mitigated at mine closure.
  - Dust fall-out areas surrounding the prospecting site.
  - Wash-off and/or mobilisation of chemically contaminated soils and sediments from the prospecting site that could have long term adverse effects on local aquatic health and/or other water uses.
  - Possible shallow groundwater contamination adversely affecting the quality of the local water resource and its beneficial use.
- Limiting the potential for dust generation on the rehabilitated prospecting site that could cause nuisance and/or health effects to surrounding landowners;

- Limiting the possible adverse water quality and quantity effects arising from the rehabilitated prospecting site to ensure that long term beneficial use of local resources is not compromised;
- Conducting soil clean-up/remediation to ensure that the planned land use could be implemented and maintained;

**4. Health and safety**

To limit the possible health and safety treats due to terrain hazards to humans and animals utilizing the rehabilitated prospecting site after closure by:

- Demonstrating through upfront soil testing that any resultant inorganic and organic pollution present on the site is acceptable;
- Removal of potential contaminants such as hydrocarbons and chemicals off site;
- Shaping of embankments and trenches to safe slopes and reintegrating of these into surrounding topography.
- Ensuring that the environmental quality as reflected above is achieved.

**5. Land capability / land use**

To ensure that the required land capability to achieve and support the planned land use can be achieved over the prospecting site by:

- Clean-up and reclamation of contaminated soil areas in order not to compromise the above land use planning earmarked for implementation;
- To ensure that the overall rehabilitated prospecting site is free draining
- Transferring prospecting related surface infrastructure to third parties for beneficial use after closure.

**6. Aesthetic quality**

To ensure that the rehabilitated prospecting site will display, at a minimum, an acceptable aesthetic appearance that would not compromise the planned land use by leaving behind:

- A prospecting area that is properly cleared-up with no fugitive/scattered waste piles
- Rehabilitated prospecting area that is free draining and disturbed areas that are suitably vegetated.
- Rehabilitated prospecting residues that are suitably landscaped, blending with the surrounding environment as far as possible.
- Shaped and rehabilitated terrace and hard stand areas, roughly emulating the local natural surface topography.

**7. Landscape viability**

To create a landscape that is self-sustaining and over time will evolve/converge to the desired ecosystem structure, function and composition by:

- Conducing surface profiling, with associated material movement optimisation, to obtain a landscape resembling the natural landscapes to support the succession trajectory towards a climax ecological system.
- Establishing woody patches and create “rough and loose” areas for pioneer specie establishment around the respective patches.
- Establishing pioneer species as follows:
- Collected and prepared seeds for broad casting;
- Seedlings grown on on-site nursery;
- Cuttings collected from surrounding veld areas;
- Conducting rehabilitation monitoring and corrective action as required.

**8. Biodiversity**

To encourage, where appropriate, the re-establishment of native vegetation on the rehabilitated mine site such the terrestrial biodiversity is largely re-instated over time, by:

- Stabilising disturbed areas to prevent erosion in the short- to medium term until a suitable vegetation cover has established; and
- Establishing viable self-sustaining vegetation communities of local fauna, as far as possible.

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

Closure objectives within the EMPr have been presented to the public as part of the public participation process and on-going closure planning for prospecting.

**(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 & Closure Plan is attached as **Appendix 8.**

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

The management plan is provided in such a manner as to ensure concurrent rehabilitation and relates to each closure objective identified for the mine. Therefore, the rehabilitation plan is considered to be compatible with the closure objectives.

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

**CALCULATION OF THE QUANTUM**

Applicant: **Morgenson Mining CC** **Ref No.:** **NC30/5/1/1/2/11894PR**
Evaluator: **Date:** **18-May-17**

| No. | Description | Unit | A Quantity | B Master Rate | C Multiplication factor | D Weighting factor 1 | E=A*B*C*D Amount (Rands) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 1 | Dismantling of processing plant and related structures | m3 | 600 | 13.7 | 1 | 1 | 8220 |
| 2 (A) | Demolition of steel buildings and structures | m2 | | 190.3 | 1 | 1 | 0 |
| 2(B) | Demolition of reinforced concrete buildings and structures | m2 | 0 | 280.46 | 1 | 1 | 0 |
| 3 | Rehabilitation of access roads | m2 | 0 | 34.05 | 1 | 1 | 0 |
| 4 (A) | Demolition and rehabilitation of electrified railway lines | m | 0 | 330.5 | 1 | 1 | 0 |
| 4 (A) | Demolition and rehabilitation of non-electrified railway lines | m | 0 | 180.3 | 1 | 1 | 0 |
| 5 | Demolition of housing and/or administration facilities | m2 | 0 | 380.6 | 1 | 1 | 0 |
| 6 | Opencast rehabilitation including final voids and ramps | ha | 0.7875 | 193716.3 | 0.52 | 1 | 79326.82485 |
| 7 | Sealing of shafts adits and inclines | m3 | 0 | 102.17 | 1 | 1 | 0 |
| 8 (A) | Rehabilitation of overburden and spoils | ha | 0 | 133017.19 | 1 | 1 | 0 |
| 8 (B) | Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential) | ha | 0.5 | 165670.5 | 1 | 1 | 82835.25 |
| 8 ( C ) | Rehabilitation of processing waste deposits and evaporation ponds (polluting potential) | ha | 0 | 481185.7 | 1 | 1 | 0 |
| 9 | Rehabilitation of subsided areas | ha | 0 | 111381.9 | 1 | 1 | 0 |
| 10 | General surface rehabilitation | ha | 0.5 | 105372.05 | 1 | 1 | 52686.025 |
| 11 | River diversions | ha | 0 | 105372.05 | 1 | 1 | 0 |
| 12 | Fencing | m | 70 | 120.2 | 1 | 1 | 8414 |
| 13 | Water management | ha | 0 | 40065.4 | 1 | 1 | 0 |
| 14 | 2 to 3 years of maintenance and aftercare | ha | 0.5 | 14022.9 | 1 | 1 | 7011.45 |
| 15 (A) | Specialist study | Sum | | | | 1 | 0 |
| 15 (B) | Specialist study | Sum | | | | 1 | 0 |
| | | | | | Sub Total 1 | | 238493.5499 |

