



6 Beyers Office Park, Bosbok Road
Randpark Ridge
South Africa

Postnet Suite 470
Private Bag X3
Northriding 2162

Tel: + 27 11 794 7534

Fax: + 27 11 794 6946

ken@cabangaconcepts.co.za

Strategic Environmental Evaluation & Development • Strategic Environmental Evaluation & Development • Strategic Environmental Evaluation & Development • Strategic Environmental Evaluation & Development

UMCEBO MINING (PTY) LTD

PROPOSED RIETFONTEIN OPENCAST MINE



SCOPING REPORT

**DRAFT REPORT IN TERMS OF SECTION 56(2) FOR PUBLIC
REVIEW AND COMMENT AND SUBMISSION TO MDEDET IN TERMS
OF SECTION 56(4) OF R.543 OF NEMA: EIA REGULATIONS**

***For the Proposed Mining of Portion 17 of the Farm
Rietfontein 314 JS***

NEMA Ref.: 17/2/3N-164

April 2012

Prepared by: Dr. B. Kasl
Cabanga Concepts CC
Unit 6 Beyers Office Park
Bosbok Road
Randpark Ridge
Tel/Fax: (011)794-7534

CONTENTS

| | | |
|----------|--|-----------|
| 1 | INTRODUCTION | 1 |
| 2 | LEGAL AND POLICY FRAMEWORK..... | 1 |
| 2.1 | THE MINERALS AND PETROLEUM RESOURCES DEVELOPMENT ACT..... | 1 |
| 2.2 | THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT..... | 1 |
| 2.3 | NATIONAL WATER ACT | 6 |
| 2.4 | NATIONAL AIR QUALITY ACT | 6 |
| 2.5 | NATIONAL HERITAGE RESOURCES ACT..... | 6 |
| 2.6 | NATIONAL WASTE MANAGEMENT ACT | 6 |
| 3 | METHODOLOGY | 7 |
| 3.1 | PRE-MINING ENVIRONMENTAL BASELINE ASSESSMENTS..... | 7 |
| 3.2 | PROJECT DESCRIPTION AND ALTERNATIVES..... | 7 |
| 3.3 | ENVIRONMENTAL, SOCIO-ECONOMIC AND CULTURAL IMPACT ASSESSMENT | 7 |
| 3.4 | PUBLIC PARTICIPATION PROCESS | 9 |
| 3.5 | ENVIRONMENTAL MANAGEMENT PROGRAMME..... | 9 |
| 3.6 | SUBMISSION OF INFORMATION | 9 |
| 4 | APPLICANT, EAP AND PROPERTY DETAILS..... | 10 |
| 4.1 | DETAILS OF APPLICANT AND MINERAL RIGHTS HOLDER | 10 |
| 4.2 | ENVIRONMENTAL ASSESSMENT PRACTITIONER..... | 10 |
| 4.3 | OWNER OF THE LAND | 10 |
| 4.4 | LOCATION OF SITE..... | 11 |
| 5 | DESCRIPTION OF THE PROPOSEDPROJECT..... | 14 |
| 5.1 | OPENCAST MINING | 14 |
| 5.2 | COAL PROCESSING | 14 |
| 5.3 | ASSOCIATED INFRASTRUCTURE AND SERVICES | 15 |
| 5.4 | WATER REQUIREMENTS | 16 |
| 5.5 | GASEOUS AND SOLID WASTE& LIQUID EFFLUENT | 17 |
| 5.6 | PROJECT PHASES | 18 |
| 6 | DESCRIPTION OF AFFECTEDENVIRONMENT | 22 |
| 6.1 | CLIMATE..... | 22 |
| 6.2 | TOPOGRAPHY | 23 |
| 6.3 | GEOLOGY..... | 23 |
| 6.4 | SOIL | 25 |
| 6.5 | LAND CAPABILITY | 26 |
| 6.6 | LAND USE | 26 |
| 6.7 | SURFACE WATER..... | 26 |
| 6.8 | GROUND WATER..... | 27 |
| 6.9 | AIR QUALITY | 27 |
| 6.10 | NOISE | 28 |
| 6.11 | FLORA AND FAUNA | 29 |
| 6.12 | SITE OF ARCHAEOLOGICAL AND CULTURAL INTEREST..... | 32 |
| 6.13 | SENSITIVE LANDSCAPES..... | 33 |
| 6.14 | VISUAL ASPECTS | 33 |
| 6.15 | TRAFFIC AND SAFETY | 33 |
| 6.16 | REGIONAL SOCIO- ECONOMIC STRUCTURE..... | 33 |

| | | |
|-----------|---|-----------|
| 7 | PROJECT AND LAND USE ALTERNATIVES AND ASSOCIATED IMPACTS | 35 |
| 7.1 | PROJECT BENEFITS..... | 35 |
| 7.2 | NO GO ALTERNATIVE..... | 35 |
| 7.3 | PROJECT SITE AND ACTIVITY ALTERNATIVES | 35 |
| 7.4 | LAND USE ALTERNATIVES | 35 |
| 8 | PUBLIC PARTICIPATION PROCESS | 40 |
| 8.1 | SCOPING PHASE | 42 |
| 8.2 | EIA PHASE..... | 44 |
| 8.3 | ISSUES AND RESPONSE SUMMARY | 45 |
| 9 | ENVIRONMENTAL IMPACT ASSESSMENT | 49 |
| 10 | CUMULATIVE IMPACT ASSESSMENT | 84 |
| 10.1 | TOPOGRAPHY | 84 |
| 10.2 | GEOLOGY..... | 84 |
| 10.3 | SOILS AND LAND CAPABILITY | 84 |
| 10.4 | SURFACE WATER..... | 84 |
| 10.5 | GROUNDWATER | 85 |
| 10.6 | AIR QUALITY | 86 |
| 10.7 | NOISE..... | 86 |
| 10.8 | VEGETATION AND FAUNA..... | 86 |
| 10.9 | SITE OF ARCHAEOLOGICAL AND CULTURAL INTEREST..... | 86 |
| 10.10 | VISUAL ASPECTS | 87 |
| 10.11 | TRAFFIC AND SAFETY | 87 |
| 10.12 | REGIONAL SOCIO- ECONOMIC STRUCTURE..... | 87 |
| 11 | SCOPE OF WORK FOR EIA | 88 |
| 11.1 | PUBLIC PARTICIPATION PROCESS | 88 |
| 11.2 | IMPACT ASSESSMENT AND MANAGEMENT OF IMPACTS..... | 88 |
| 12 | CONCLUSION | 89 |
| 13 | REFERENCES | 90 |

LIST OF TABLES

| | | |
|------------------|---|-----------|
| <i>Table 1:</i> | <i>MPRDA and NEMA requirements for a scoping report</i> | <i>2</i> |
| <i>Table 2:</i> | <i>Activities listed under NEMA applicable to the mining operation</i> | <i>4</i> |
| <i>Table 3:</i> | <i>Surface Right Ownership</i> | <i>10</i> |
| <i>Table 4:</i> | <i>Distances and directions to neighbouring towns</i> | <i>11</i> |
| <i>Table 5:</i> | <i>Climatic Data for the region (South African Weather Bureau)</i> | <i>22</i> |
| <i>Table 6:</i> | <i>Wind speed (m/s) and Direction (Middelburg – South African Weather Bureau)</i> | <i>23</i> |
| <i>Table 7:</i> | <i>Dust fallout guidelines</i> | <i>28</i> |
| <i>Table 8:</i> | <i>Target, alert and actions thresholds</i> | <i>28</i> |
| <i>Table 9:</i> | <i>Typical rating levels for ambient noise in districts (extracted from the sans cop 10103:2003)</i> <i>28</i> | |
| <i>Table 10:</i> | <i>Categories of environmental / group response for Rural Districts (sans cop 10103:2003)</i> <i>29</i> | |
| <i>Table 11:</i> | <i>Birds observed by the local bird club</i> | <i>29</i> |
| <i>Table 12:</i> | <i>Comparative impact assessment for alternative land uses</i> | <i>37</i> |

| | | |
|------------------|---|-----------|
| <i>Table 13:</i> | <i>NEMA minimum PPP requirements</i> | <i>40</i> |
| <i>Table 14:</i> | <i>Issues and response table.....</i> | <i>46</i> |
| <i>Table 15:</i> | <i>Activity based impact assessment and proposed mitigation and monitoring activities... </i> | <i>49</i> |

LIST OF FIGURES

| | |
|--|-----------|
| <i>Figure 1: Wind Roses for July 2008 and October 2008 (GCS, 2008)</i> | <i>24</i> |
|--|-----------|

LIST OF PLANS

| | |
|---|-----------|
| <i>Plan 1: Regional and local setting.....</i> | <i>12</i> |
| <i>Plan 2: Local Setting with the mining area indicated by the shaded blue area</i> | <i>13</i> |

LIST OF APPENDICES

| | |
|--|--|
| <i>Appendix A: Cabanga Concepts Company Profile and EAP CV</i> | |
| <i>Appendix B: Public Participation Process Report and Related Documents</i> | |

1 INTRODUCTION

Umcebo Mining (Pty) Ltd (Umcebo) has submitted an application for environmental authorisation to the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) for the proposed Rietfontein Opencast Mine, Middelburg, Mpumalanga. MDEDET has since accepted this application and instructed Umcebo to proceed with the Scoping Report process (this report) in terms of the National Environmental Management Act, Act of 107 of 1998 (NEMA) and its Environmental Impact Assessment Regulations, 2010. The following reference number has been assigned to this project: **17/2/3N-164** by MDEDET.

This report details the various mining-related activities, gives a desktop review of the baseline environment, indicates alternative land uses, sites and activities, highlights the way forward with regard to the public participation process and specialists studies required and finally gives a preliminary environmental impact assessment.

Cabanga Concepts cc is an independent, environmental consulting company which has been appointed to manage the process in accordance with the NEMA, the National Water Act (NWA) and the Minerals and Petroleum Resources Development Act (MPRDA) in order for Umcebo to obtain the necessary environmental authorisations in support of its mining right over portion 17 of Rietfontein 314 JS.

2 LEGAL AND POLICY FRAMEWORK

2.1 The Minerals and Petroleum Resources Development Act

In terms of the MPRDA, a mining right can only be granted once a Scoping, Environmental Impact Assessment (EIA) and Environmental Management Programme (EMP) have been completed for the proposed operation. Furthermore, this process must include a Public Participation Process (PPP).

To date a mining right application for portion 17 of the farm Rietfontein 314 JS has been submitted to the Department of Mineral Resources (DMR), this was accepted by the DMR on the 29 March 2012. As part of the environmental authorisation process a scoping report was compiled in accordance with Section 49 of the MPRDA regulations. This report was submitted to the DMR on the 26th April 2012.

Table 1 below indicates the requirements of the MPRDA for a scoping report. Table 1 also cross references these requirements to the relevant sections in the scoping report.

2.2 The National Environmental Management Act

In addition to the MPRDA, the National Environmental Management Act (no. 107 of 1998 – NEMA) sets out the requirements for the environmental assessment of a range of activities which are associated with mining. Although the Department

Mineral Resources (DMR) remains the primary decision making authority for the environmental authorisation for the activity of mining under the MPRDA, the scoping report has been prepared in order to meet the requirements of both the MPRDA and NEMA as some of the mining-related activities will trigger NEMA scheduled activities. Table 1 indicates the requirements for the scoping phase of NEMA and the requirements for the public participation (PPP) process.

Table 1: MPRDA and NEMA requirements for a scoping report

| Legal and Regulatory Requirement: | Cross Reference: |
|--|---|
| MPRDA Regulations, Section 49– Contents of a Scoping Report | |
| (1) A scoping report, in relation to a proposed mining operation, must - | See Section: |
| a. Describe the methodology applied to conduct scoping | 3 |
| b. Describe the existing status of the environment prior to the mining operation | 6 |
| c. Identify and describe the anticipated environmental, social and cultural impacts, including cumulative effects, where applicable | 9&10 |
| d. Identify and describe reasonable land use or development alternatives to the proposed operation, alternative means of carrying out the operation and the consequences of not proceeding with the proposed operation | 7 |
| e. Describe the most appropriate procedure to plan and develop the proposed mining operation | 1 |
| f. Describe the process of engagement of identified interested and affected persons, including their views and concerns | 8 |
| g. Describe the nature and extent of further investigations required in the environmental impact assessment report. | Error! Reference source not found. |
| NEMA Regulation 385, Section 32 – Content of Scoping Reports | |
| (1) A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include - | |
| a. Details of - | 0 |
| i. The EAP who prepared the report | 0& Appendix A |
| ii. The expertise of the EAP to carry out scoping procedures | 0& Appendix A |
| b. A description of the proposed activity and of any feasible and reasonable alternatives that have been identified | 1&7 |
| c. A description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is - | 4 |
| i. A linear activity, a description of the route of the activity | N/A |
| ii. An ocean-based activity, the co-ordinates where the activity is to be undertaken | N/A |

| Legal and Regulatory Requirement: | Cross Reference: |
|--|-------------------------|
| d. A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity | 6&9 |
| e. An identification of all legislation and guidelines that have been considered in the preparation of the scoping report | 2 |
| f. A description of environmental issues and the potential impacts, including cumulative impacts, that have been identified | 9&10 |
| g. Information on the methodology that will be adopted in assessing the potential impacts that have been identified, including any specialist studies and specialised processes that will be undertaken | 3&11 |
| h. Details of the public participation process conducted in terms of regulation 28 (a), including - | 8 |
| i. The steps that were taken to notify potentially interested and affected parties of the application | 8 |
| ii. Proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the application have been displayed, placed or given | 8 |
| iii. A list of all persons or organisations that were identified and registered in terms of regulation 57 as interested and affected parties of the application | 8 |
| iv. A summary of issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues | 8 |
| i. A plan of study for environmental impact assessment which sets out the proposed approach to the environmental impacts assessment of the application, which must include | 11 |
| i. A description of tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken. | 11 |
| ii. An indication of the stages at which the competent authority will be consulted. | 8 |
| iii. A description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity | 3&7 |
| iv. Particulars of the public participation process that will be conducted during the environmental impact assessment process | 8 |
| j. Any specific information required by the competent authority | N/A currently |
| (2) In addition, a scoping report must take into account any guidelines applicable to the kind of activity which is the subject of the application | 2 |

The activities of relevance according to Regulations 544, 545 and 546 of NEMA and its EIA Regulations are indicated in Table 2, and are subject to a scoping and EIA process.

Table 2: Activities listed under NEMA applicable to the mining operation

| Regulation: | Activity No.: | Description: |
|---------------------|----------------------|---|
| R.544, 18 June 2010 | 11 | <p>The construction of structures within a watercourse or within 32 m of a water course.</p> <p>The opencast mine area will mine through a drainage line and therefore it is possible that infrastructure related to mining will be erected within the watercourse or within 32 meters of the water course. Infrastructure of relevance that may be erected includes the PCD and related water management features such as berms and channels, and mining-related buildings (workshop, ablutions, change house, security and admin block). The location of infrastructure will be finalised following the specialist studies that will be conducted as part of the EIA.</p> |
| R.544, 18 June 2010 | 12 | <p>The off-stream storage of water with a combined capacity of 50 000m³.</p> <p>The combined capacity of water stored within sumps and the PCD may exceed 50 000m³. The final quantities will only be determined once the surface water and groundwater assessments have been completed and a water balance is drawn up.</p> |
| R.544, 18 June 2010 | 18(i) | <p>The dredging and excavation of soil and rock from a water course.</p> <p>The opencast mine area will mine through a drainage stream and therefore soil, overburden and coal seams will be removed from the area. These will be replaced through the roll-over rehabilitation as the coal seams are removed.</p> |
| R.544, 18 June 2010 | 22 | <p>Construction of a road.</p> <p>The mine will construct haul and access roads to link Rietfontein with the existing Middelburg Townlands Colliery. The positions of the roads will be finalised following the specialist studies that will be conducted as part of the EIA.</p> |
| R.544, 18 June 2010 | 26 | <p>Any process or activity identified in NEM:BA.</p> <p>It may be necessary to apply for permits to remove red data species from site. This can only be confirmed after the completion of specialists' studies which will be conducted as part of the EIA process.</p> |
| R.545, 18 June 2010 | 5 | <p>Any activity which requires a permit under legislation governing the release of pollutants.</p> |

| Regulation: | Activity No.: | Description: |
|---------------------|---------------|---|
| | | The proposed opencast mine will require several 21(g) water uses to be licensed under the NWA through DWA. These will include coal stockpiling storage and containment of dirty mine water in sumps and PCDs and dust suppression. |
| R.545, 18 June 2010 | 15 | Transformation of undeveloped land of 20 ha or more. The opencast mine will affect approximately 32 ha and the associated infrastructure a further 12 ha. A total of 44 ha will be disturbed. The land appears to be undeveloped but this will only be confirmed during land use studies which will be completed during the EIA process. |
| R.546, 18 June 2010 | 4(a)(ii)(c) | Construction of a road in a sensitive area. The mine will construct haul and access roads to link Rietfontein with the existing Middelburg Townlands Colliery. The positions of the roads will be finalised following the specialist studies that will be conducted as part of the EIA. As the opencast mine area is within a watercourse, sections of the road will affect sensitive areas. |
| R.546, 18 June 2010 | 10(a)(ii)(cc) | The storage of dangerous goods in a sensitive area. Diesel for mine machinery and vehicles will be supplied from bulk storage facilities which will be constructed at Rietfontein. Approximately 69 000 litres (69m ³) of diesel will be stored on site. As the mine will be within a watercourse it may be possible that the diesel storage will occur within a sensitive area. |
| R.546, 18 June 2010 | 13(c)(ii)(cc) | Removal of 1ha or more of vegetation where 75% constitutes indigenous vegetation. The opencast mine will affect approximately 32 ha and the associated infrastructure a further 12 ha. A total of 44 ha will be disturbed. The mine will be within a watercourse and associated wetland area and more than 1 ha of sensitive area will be affected. |
| R.546, 18 June 2010 | 14(a)(i) | The clearance of 5ha or more of vegetation where 75% constitutes indigenous vegetation. The opencast mine will affect approximately 32 ha and the associated infrastructure a further 12 ha. A total of 44 ha will be disturbed. |
| R.546, 18 June 2010 | 16(a)(ii)(dd) | Construction of buildings and associated infrastructure of 10 m ² or more within a sensitive area. The opencast mine will affect approximately 32 ha and the associated infrastructure a further 12 ha. The mine will be within a watercourse and associated wetland area and |

| Regulation: | Activity No.: | Description: |
|-------------|---------------|---|
| | | infrastructure is likely to affect sensitive areas. |

2.3 National Water Act

A water use licence application will be submitted according to the requirements of the National Water Act (Act 36 of 1998) and its associated Best Practice Guidelines. All water uses on site will be licensed through this process. All water management and containment features will be designed according to best practice guidelines, relevant water-related regulations and relevant engineering design standards.

2.4 National Air Quality Act

The dust fall-out studies will be conducted in accordance with the National Environment Management: Air Quality Act, 39 of 2004 (as amended). The ASTM International measurement system to determine monthly average fallout concentrations and the South African National Standards (SANS) 1929: 2005, Edition 1.1 will be utilised during dust sampling and analysis. No air quality applications will be required as all coal stockpiles will remain within the mining boundary and are therefore excluded from the scheduled activities listed under the Air Quality Act.

2.5 National Heritage Resources Act

The heritage impact assessment forms part of the environmental impact assessment as required by the EIA regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998). The heritage impact assessment will be done in accordance with Section 38 of the National Heritage Resources Act, No. 25 of 1999 and be submitted to the South African Heritage Resources Agency (SAHRA).

2.6 National Waste Management Act

The National Environmental Management: Waste Act (No. 59 of 2008) came into operation on the 1 July 2009. It addresses waste generation, classification and management issues, including recycling of waste. The waste generated from the mining activities will be minimal and predominantly mine-related, which currently is still within the ambit of the MPRDA.

As the various transitional periods of the Acts above come into effect and expire, the relevant applications under this Act will be made by Umcebo should the need arise.

3 METHODOLOGY

3.1 Pre-mining Environmental Baseline Assessments

This scoping report includes the pre-mining baseline environment status. The baseline studies will be initiated during the scoping phase and therefore the current description is considered a general overview from existing information on neighbouring areas and a desktop level assessment. The specialist studies which will be conducted as part of the process include:

- Soils, land capability and land use studies;
- Surface water studies;
- Groundwater assessment and geohydrological modelling
- Atmospheric studies;
- Baseline noise assessments;
- Flora and fauna assessments;
- Aquatic assessments;
- Wetland assessment and delineation; and
- Heritage Study (Phase I assessment).

3.2 Project Description and Alternatives

The scoping report includes a detailed project description, much of which will remain unaltered due to the nature and position of the coal seams. Alternative sites and project alternatives have therefore not been further discussed. Where feasible project alternatives do exist, then these have been elaborated on. Land use alternatives have been assessed under the relevant sections.

3.3 Environmental, Socio-economic and Cultural Impact Assessment

The scoping report includes a preliminary impact assessment. The methodology used for impact assessments will be the same as that in the EIA and EMP report and is described below.