| | | | | |
|---|---|---|---|---|
| 1 | Preliminary and General | 28619.22598 | weighting factor 2: 1 | 28619.22598 |
| 2 | Contingencies | 23849.35499 | | 23849.35499 |
| | | | Subtotal 2 | 290962.13 |
| | | | VAT (14%) | 40734.70 |
| | | | **Grand Total** | **331697** |

It is envisaged that 200 pits will be dug. It may be less depending on results.

4620.6068 ha – 5m x 3m x 5m (200 pits). It is planned that only 50 pits will be excavated in the first year, but it may be more if the process is quicker than planned for. It should be kept in mind that no more than 200 pits will be excavated.

The total area to be disturbed a year will be- 50 pits x (5m x 3m) = 0.075Ha per year.

4620.6068 ha - 50m x 30m x 5m trench (50 trenches). It is planned that only 10 trenches will be excavated in the first year, but it may be more if the process is quicker than planned for. It should be kept in mind that no more than 50 trenches will be excavated.

The total area to be disturbed a year will be- 10 trenches x (50m x30m) = 1.5 Ha per year. No more than 1.575 ha will be left as un-rehabilitated in two years. Rehabilitation will be done concurrently.

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

**Financial Guarantee**

The financial guarantee for the rehabilitation for land disturbed Morgenson Mining CC was submitted together with the application for the prospecting right.

**Rehabilitation Fund**

Morgenson Mining CC will also make provision for rehabilitation during closure by establishing a rehabilitation trust.

## 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) Mechanism for monitoring compliance**
**l)**

| 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 |
|---|---|---|---|---|
| Clearance of vegetation | Loss or fragmentation of habitats | • Conduct regular internal audits<br>• Conduct regular external audits | • Environmental Manager<br>• Suitable qualified environmental auditor | Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required. |
| Prospecting of Alluvial Diamonds – excavations | Loss of topsoil<br>Erosion<br>Air Pollution<br>Noise<br>Impact on potential cultural and heritage artefacts | • Conduct regular internal audits<br>• Conduct regular external audits | • Environmental Manager<br>• Suitable qualified environmental auditor | Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required. |
| Waste management | Pollution | • Conduct regular internal audits<br>• Conduct regular external audits | • Environmental Manager<br>• Suitable qualified environmental auditor | Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits |

| | | | | |
|---|---|---|---|---|
| | | | | should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required. |
| Water Use and Quality | Water pollution | • Conduct regular internal audits<br>• Conduct regular external audits | • Environmental Manager<br>• Suitable qualified environmental auditor | Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required. |

## m) Indicate the frequency of the submission of the performance assessment report.

External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the Competent Authority if required.

## n) Environmental Awareness Plan

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

Morgenson Mining CC will implement an Environmental Awareness Plan which will include various mechanisms for informing employees of environmental risks resulting from their work, including:

- Induction training for full –time staff and contractors;
- In-house training sessions to be held with relevant employees;
- On the job training regarding environmental issues
- Training and skills development

The above measures will be implemented through an Environmental Communication Strategy to be implemented.

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

Morgenson Mining CC will implement an incident reporting and reporting procedure in order to identify risks timeously and implement actions to avoid or minimise environmental impacts.

## o) Specific information required by the Competent Authority

**(Among others, Confirm that the financial provision will be reviewed annually).**

No specific information requirements have been detailed by the Competent Authority.

## 2) UNDERTAKING

The EAP herewith confirms

**a)** the correctness of the information provided in the reports ☒

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

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

**d)** the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed; ☒

Signature of the environmental assessment practitioner:

Milnex 189 CC – Environmental Consultants

Name of company:

18/05/2017

Date:

**-END-**