Impact assessment methods were developed to: (1) identify the potential impacts of a proposed development on the social and natural environment; (2) predict the probability of these impacts and (3) evaluate the significance of the potential impacts.

The methodology used by Cabanga Concepts is as follows:

| The <u>status</u> of the impact | | |
|---|---------------------------------------|--|
| Status | Description | |
| Positive: | a benefit to the holistic environment | |
| Negative: | a cost to the holistic environment | |
| Neutral: | no cost or benefit | |
| The <u>duration</u> of the impact | | |
| Score | Duration | Description |
| 1 | Short term | Less than 2 years |
| 2 | Short to medium term | 2 – 5 years |
| 3 | Medium term | 6 – 25 years |
| 4 | Long term | 26 – 45 years |
| 5 | Permanent | 46 years or more |
| The <u>extent</u> of the impact | | |
| Score | Extent | Description |
| 1 | Site specific | Within the site boundary |
| 2 | Local | Affects immediate surrounding areas |
| 3 | Regional | Extends substantially beyond the site boundary |
| 4 | Provincial | Extends to almost entire province or larger region |
| 5 | National | Affects country or possibly world |
| The <u>reversibility</u> of the impact | | |
| Score | Reversibility | Description |
| 1 | Completely reversible | Reverses with minimal rehabilitation & negligible residual affects |
| 3 | Reversible | Requires mitigation and rehabilitation to ensure reversibility |
| 5 | Irreversible | Cannot be rehabilitated completely/rehabilitation not viable |
| The <u>affect</u> (severe or beneficial) of the impact | | |
| Score | Severe/beneficial effect | Description |
| 1 | Slight | Little effect - negligible disturbance/benefit |
| 2 | Slight to moderate | Effects observable - environmental impacts reversible with time |
| 3 | Moderate | Effects observable - impacts reversible with rehabilitation |
| 4 | Moderate to high | Extensive effects - irreversible alteration to the environment |
| 5 | High | Extensive permanent effects with irreversible alteration |
| The <u>probability</u> of the impact | | |
| Score | Rating | Description |
| 1 | Unlikely | Less than 15% sure of an impact occurring |
| 2 | Possible | Between 15% and 40% sure of an impact occurring |
| 3 | Probable | Between 40% and 60% sure that the impact will occur |
| 4 | Highly Probable | Between 60% and 85% sure that the impact will occur |
| 5 | Definite | Over 85% sure that the impact will occur |
| The <u>Consequence</u> | | = Severity + Spatial Scale + Duration + Reversibility. |
| | | |

The Significance

= Consequence x Probability.

The rating is described as follows:

| Score out of 100 | Significance |
|------------------|------------------|
| 1 to 20 | Low |
| 21 to 40 | Moderate to Low |
| 41 to 60 | Moderate |
| 61 to 80 | Moderate to high |
| 81 to 100 | High |

Will mitigation be possible (yes or no)?

3.4 Public participation process

The public participation for this project will be conducted according to NEMA requirements as these are more specific and intensive. The detailed PPP has been reported further under the relevant chapter, where all PPP conducted to date and all future PPP has been reported on.

3.5 Environmental Management Programme

During the evaluation of impacts, consideration was and will be given to information gained through various specialist investigations, through public interaction and through the review of the various environmental documents which will be submitted for public review and comment. Identification of impacts will then assist in formulating the environmental management plan. The environmental management plan will be formulated by considering the mitigation of each negative impact and consolidating these mitigations measures into a management plan which also highlights inspection and monitoring, frequency of inspections and proposed action plans to any potential issues observed.

3.6 Submission of Information

In accordance with the MPRDA the applicant has thus far submitted a mining right application (including a mine works programme). This was followed by the submission of a Scoping Report in terms of the MPRDA on the 26th April 2012.

According to NEMA, an application for environmental authorisation has been submitted to MDEDET. This has since been accepted and the applicant instructed to proceed with the Scoping Report phase of the project. The project has been assigned the reference number: 17/2/3N-164.

This scoping report forms the first phase of the environmental documentation required by both the DMR in support of the MPRDA, and MDEDET in support of the NEMA.

The EIA/EMP Report process will follow, and will be submitted to the relevant authorities by the 28 September 2012.

4 APPLICANT, EAP AND PROPERTY DETAILS

4.1 Details of Applicant and Mineral Rights Holder

Name of Company: Umcebo Mining (Pty) Ltd

Name of Mine: Rietfontein Opencast Mine

Postal Address: Private Bag X 1838, Middelburg, 1050, South Africa

Telephone: +27 (0)13 244 8000

Fax Number: +27 086 666 5548

Responsible Person: Sunil Mungaroo

Cell number: 079 495 4930

E-mail address: Sunil.Mungaroo@Shandukacoal.com

4.2 Environmental Assessment Practitioner

Name of Company: Cabanga Concepts cc

Postal Address: Postnet Suite 470

Private Bag X3

Northriding

2162

Telephone: +27 (0)11 794 7534

Fax Number: +27 (0)11 794 6946

Cell Number: +27 (0)74 105 8226

Responsible Persons: Michael Barnes

A summary CV and company profile has been included in Appendix A.

4.3 Owner of the Land

Table 3 shows the surface right ownership. Umcebo will enter negotiations to purchase the property from the land owners as a primary option.

Table 3: Surface Right Ownership

| Description | Area (ha) | Title deed number | Surface owner | Contact Details: |
|-------------------------------|-----------|-------------------|-----------------|--------------------------|
| Rietfontein 314 JS Portion 17 | 432.7463 | T71204/1991 | Lucas de Clercq | 0126676094 0832681222 |

4.4 Location of Site

4.4.1 Regional setting (Plan 1)

The project site is around 10 km south of the town of Middleburg, on the south of the Middleburg Townlands Colliery Extension and south west of the Middleburg Townlands Colliery, both owned and operated by Shanduka of which Umcebo is a subsidiary.

4.4.2 Magisterial district and Municipalities

The project site is situated in the Steve Tshwete Local Municipality (MP313) of the Nkangala District Municipality (DC31).

4.4.3 Direction and distance to neighbouring towns

Table 4 shows the nearest towns and distances and direction to these towns.

Table 4: Distances and directions to neighbouring towns

| Town | Distance | Direction |
|------------|----------|-----------|
| Middleburg | 10 km | North |
| Witbank | 19 km | West |
| Bethal | 67 km | South |
| Hendrina | 48 km | Southeast |
| Belfast | 60 km | East |

4.4.4 Local setting(Plan 2)

The project area falls within the Olifants River catchment, within the B11H quaternary catchment.

4.4.5 Land Tenure and use of immediately adjacent land

The project site is currently used for dairy farming and grazing; neighbouring areas have been cultivated into informal Wattle plantations. Land use of the surrounding area is mostly agriculture and grazing on natural grasslands with extensive coal mining in the area. The town of Middelburg is located 10 km north-east of the proposed site.

4.4.6 Surface infrastructure and servitudes

The site is adjacent to the Middelburg Townlands Colliery Extension, just south of the N4 highway and west of the R575 off-ramp. A railway line runs north of the proposed site. Overhead powerlines run further north of the railway line alongside the mutual boundary of portion 35 and 14 of Elandspruit 291 JS. A 400 kV line lies west of the proposed mining block. Servitudes are associated with the above mentioned rail and power lines.

Plan 1: Regional and local setting

Plan 2: Local Setting with the mining area indicated by the shaded blue area

5 DESCRIPTION OF THE PROPOSED PROJECT

The project description given below entails a full description of operations for the full life of mine. Opencast mining will be conducted on the northern section of the property as indicated in Plan 2 (shaded area).

5.1 Opencast Mining

The area directly affected by mining is around 32 ha and contains around 1.323 million tons in situ coal reserves which will be mined over a 15 month period. Around 40 000 tons per month will be mined with a total yield of around 781 600 tons which will be sold as Eskom product.

The target seam is No. 1 Seam.

The construction phase will compose of the following activities

- Site establishment 30 Days
- Strip Topsoil and stockpile 14 Days
- Remove Softs and stockpile 6 Days
- Drill & Blast 14 Days
- Remove Hards and stockpile 6 Days
- First Coal with temporary stockpile 70 Days

In the first month of production only 15 000 tons will be mined, with the following month being the first full production month of 33 000 tons ROM coal extracted. The targeted production of 45 000 tons per month will be reached in the third month.

Mining could continue into the remaining contiguous resources if agreement could be reached with Shanduka Resources. If not, coal will be depleted with the last 30 000 tons mined in month 17. The mining of the reserves will result in the 498 000 tons ROM being mined in the first year and 212000 tons ROM mined in the second year.

Due to shallow depth of the resource, at 5 to 20 m below surface, it is ideal for opencast mining. An opencast strip mining method would be employed utilising the truck & shovel method. Roll-over mining will be concurrent to roll-over rehabilitation, however due to the small area affected, most rehabilitation will occur once extraction is complete.

5.2 Coal processing

The ROM coal is transported 6km to the existing Middleburg Townlands Colliery's plant on 30 ton trucks.

ROM coal will be crushed to -50mm and the +25mm material will be screened off. The fine coal yields 100% for an Eskom product. The coarse coal is washed at an RD of 1.8 and a yield of 63%. The raw fines and the washed coarse coal will be blended for the final Eskom product. The overall yield is 83.4%.

Coal processing will be done at the existing processing facilities at Middleburg Townlands Colliery.

The final product will be loaded onto 30 ton trucks and transported by road to the designated Eskom power station.

5.2.1 Discard handling

As coal will be processed at Middleburg Townlands Colliery, discard will be disposed at Middleburg Townlands Colliery.

5.2.2 Slurry handling

As coal will be processed at Middleburg Townlands Colliery, slurry will be disposed at Middleburg Townlands Colliery.

5.3 Associated Infrastructure and Services

An additional 12 ha will be disturbed for associated infrastructure and road development.

5.3.1 Haul and access roads

The mine will construct haul and access roads to link Rietfontein with Middleburg Townlands Colliery. The positions of the roads will be finalised following the specialist studies that will be conducted as part of the EIA.

5.3.2 Sumps and pumps

Dewatering activities will be carried out on site. In all likelihood, the mine will make use of diesel pumps to dewater the opencast pit and dispose of mine affected water into a lined pollution control dam.

5.3.3 Power supply

No electricity will be required on site. Mining will be done with diesel driven equipment. Diesel gensets will be utilised for power requirements such as lighting.

Only electricity requirements will be for the existing processing plant at the nearby Graspan / Townlands Collieries which will be utilised for processing of coal extracted from the Rietfontein opencast mine.

5.3.4 Diesel supply

Mining equipment, including drills, trucks and shovels, front-end loaders and 30 ton trucks for coal haulage will be diesel operated. Diesel will be supplied from bulk storage facilities which will be constructed at Rietfontein. Approximately 69 000 litres of diesel will be stored on site.

5.3.5 Magazine

Drill rods and drill bits will be used to drill the hard overburden above the coal seam. The biggest consumable during the mining operation is the explosives required to break the hard overburden. Explosives will be obtained from Middelburg Townlands Colliery.

5.3.6 Weighbridge

A weighbridge will be constructed at the entrance of the mine.

5.3.7 Workshop

A Workshop will be constructed for the servicing of diesel driven equipment on site. Workshops will have properly constructed oil and silt traps.

5.3.8 Lighting

Light masts will be erected at various locations to provide lighting at times of poor visibility and during the night as the colliery will be a 24 hour facility. Lights will be powered by diesel gensets.

5.3.9 Ablution facilities

The mine will construct change houses and ablution facilities for the contractors and employees on site. Septic tanks will be constructed and the mine will enter in a service level agreement with a service provider to maintain and empty the septic tanks.

5.3.10 Security and access

The site will be fenced off and will be patrolled on a 24hr basis.

5.3.11 Admin Block

Park homes will be used as administration blocks.

5.4 Water Requirements

The main water use on site will be the dewatering of pits to allow for the safe mining of the reserve. Water will be pumped from the pits and stored in in-pit sumps.

5.4.1 Potable water supply

Potable water supply will be by means of abstraction from groundwater supply in the area. Alternative options for potable water supply will be to truck water to site supplied by the municipal water provider.

5.4.2 Process water supply

Water within the in-pit sumps and PCD will be utilised for dust suppression, with additional water for dust suppression on the haul roads provided by the nearby Middelburg Townlands Colliery. This water will be sourced at no cost. Any water requirements which may be needed for drilling or other on-site activities will be sourced from the water within in-pit sumps.

5.4.3 Storm water management

All storm water drainage infrastructures will accommodate 1:50 year storm event as required by legislation. Clean and dirty water will be separated and all dirty water will be channelled into the lined PCD. Clean water falling outside the footprint will be directed to natural drainage lines via berms and channels upslope of the area of activity.

The process water from the wash bay and workshop area will collect within the sump via an oil separator.

The mine will enter in a service level agreement with a service provider to maintain and empty the septic tanks and remove sewage from site.

5.5 Gaseous and Solid Waste & Liquid Effluent

5.5.1 Gaseous Emission

No scheduled gaseous emissions will take place on site.

Vehicles and machinery will emit fumes, but will be serviced and maintained regularly to keep these emissions within the relevant vehicle/machine's specifications.

Dust will be monitored and managed on site to ensure these are within the standards set by DEDET.

5.5.2 Solid and Liquid Waste Management

| Waste type | Waste treatment |
|------------------------|---|
| CONSTRUCTION | |
| Construction waste | Will be removed from site by contractors. |
| Domestic waste | Locally collected in bins and transferred to skips for disposal at the municipal waste site. Recycling will be done as far as possible with regards to paper, glass, tins/cans, plastics, batteries and computer equipment, and inflorescent lights. |
| Sewage | Will be removed from site by contractors. |
| Used hydrocarbon waste | These will be collected in drums and stored within an adequately sized bunded area, constructed to SABS standards. The waste will be collected and removed from site by a reputable contractor. |
| OPERATIONS | |

| Waste type | Waste treatment |
|-----------------------------|---|
| Domestic and office waste | Locally collected in bins and transferred to skips for disposal at the municipal waste site. Recycling will be done as far as possible with regards to paper, glass, tins/cans, plastics, batteries and computer equipment, and inflorescent lights. |
| Sewage | Will be removed from site by contractors. |
| Used hydrocarbon waste | These will be collected in drums and stored within an adequately sized bunded area, constructed to SABS standards. The waste will be collected and removed from site by a reputable contractor. |
| Old tyres | These will be collected and temporarily stored in an allotted area in the scrap yard for recycling by a reputable contractor. |
| Scrap metal | This will be collected and temporarily stored in an allocated area in the scrap yard for recycling by a reputable contractor. |
| Old machinery | Due to the short duration of the project, old machinery waste is not expected to be generated on site. Any old machinery will be collected and temporarily stored in an allocated area in the scrap yard for recycling by a reputable contractor. |
| DECOMMISSIONING AND CLOSURE | |
| Building rubble | All building rubble will be removed from site and disposed of by the contractor. Where the material is safe to use for filling of final voids, then this will be done. |
| Domestic waste | Locally collected in bins and transferred to skips for disposal at the municipal waste site. Recycling will be done as far as possible with regards to paper, glass, tins/cans, plastics, batteries and computer equipment, and inflorescent lights. |
| Sewage | Portable toilets will again be utilised as facilities get dismantled and maintained by a reputable contractor. |
| Used hydrocarbon waste | These will be collected in drums and stored within an adequately sized bunded area, constructed to SABS standards. The waste will be collected and removed from site by a reputable contractor. |

5.6 Project Phases

The project can be divided into five phases, namely, the planning and design phase, the construction phase, operational phase, decommissioning phase and the post closure phase. The activities associated with these phases are listed below:

| ACTIVITY (Potential NEMA activities which may be triggered) | SUB ACTIVITY |
|---|----------------------------------|
| PLANNING AND DESIGN PHASE | |
| Site visits | Vehicle and foot traffic on site |

| ACTIVITY (Potential NEMA activities which may be triggered) | SUB ACTIVITY |
|--|--|
| CONSTRUCTION PHASE | |
| Construction of water management features and PCD [Reg.544, Activities 11, 12, 18(i) and 26; Reg 545, Activity 5; Reg 546, Activity 13(a)(ii)(cc)] | Truck and heavy machinery operation |
| | Removal of herbaceous material with soil stripping |
| | Berm and channel construction |
| | PCD Construction |
| Upgrade & construction of roads [Reg.544, Activity 11, 18(i), 22 and 26; Reg 546, Activity 4(a)(ii)(cc); Reg 546, Activities 13(a)(ii)(cc) and 14(a)(i)] | Truck and heavy machinery operation |
| | Removal of herbaceous material with soil stripping |
| | Berm and channel construction |
| Preparation of mine infrastructure area [Reg 545, Activity 15; Reg 546, Activities 13(a)(ii)(cc) and 14(a)(i)] | Truck and heavy machinery operation |
| | Removal of herbaceous material with soil stripping |
| | Berm and channel construction |
| | Leveling and compacting of areas for infrastructure |
| Construction of foundations and construction of infrastructure [Reg.544, Activity 11, 18(i) and 26; Reg 546 Activity 16(a)(ii)(dd)] | Truck and heavy machinery operation |
| | Construction of various infrastructure for administrative and security duties, wash bay, ablutions and installation of light masts |
| Drilling of boreholes for potable water supply | Drilling |
| | Fitting of and operation of pumps |
| | Construction and utilisation of water storage tanks |
| Construction and utilisation of toilets and change houses [Reg.544, Activity 11; Reg 546 Activity 16(a)(ii)(dd)] | Construction of bathrooms and change houses |
| | Utilisation of change houses and bathrooms |
| Diesel and hydrocarbon storage [Reg.544, Activity 11; Reg 546, Activities 10(a)(ii)(cc) and 16(a)(ii)(dd)] | Construction of bunded areas for hydrocarbon storage |
| | Handling and initial storage of diesel |
| Preparation of opencast mining areas [Reg 544, Activities 11, 18(i) and 26; Reg 545, Activity 15; Reg 546, Activities 13(a)(ii)(cc) and 14(a)(i)] | Truck and heavy machinery operation |
| | Removal of herbaceous material with soil stripping |
| | Topsoil and subsoil stockpiling |
| | Removal and stockpiling of soft overburden |
| Blasting of rock for the opencast pits & box cut area [Reg 544, Activity 18(i)] | Excavation of box cut and associated blasting |
| | Removal and stockpiling of had overburden |
| Construction of in-pit infrastructure [Reg 545, Activity 5] | Construction and installation of sump and pump |
| | Pumping of in-pit water |
| Waste generation | Domestic and industrial waste generation |
| General activities | General activities |

| ACTIVITY (Potential NEMA activities which may be triggered) | SUB ACTIVITY |
|--|--|
| OPERATION PHASE | |
| Operation water management facilities [Reg.544, Activity 12; Reg 545, Activity 5] | Operation of berms and trenches |
| | Operation of PCD/in-pit sump |
| Utilisation of roads | Truck and heavy machinery operation |
| | Coal Transportation |
| Pumping and conveyance of groundwater for potable use | Operation of pumps |
| | Groundwater conveyance and temporary storage |
| Utilisation of change houses and bathrooms | Utilisation of change houses and bathrooms |
| Diesel and hydrocarbon storage [Reg 546, Activity 10(a)(ii)(cc)] | Handling and initial storage of diesel |
| Opencast mining and related in-pit water management [Reg 545, Activity 5] | Blasting activities and opencast mining |
| | Removal of coal seams |
| | Pumping of in-pit water |
| Creation of new opencast cuts [Reg 544, Activities 11, 18(i) and 26; Reg 545, Activities 5 and 15; Reg 546, Activities 13(a)(ii)(cc) and 14(a)(i)] | Truck and heavy machinery operation |
| | Removal of herbaceous material with soil stripping |
| | Soil mobilisation |
| | Blasting of overburden |
| | Overburden mobilisation through roll over mining |
| | Removal of coal seams |
| Rehabilitation from roll-over mining | Rehabilitation of mined out areas |
| Raw coal handling [Reg 545, Activity 5] | Coal stockpiling and handling |
| Operation of floodlights | Operation of floodlights |
| Washing at service station, wash bays, hard park and workshop | Truck and heavy machinery activity |
| Waste generation | Waste generation |
| General activities | General activities |
| DECOMMISSIONING PHASE | |
| Operation water management facilities [R.544, Activity 12; Reg 545, Activity 5] | Operation of berms and trenches |
| | Operation of PCD |
| Removal of final sewage from septic tanks | Sewage removal |
| Hazardous substances handling (hydrocarbons) | Removal of hydrocarbons from site |
| Dismantling, removal and rehabilitation of unnecessary | Truck and heavy machinery activity |
| | Removal of infrastructure |

| ACTIVITY (Potential NEMA activities which may be triggered) | SUB ACTIVITY |
|--|--|
| infrastructure | |
| Borehole water | Sealing and closure of boreholes as borehole water requirements cease |
| Filling the final opencast voids | Filling of access voids |
| | Mobilisation of overburden and subsoils |
| Roads | Final rehabilitation of roads no longer required |
| Rehabilitation of unnecessary water management facilities | Final removal of all berms, trenches and filling of PCD |
| | Mobilisation of soils for infilling of PCD |
| Final surface rehabilitation of all disturbed areas | Truck activity and operation of machinery |
| | Ripping/discing of all leveled or compacted areas where required |
| | Reprofiling of all disturbed areas |
| | Application of topsoil |
| | Amelioration of topsoil |
| | Construction of contour berms (where necessary) |
| | Establishment of artificial wetlands (if deemed necessary for water flowing into the natural drainage lines) |
| | Seeding all rehabilitated areas |
| Waste generation | Waste generation |
| General activities | General activities |
| CLOSURE AND POST CLOSURE PHASES | |
| Managing and monitoring for all post mining impacts to prevent any further pollution | Monitoring and addressing problem areas |

6 DESCRIPTION OF AFFECTED ENVIRONMENT

Much of the detail provided below is desk-top level studies and generalisations drawn from prior studies conducted on neighbouring mines. During the EIA/EMP phase, various studies will be completed for the specific area of interest and included in the EIA/EMP report.

6.1 Climate

Climate data below was extracted from the Middleburg Townlands Colliery (MTC) amendment report compiled by GCS (2008). The proposed Rietfontein mine is situated adjacent to MTC, in the Mpumalanga Highveld (Table 5).

The rain occurs almost exclusively as showers (mild to heavy) and thunderstorms, mainly in summer (October to March). Maximum rainfall occurs in December to February. The winter months are dry and heavy rainfall (100 mm plus) in a single 24-hour period are rare, but do occur. Mean annual evaporation is 1 494 mm, which is more than double the mean annual rainfall.

The mean daily maximum temperature in January and July is 25°C and 16°C respectively. The range in mean daily minimum is from 0 to 12°C in July and January respectively. Temperatures can fall as low as -13°C. Frost can occur annually about 30 to 40 times over a 120 day period over the winter months.

Table 5: Climatic Data for the region (South African Weather Bureau)

| Month | Ave Rainfall (mm) | Mean Maximum (°C) | Mean Minimum (°C) | Mean Average (°C) | Mean Evaporation (mm) |
|-------|-----------------------------|------------------------------|-----------------------------|------------------------------|----------------------------|
| Jan | 106.9 | 32.0 | 9.1 | 20.6 | 164 |
| Feb | 87.7 | 30.8 | 9.0 | 19.9 | 140 |
| Mar | 76.0 | 30.2 | 6.4 | 18.3 | 135 |
| Apr | 45.0 | 27.9 | 1.4 | 14.7 | 104 |
| May | 15.2 | 26.1 | - 2.9 | 11.6 | 86 |
| Jun | 5.3 | 22.4 | - 6.0 | 8.2 | 67 |
| Jul | 4.6 | 23.0 | - 5.8 | 8.6 | 78 |
| Aug | 6.5 | 26.0 | - 4.1 | 11.0 | 108 |
| Sept | 19.9 | 29.2 | - 1.3 | 14.0 | 137 |
| Oct | 67.4 | 31.3 | 4.4 | 17.9 | 155 |
| Nov | 117.8 | 31.8 | 5.8 | 18.8 | 150 |
| Dec | 106.3 | 31.2 | 7.8 | 19.5 | 170 |
| | 658.6 – total annual | 28.5 – annual average | 2.0 – annual average | 15.2 – annual average | 1494 – total annual |

According to the weather statistics for the area, it is evident that the driest month occurs in July and the windiest month occurs in October (Figure 1). The strongest winds are

generally from the west all year round and are strong enough to cause dust problems in areas that are highly exposed. The dominant wind direction for the area is from the South East. The area is characterised by fairly high winds - 51% of all winds have speeds of more than 1.5 m / sec (Table 6).

Table 6: Wind speed (m/s) and Direction (Middelburg – South African Weather Bureau)

| Site | Direction | | | | | | | | | | | | | | | |
|--------------------------------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | N | | NE | | E | | SE | | S | | SW | | W | | NW | |
| | <i>n</i> | <i>v</i> | <i>n</i> | <i>v</i> | <i>n</i> | <i>v</i> | <i>n</i> | <i>v</i> | <i>N</i> | <i>v</i> | <i>n</i> | <i>v</i> | <i>n</i> | <i>v</i> | <i>n</i> | <i>v</i> |
| Middelburg Dam Weather Station | 6 | 4 | 3 | 3 | 7 | 4 | 18 | 3 | 4 | 3 | 2 | 4 | 5 | 4 | 6 | 4 |
| <i>n</i> – average frequency | | | | | | | | | | | | | | | | |
| <i>v</i> – average speed (m/s) | | | | | | | | | | | | | | | | |

6.2 Topography

The topography can be described as gently undulating. The mine area is located on a hilltop with the area sloping towards the south and west. The elevation ranges from 1550 m to 1600m above mean sea level (mamsl).

6.3 Geology

The Middelburg area lies in the northern extremity of the Karoo basin and forms the East Witbank Coalfield. Coal seams are susceptible to quality variations (GCS, 2008a).

The Ecca Group (Vryheid Formation) overlies the Dwyka Formation and comprises predominantly clastic sediments deposited in an extensive landlocked basin experiencing only rare marine incursion (GCS, 2008b).

The Dwyka Group of late Carboniferous to Early Permian age is characterized by sediments of glacial origin including tillites, diamictites and varvites which lie unconformably on the pre-Karoo igneous basement. The succeeding Vryheid Formation comprises a predominantly arenaceous deltaic sequence of sandstones and conglomerates with subordinate siltstones, shales and coal seams.

Five coal seams (numbered 1 through 5 from the base upwards) are contained in a 70 m thick succession comprising dominantly of sandstone with subordinate siltstone and mudstone. The partings between the seams are remarkably constant although seam splits are common with up to 8 m between partings. The distribution and attitude of the No.1 and No.2 seams is largely determined by the pre-Karoo topography and the No.4 and No.5 seams are controlled by the present-day erosion surface. The No.3 seam is usually less than 0.5 m thick.

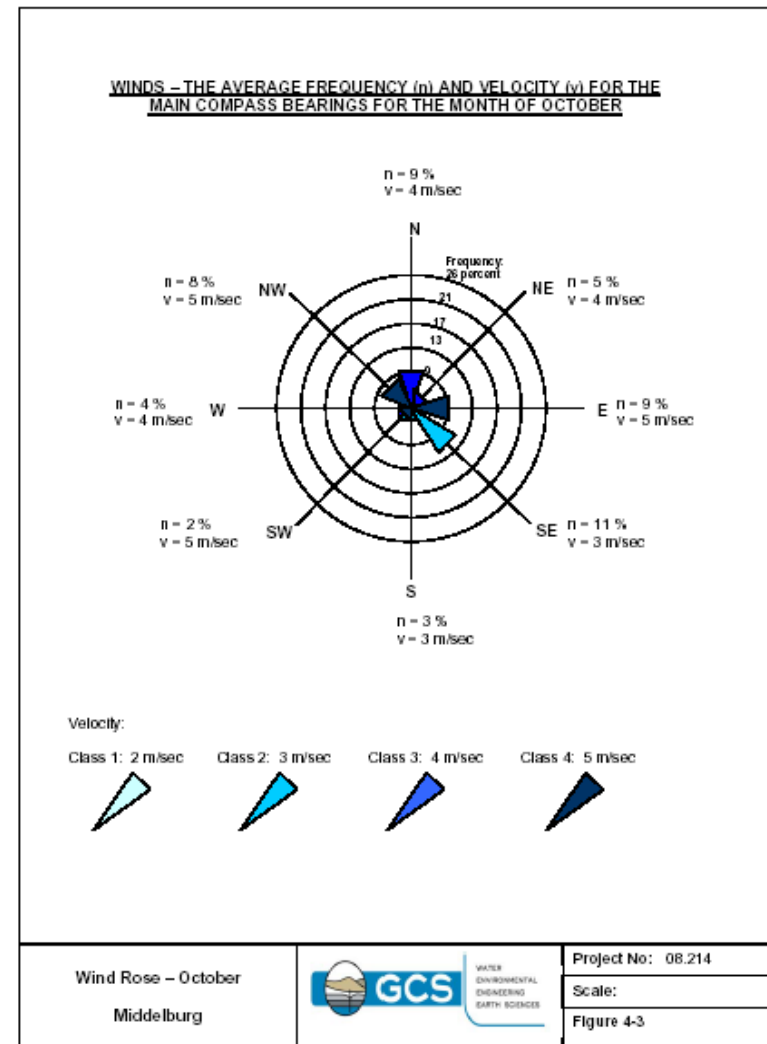
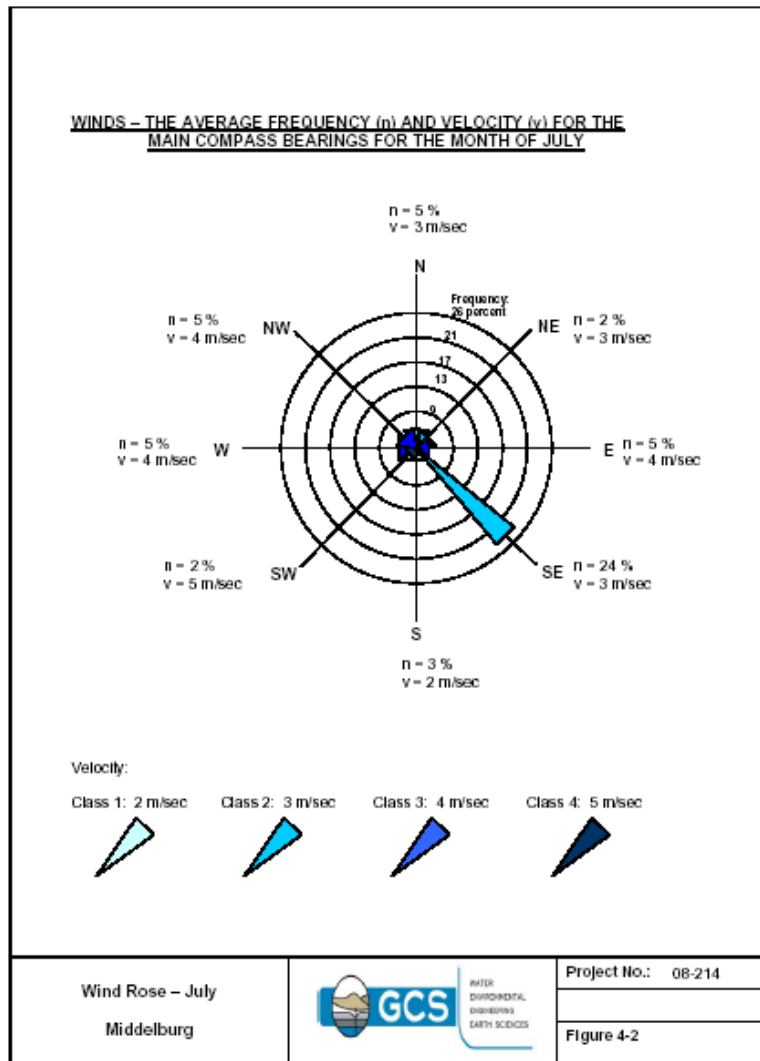


Figure 1: Wind Roses for July 2008 and October 2008 (GCS, 2008)

Typically the Karoo Supergroup is intruded by Jurassic-aged dolerite, forming extensive sills and thin dykes. The Karoo rocks are not known for the development of economic aquifers but occasional high yielding boreholes may be present. Generally these rock types can be divided into two distinct aquifers, namely a shallow weathered aquifer and a deeper fractured aquifer (GCS, 2008b).

6.4 Soil

The general regional soil description below has been obtained from ESS (2008) studies conducted on neighbouring and nearby farms.

The soils of the area that is proposed for mining are influenced to a great extent by the parent materials from which they are derived, the climatic conditions pertaining, and their topographic position. With a moderately flat to undulating topography and a complex inter-relationship of sedimentary and intrusive parent materials that make up the lithologies underlying the general area, and a strong geological lineament that has influenced the drainage system (wide open drainage lines), the pedology of the area is somewhat complex.

From prior studies in neighbouring areas (ESS, 2008) one can generally state that soils that occupy the lower midslopes to crest positions in the topography have a fine to medium grained, sandy loam to sandy clay loam character (texture) and single grained to apedal structure. The colluvial soils (hydromorphic) in lower lying areas in and around the streams and moist grassland areas are generally more clay rich (sandy clay to clay loams), have a greater degree of wetness and are at least one order of magnitude stronger in structure than the mid and upper midslope soils.

The soils derived from the sediments that occur in the climatic conditions associated with the Highveld region of Mpumalanga, generally return dystrophic to mesotrophic characteristics (moderate rainfall area with variable climatic conditions) sandy loams and sandy clay loams, that are dry, friable and have moderately well drained profiles with at best moderate water holding capabilities.

The most common soil forms found in the area include the Hutton, Clovelly, Griffin and Glencoe Form soils, along with the more sandy clay loams that display some signs of wetness at their base, including the deeper Dresden, Avalon and Pinedene Forms that occupy the transitional zone, and the more obvious and generally shallower hydromorphic soils such as the Westleigh, Kroonstad and possibly Katspruit. The occurrence of these soil forms and their spatial distribution will be confirmed during a detailed assessment on site.

6.4.1 Available topsoil

Indications are that the soils are extremely variable in depth, profile and structure, and could vary over a significantly small spatial area. The soil survey will include the characterisation of soil depth, erodibility factors, and soil utilization potential characteristics.

6.5 Land Capability

The regional description of land capability was obtained from prior studies conducted by ESS (2008) on neighbouring and surrounding properties.

The rating of Land Capability for an area is classified into four classes (wetland, arable land, grazing land and wilderness), and uses a combination of the Chamber of Mines Guidelines (1991) and the Canadian Land Inventory System (CLI). These systems are dependent on the soil study to a great extent, and require that the effective rooting depths are known.

It is likely from past field work that the land capability in the area will classify/rate as moderate to poor grazing land potential, with significant areas that will classify as having a wilderness status. Due to the location wetland land capability is also likely to be prevalent.

6.6 Land Use

The description of land use was obtained from prior studies conducted by ESS (2008) on neighbouring and surrounding properties. From these past studies it is likely that the majority of the area is used for grazing on natural grasslands. Mining activities and town development associated with Middleburg include other surrounding land uses.

6.7 Surface Water

Below is a general description of the surface water features in and around the area. A detailed surface water assessment will be undertaken to determine the specific characteristics associated with the specific property and its water features.

6.7.1 Surface water quantity

The study area falls within the B11H quaternary catchment.

There is a non-perennial stream which flows from the north-east to the south-west across the property of interest, south of the proposed mining area (Plan 1). This non-perennial stream confluences with the Spookspruit which continues to flow westwards until it eventually joins the Olifants River.

The non-perennial stream on the property will have zero flow in the dry months.

6.7.2 Water authority

The Department of Water Affairs and Forestry (Gauteng Region) performs water quality management and is also responsible for controlling water use from the river system.

6.7.3 Wetlands

A drainage wetland appears to occur on the area proposed for opencast mining, however this will be confirmed through a detailed wetland and soil assessment.

6.8 Ground Water

A detailed groundwater investigation will be undertaken as part of the EIA/EMP process.

Hodgson & Krantz (1998) (in GCS, 2008) subdivided the coal fields into three (3) main aquifers:

The weathered Karoo aquifer (weathered aquifer): Consists of *in-situ* weathered material and transported material. Thickness varies between 5m and 15m. Local areas of deeper weathering are associated with intrusive dykes and faults. The weathered aquifer is unconfined while localised clay lenses lead to temporary perched conditions.

The fractured Karoo aquifer: Consists of sandstones, siltstones and coal seams. The well cemented nature of the sandstones results in the significant flow being restricted to fractures. Due to the preferential orientation of fractures and the deposition of the strata under submerged conditions there is an anisotropy with regards to permeability; the horizontal permeability being about one order of magnitude greater than the vertical.

The fractured pre - Karoo aquifer: Occurs in areas which are separated from the fractured Karoo aquifer by the Dwykatillite, which acts as an aquiclude. This low permeability lithology consists of basement granites. Fractures or areas of weathering not removed by glaciation dominate the flow regime within the aquifer.

Past studies in the area indicate that a linear correlation exists between the static water level and topography where the natural groundwater table has not been disturbed by large-scale abstraction.

Several privately owned boreholes and springs exist in the surrounding area and each will be documented during the hydrocensus which will be carried out as part of the groundwater investigation for the area.

In general the weathered aquifer has good water quality as the majority of leachable salts have been washed out of this aquifer by years of dynamic groundwater flow. The fractured aquifer qualities exhibit higher conductivity values as a result of higher sulphate, magnesium and calcium concentrations (GCS, 2008). Water quality samples for the area will be taken and assessed for the EIA/EMP phase.

Groundwater use, other than that associated with mining, within the area is mainly for domestic use, watering gardens, stock watering and irrigation.

6.9 Air Quality

6.9.1.1 *Air Quality Regulations*

A four-band scale is used in the evaluation of dust fall (Table 7). Target, alert and action levels are indicated in Table 8. These environmental limits for dust levels were established to minimize effects such as air pollution and to prevent any developments that may have a severe impact on the environment or impact negatively on society.

A detailed dust dispersion study will be undertaken for the proposed site and findings will be reported within the EIA/EMP report.

Table 7: Dust fallout guidelines

| Band Number | Band Description Label | Dust-Fall Rate (D) (mg/m ² /day, 30-day average) | Comment |
|-------------|------------------------|---|--|
| 1 | Residential | D < 600 | Permissible for residential and light commercial |
| 2 | Industrial | 600 < D < 1 200 | Permissible for heavy commercial and industrial |
| 3 | Action | 1 200 < D < 2 400 | Requires investigation and remediation if two sequential months lie in this band, or more than three occur in a year |
| 4 | Alert | 2 400 < D | Immediate action and remediation required following the first exceedance. Incident report to be submitted to relevant authority. |

Table 8: Target, alert and actions thresholds

| Level | Dust-Fall Rate (D) (mg m ⁻² day ⁻¹ , 30-day average) | Averaging Period | Permitted Frequency of exceedance |
|--------------------|--|------------------|---|
| Target | 300 | Annual | - |
| Action residential | 400 | 30 days | Three within any year, no two sequential months |
| Action industrial | 1200 | 30 days | Three within any year, not sequential months |
| Alert threshold | 2400 | 30 days | None. First exceedance requires remediation and compulsory report to authorities. |

6.10 Noise

The current activities which contribute to elevated noise levels in the area include traffic on the N4 and R575, farming activities, residential activities near farm houses, animal noises and mining activities. Baseline noise surveys will be conducted for the EIA/EMP report.

Environmental limits for noise were established to minimise noise impacts. The SANS limits for ambient noise in different types of districts is given in Table 9 below (SANS Code of Practice 10103:2003).

The SANS COP 10103:2003 also stipulates the response related to the degree of difference in levels between the ambient (intrusive) noise and the residual noise (Table 10). For the purpose of the study, areas are classified as "Rural Districts".

Table 9: Typical rating levels for ambient noise in districts (extracted from the sans cop 10103:2003)

| Type of District | EQUIVALENT CONTINUOUS RATING LEVEL, L _{Req,T} FOR NOISE | |
|------------------|--|--------------------|
| | OUTDOORS | INDOORS, WITH OPEN |

| | WINDOWS | | | | | |
|---|-----------|----------|------------|-----------|----------|------------|
| | Day-night | Day time | Night time | Day-night | Day time | Night time |
| Residential Districts Rural Districts | 45 | 45 | 35 | 35 | 35 | 25 |
| Suburban districts with little road traffic | 50 | 50 | 40 | 40 | 40 | 30 |
| Urban districts | 50 | 55 | 45 | 45 | 45 | 35 |
| Non Residential Districts Urban districts with some workshops, with business premises and with main roads | 60 | 60 | 50 | 50 | 50 | 40 |
| Central business districts | 65 | 65 | 55 | 55 | 55 | 45 |
| Industrial districts | 70 | 70 | 60 | 60 | 60 | 50 |
| <ul style="list-style-type: none"> ▪ Daytime – 06:00 to 22:00 ▪ Night-time – 22:00 to 06:00 | | | | | | |

Table 10: Categories of environmental / group response for Rural Districts (sans cop 10103:2003)

| EXCESS LrdBA | ESTIMATED COMMUNITY/GROUP RESPONSE | |
|--------------|------------------------------------|-------------------------------------|
| | CATEGORY | DESCRIPTION |
| 0 -5 | little | Sporadic complaints |
| 5-10 | Medium | Widespread complaints |
| 10-20 | Strong | Threats of community / group action |
| >15 | Very strong | Vigorous community / group action |

6.11 Flora and Fauna

Rietfontein is situated in the Grassland Biome of South Africa, specifically within the Rand Highveld Grassland (Gm11) (GCS, 2008). The area is depicted as having a highly variable landscape with extensive sloping plains and a series of ridges slightly elevated over undulating surrounding plains (GCS, 2008).

The following vegetation usually occurs in this Region: *Aristida*, *Digitaria*, *Eragrostis*, *Themeda* and *Tristachya*. The following woody species are associated with the Rand Highveld Grassland: *Acacia caffra*, *Celtis Africana*, *Diospyroslycioideslycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschii* and *Rhus magalismsontanum* (GCS, 2008).

Past surveys have indicated that only few mammal species were present in the area (GCS, 2008). Several bird species have been observed in the area by the local bird club (Table 11 – GCS, 2008).

Table 11: Birds observed by the local bird club

| List of Bird species observed in the area | |
|---|---|
| <i>Tachybaptus ruficollis</i> (Dabchick) | <i>Phalacrocorax carbo</i> (Cormorant – Reed) |

| List of Bird species observed in the area | |
|---|---|
| <i>Phalacrocorax carbo</i> (Cormorant – Whitebreasted) | <i>Anhinga melanogaster</i> (Darter) |
| <i>Numida leleagris</i> (Guineafowl – Helmeted) | <i>Scopus umbretta</i> (Hamerkop) |
| <i>Vanellus coronatus</i> (Plover – Crowned) | <i>Geronticus calvus</i> (Ibis – Bald) |
| <i>Aviceda cuculoides</i> (Hawk – Cuckoo) | <i>Egretta garzetta</i> (Egret – Little) |
| <i>Ardea cinerea</i> (Heron – Grey) | <i>Bubulcus ibis</i> (Egret – Cattle) |
| <i>Ardea melanocephala</i> (Heron – Blackheaded) | <i>Ardea purpurea</i> (Heron – Purple) |
| <i>Threskiornis aethiopicus</i> (Ibis – Sacred) | <i>Ardeola ralloides</i> (Heron – Squacco) |
| <i>Haliaeetus vocifer</i> (Eagle – African Fish) | <i>Ixobrychus minutes</i> (Bittern – Little) |
| <i>Casmerodius albus</i> (Egret – Great white) | <i>Platalea alba</i> (Spoonbill – African) |
| <i>Alopochen aegyptiacus</i> (Goose – Egyptian) | <i>Buteo sp.</i> (Buzzard – Honey) |
| <i>Plectropterus gambensis</i> (Goose – Spurwinged) | <i>Anas undulata</i> (Duck – Yellowbilled) |
| <i>Anas erythrorhyncha</i> (Teal – Redbilled) | <i>Fulica cristata</i> (Coot – Redknobbed) |
| <i>Milvus migrans migrans</i> (Kite – Black) | <i>Oxyura maccoa</i> (Duck Maccoa) |
| <i>Milvus migrans parasites</i> (Kite – Yellowbilled) | <i>Accipiter tachiro</i> (Goshawk – African) |
| <i>Kaupifalco monogrammicus</i> (Kite – Blackshouldered) | <i>Micronisus gabar</i> (Goshawk – Gabar) |
| <i>Charadrius tricollaris</i> (Plover – Threebanded) | <i>Falco naumanni</i> (Kestrel – Lesser) |
| <i>Buteo buteo vulpinus</i> (Buzzard – Steppe) | <i>E. caffra</i> (Korhaan – Whitebellied) |
| <i>Accipiter badius</i> (Goshawk – Little Banded) | <i>Falco dickisoni</i> (Kestrel – Greater) |
| <i>Circeatus pectoralis</i> (Eagle – Blackbreasted snake) | <i>Polyboroides typus</i> (Gymnogone) |
| <i>Falco vespertinus</i> (Kestrel – Western Redfooted) | <i>Falco biarmicu</i> (Flacon – Lanner) |
| <i>Falco amurensis</i> (Kestrel – Eastern Redfooted) | <i>Plegadis falcinellus</i> (Ibis – Glossy) |
| <i>Francolinus natalensis</i> (Francolin – Natal) | <i>Bostrychia hadedash</i> (Ibis Hadedada) |
| <i>Gallinula chloropus</i> (Moorhen – Common) | <i>Anas sparsa</i> (Duck – African Black) |
| <i>Porphyrio porphyrio</i> (Gallinule – Purple) | <i>Vanellus armatus</i> (Plover – Blacksmith) |
| <i>Charadrius pecuarius</i> (Plover – Kittlitz's) | <i>Vanellus senegallus</i> (Plover – Wattled) |
| <i>Tringa hypoleucos</i> (Sandpiper – Common) | <i>Tringa glareola</i> (Sandpiper – Wood) |
| <i>Tringa stagnatilis</i> (Sandpiper – Marsch) | <i>Calidris minuta</i> (Stint – Little) |
| <i>Philomachus pugnax</i> (Ruff (m) Reeve (f)) | <i>Gallinago sp.</i> (Snipe – Ethiopian) |
| <i>Cursorius temminckii</i> (Courser – Temminck's) | <i>Burbinus capensis</i> (Dikkop – Spotted) |
| <i>Chlidonias leucopterus</i> (Tern – Whitewinged) | <i>Larus cirrocephalus</i> (Gull – Greyheaded) |
| <i>Columba guinea</i> (Pigeon – Rock (Speckled)) | <i>Chlidonias hybridus</i> (Tern – Whiskered) |
| <i>Streptopelia. Semitorquata</i> (Dove – Redeyed) | <i>Columba livia</i> (Pigeon – Feral) |
| <i>Streptopelia capicola</i> (Dove – Cape Turtle) | <i>Oena capensis</i> (Dove – Namaqua) |
| <i>Streptopelia senegalensis</i> (Dove – Laughing) | <i>Corythaixoides concolor</i> (Lourie – Grey) |
| <i>Clamator glandarius</i> (Cuckoo – Redchested) | <i>Cuculus clamosus</i> (Cuckoo – Black) |
| <i>Centropus burchellii</i> (Coucal – Burchell's) | <i>Chrysococcyx caprius</i> (Cuckoo – Diederik) |
| <i>Colius striatus</i> (Mousebird – Speckled) | <i>Asio capensis</i> (Owl – Marsh) |

| List of Bird species observed in the area | |
|---|---|
| <i>Urocolius indicus</i> (Mousebird – Redfaced) | <i>Bubo africanus</i> (Owl – Spotted Eagle) |
| <i>M. bullockoides</i> (Bee-eater – Whitefronted) | <i>C. pectoralis</i> (Nightjar – Fierynecked) |
| <i>Merops pussillus</i> (Bee-eater – Little) | <i>Apus caffer</i> (Swift – Whiterumped) |
| <i>Lybius torquatus</i> (Barbet – Blackcollared) | <i>Apus affinis</i> (Swift – Little) |
| <i>Tricholaema leucomelas</i> (Barbet – Pied) | <i>Apus melba</i> (Swift – Alpine) |
| <i>Alcedo semitorquata</i> (Kingfisher – Halfcollared) | <i>Cypsiurus parvus</i> (Swift – Palm) |
| <i>Alcedo cristata</i> (Kingfisher – Malachite) | <i>Ceryle rudis</i> (Kingfisher – Pied) |
| <i>Halcyon senegalensis</i> (Kingfisher – Woodland) | <i>Ceryle maxima</i> (Kingfisher – Giant) |
| <i>Halcyon albiventris</i> (Kingfisher – Brownhooded) | <i>Upupa epops</i> (Hoopoe – African) |
| <i>Phoeniculus purpureus</i> (Woodhoopoe – Redbilled) | <i>Indicator sp.</i> (Honeyguard – Sharpbilled) |
| <i>Pogoniulus chrysoconus</i> (Barbet – Yellowfronted Tinker) | - (Wryneck – Redthroated) |
| <i>Trachyphonus vaillantii</i> (Barbet – Crested) | <i>M. apiata</i> (Lark – Clapper) |
| <i>Indicator indicator</i> (Honeyguide – Greater) | <i>Corvus capensis</i> (Crow – Black) |
| <i>Dendropicos fuscescens</i> (Woodpecker – Cardinal) | <i>Corvus albus</i> (Crow – Pied) |
| <i>Hirundo rustica</i> (Swallow – Eurasian) | <i>Hirundo fuligula</i> (Drongo – Forktailed) |
| <i>Hirundo albigularis</i> (Swallow – Whitethroated) | <i>Oriolus larvatus</i> (Oriole – Blackheaded) |
| <i>Hirundo semirufa</i> (Swallow – Redbreasted) | <i>Hirundo sp.</i> (Swallow – SA Cliff) |
| <i>Hirundo cucullata</i> (Swallow – Greater Striped) | <i>Hirundo fuligula</i> (Martin – Rock) |
| <i>Hirundo abyssinica</i> (Swallow – Lesser Striped) | <i>Delichon urbica</i> (Martin – House) |
| <i>Turdus litsitsirupa</i> (Thrush – Groundscraper) | <i>Turdus libonyana</i> (Thrush – Kurrichane) |
| <i>Riparia paludicola</i> (Martin – Brownthroated) | <i>Turdus olivaceus</i> (Thrush – Olive) |
| <i>Turdoides jardeneii</i> (Babbler – Arrowmarked) | <i>Mirafra africana</i> (Lark – Rufousnaped) |
| <i>Pycnonotus barbatus</i> (Bulbul – Blackeyed) | <i>Calandrella cinerea</i> (Lark – Redcapped) |
| <i>Monicola rupentris</i> (Rockthrush – Cape) | <i>Oenanthe monticola</i> (Chat – Mountain) |
| <i>Cercomela familiaris</i> (Chat – Familiar) | <i>Oenanthe pileata</i> (Wheatear – Capped) |
| <i>Myrmecocichla formicivora</i> (Chat – Anteating) | <i>Saxicola torquata</i> (Chat – Stone) |
| <i>Erythropygia leucophrys</i> (Robin – Whitebrowed) | <i>Cossypha caffra</i> (Robbin – Cape) |
| <i>Phylloscopus trochilus</i> (Warbler – Willow) | <i>Erythropygia sp.</i> (Robin – Bearded) |
| <i>A. gracilirostris</i> (Warbler – Cape Reed) | <i>Sphenoeacus afer</i> (Grassbird) |
| <i>Cisticola juncidis</i> (Cisticola – Fantailed) | <i>Cisticola textrix</i> (Cisticola – Cloud) |
| <i>Cisticola chiniana</i> (Cistiola – Rattling) | <i>Prinia subflava</i> (Prinia – Tawnyflanked) |
| <i>Cisticola tinniens</i> (Cisticola – Levaillant's) | <i>Prinia flavicans</i> (Prinia – Blackchested) |
| <i>Muscicapa striata</i> (Flycatcher – Spotted) | <i>Sigelus silens</i> (Flycatcher – Fiscal) |
| <i>Myioparus plumbeus</i> (Flycatcher – Fantailed) | <i>Batis molitor</i> (Batis – Chinspot) |
| <i>Terpsiphone viridis</i> (Flycatcher – Paradise) | <i>Stenostira scita</i> (Flycatcher – Fairy) |
| <i>Motacilla aguimp</i> (Wagtail – African Pied) | <i>Anthus cinnamomeus</i> (Pipet – Grassveld) |

| List of Bird species observed in the area | |
|---|--|
| <i>Macronyx capensis</i> (Longclaw – Orangethroated) | <i>Anthus leucophrys</i> (Pipet – Plainbacked) |
| <i>Malaconotus blancoti</i> (Shrike – Greyheaded Bush) | <i>Dryoscopus cubla</i> (Puffback) |
| <i>Prionops plumatus</i> (Helmetshrike – White) | <i>Telephorus zeylonus</i> (Bokmakierie) |
| <i>Laniarius ferrugineus</i> (Boubou – Southern) | <i>Lanius collaris</i> (Shrike – Fiscal) |
| <i>Tchagra senegala</i> (Tchagra – Blackcrowned) | <i>Acridotheres tristis</i> (Myna – Indian) |
| <i>Creatophora cinerea</i> (Starling – Wattled) | <i>Spreo bicolour</i> (Starling – Pied) |
| <i>Cinnyricinclus leucogaster</i> (Starling – Plumcoloured) | <i>Nectarinia famosa</i> (Sunbird – Malachite) |
| <i>Lamprotornis nitrens</i> (Starling – Glossy) | <i>Nectarinia mariquensis</i> (Sunbird – Marico) |
| <i>Omychognathus morio</i> (Starling – Redwinged) | <i>Zosterops pallidus</i> (White-eye – Cape) |
| <i>Nectarinia afra</i> (Sunbird – Greater Doublecollard) | <i>Passer domesticus</i> (Sparrow – House) |
| <i>Nectarinia talatala</i> (Sunbird – Whitebellied) | <i>Passer melanurus</i> (Sparrow – Cape) |
| <i>Nectarinia amethystia</i> (Sunbird – Black) | <i>Passer diffuses</i> (Sparrow – Greyheaded) |
| <i>Petronia superciliaris</i> (Sparrow – Yellowthroated) | <i>Ploceus capensis</i> (Weaver – Cape) |
| <i>Amblyospiza albifrons</i> (Weaver – Thickbilled) | <i>Ploceus velatus</i> (Weaver – Masked) |
| <i>Anaplectes rubriceps</i> (Weaver – Redheaded) | Finch – Cuckoo |
| <i>Euplectes axillaries</i> (Widow – Redshouldered) | <i>Euphlectes orix</i> (Bishop – Red) |
| <i>Euplectes albonotatus</i> (Widow – Whitewinged) | <i>Euplectes afer</i> (Bishop – Golden) |
| <i>Euplectes ardens</i> (Widow – Redcollared) | Quelea – Redbilled |
| <i>Euplectes progne</i> (Widow – Longtailed) | <i>Uraeginthus angolensis</i> (Waxbill – Blue) |
| <i>Sporaeginthus subflavus</i> (Waxbill – Orangebreasted) | <i>Estrilda melanotis</i> (Waxbill – Swee) |
| <i>Amadina erythrocephala</i> (Finch – Redheaded) | <i>Amadina fasciata</i> (Finch – Cutthroat) |
| <i>Spemestes cucullatus</i> (Mannikin – Bronze) | <i>Vidua macroura</i> (Whydah – Pintailed) |
| <i>Serinus mozambicus</i> (Canary – Yelloweyed) | <i>Serinius canicollis</i> (Canary – Cape) |
| <i>Serinus afrogularis</i> (Canary – Blackthroated) | <i>Emberiza capensis</i> (Bunting – Cape) |
| <i>Serinius gularis</i> (Canary – Streakyheaded) | <i>Emberiza tahapisi</i> (Bunting – Rock) |

Much of the site appears to be dominated by grassland vegetation types utilised for grazing. The site also appears to be disturbed and degraded, but status of the site will be confirmed through detailed flora and fauna assessment which will be carried out for the EIA/EMP phase.

6.12 Site of Archaeological and Cultural Interest

Past surveys in the area have indicated no Stone Age or Iron Age sites. Historical sites that have been observe din surrounding areas include homesteads, farming related structures and historical mining features. A full Phase I assessment will be completed for the relevant area.

6.13 Sensitive landscapes

A drainage wetland appears to occur on the area proposed for opencast mining. It is also likely that there will be wetland areas associated with the non-perennial stream south of the proposed development. These will be confirmed through a detailed wetland and soil assessment.

6.14 Visual aspects

The site is surrounded by predominantly mining and agricultural areas. The various soil and rock stockpiles are visible from the N4 as well as the R575 and the additional proposed mining of Rietfontein should not contribute significantly to the deterioration of the aesthetics of the area, especially as the mine will only be operational for a 2 year period.

6.15 Traffic and Safety

Traffic should be minimally impacted on. Current main provincial roads include the N4 highway and R575, which will only be required briefly for transportation of goods and infrastructure for predominantly the construction and then decommissioning of mine-related infrastructure. Haul roads will be constructed from Rietfontein to the existing MTC wash plant and public roads will be avoided as far as practically possible. Any intersections that may be required will be developed in accordance with the Department of Public Works, Roads and Transport and will have the necessary signs to ensure other road users are made aware of these intersections.

No populated areas will be traversed for coal haulage.

6.16 Regional Socio- Economic structure

Information below was obtained from the Townlands Colliery EMP (GCS, 2002) and the Amendment Scoping Report for Townlands Colliery (GCS, 2008) which summarised information from Statistics South Africa, focussing on the 1991 to and 1996 censuses. More updated info was included where possible from the Middleburg Town Council.

The project area falls under the Steve Tshwete Local Municipality area (formally known as the Middelburg Local Municipality), which in turn is under the jurisdiction of the Nkangala District Municipality in the Mpumalanga Province.

6.16.1 Population density, growth and location

The population numbers of the Steve Tshwete district was measured in 1996, and is given as 145 399. A more recent estimate from the town council states that the number is up to 145 458. The population density for the area is approximately 26 people per km². From the statistics available, the location (rural or urban) of the majority of the population is not known.

6.16.2 Major economic activities and sources of employment

The main economic activities taking place on a regional scale, includes coal mining, power generation and economic farming activities. The proximity of the mine to the town of Middleburg results in many economic activities occurring in the vicinity of the mine.

6.16.3 Unemployment status

Approximately 32% of the people in the Mpumalanga Province are currently unemployed, with estimates for the Steve Tshwete Local Municipality similar at 35% unemployment. Approximately 1 700 of 33 600 (5%) households in the Middleburg area receive no income.

6.16.4 Social infrastructure

The town of Middleburg originated due to primarily mining and agricultural activities in the area. The town offers most social infrastructure, including schools, hospitals, recreational and sport facilities and shopping centres. Security and civil defence offices are also established within the town.

6.16.5 Water supply

Water to the town is supplied via the Pienaar Dam and the Middleburg Dam. Various small holdings and residential areas around the town also utilise borehole water for irrigation and domestic use.

6.16.6 Power supply

The town is supplied power by Eskom and power-related infrastructure is developed within the town and surrounding areas.

6.16.7 Municipal LED objectives

- The LED objectives and strategies for the Steve Tshwete Local Municipal Council (2006) involve:
- The rendering of affordable, accessible, efficient and quality services
- The maximising of infrastructural development through the utilisation of all available resources
- The implementation of effective systems and procedures
- The creation of an enabling environment for local economic development
- Effective co-operation with relevant stakeholders.

7 PROJECT AND LAND USE ALTERNATIVES AND ASSOCIATED IMPACTS

7.1 Project Benefits

The major benefits of the project are as follows:

- Provide full time employment for 6 people and contractual employment for 81 people over the two-year operation period.
- The project will further create indirect employment through hiring of contractors and obtaining supplies. This will primarily be sought locally if available.
- The mine will result in continued implementation of social and local economic development plans through its S&LP.
- The proposed project will make a significant contribution to the inland coal market as well as the GDP.

7.2 No go alternative

As much as the no-go option resulting in the protection of the environment *in situ* and the continued use of the land for stock farming, it will result in the sterilisation of the coal resources should no other company mine the area. This would reduce coal resources for power generation which is currently a major issue in South Africa, which currently has no viable economical power generation alternatives. The no-go option would also result in no new employment opportunities.

7.3 Project site and activity alternatives

The project site is determined and delimited by the extent of the coal seam and no further site alternatives have been assessed. Currently the infrastructure location has not been finalised and is awaiting findings from the various specialist studies which will be completed as part of the EIA/EMP process. Any alternatives which may come from these studies will be further assessed in the EIA/EMP report.

Project activity alternatives have not been further assessed. The coal seam of interest is shallow and can only be mined by opencast means. The limited extent of mining also makes truck-and-shovel mining the only realistic options.

7.4 Land use alternatives

Table 12 lists the three alternative land uses which were considered during land use alternative assessment and the impacts associated with these land uses, in comparison with that of mining. The comparative impact assessment indicates that opencast mining will have the greatest environmental impacts followed by residential

development and crop agriculture. Stock farming will have the least impact to the environment as that is the predominant current land use.

Mining and its associated activities will have the greatest impact on the environment and is the least sustainable but upon completion of mining and with proper rehabilitation other land uses can be considered for the area. Most of the mining impacts will also be for a very limited period restricted to the three years for construction and operation. Residual impact extent and severity will still need to be assessed, but in general, responsible mining and rehabilitation from the start of the operation can mitigate a lot of the residual impacts associated with mining. Mining will also have a great positive economic impact, and should be considered a viable land use for the area, especially due to the fact that surrounding areas are already under various mining activities.

Table 12: Comparative impact assessment for alternative land uses

| Aspect | Residential | Agriculture - crops | Agriculture - Stock | Mining |
|-----------------|---|---|---|--|
| Topography | Status: -ve Duration: Permanent Extent: Site specific Probability: Definite Severity: Slight Significance: Low | Status: -ve Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low | Status: -ve Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low | Status: -ve Duration: Medium to short term Extent: Site specific Probability: Definite Severity: Slight to moderate Significance: Moderate to low |
| Soils | Status: -ve Duration: Permanent Extent: Site specific Probability: Definite Severity: Slight to moderate Significance: Moderate to low | Status: -ve Duration: Long term Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate | Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: - | Status: -ve Duration: Medium term Extent: Site specific Probability: Definite Severity: Moderate to high Significance: Moderate to high |
| Land Capability | Status: -ve Duration: Permanent Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate | Status: -ve Duration: Long term Extent: Site specific Probability: Definite Severity: Slight to moderate Significance: Moderate to low | Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: - | Status: -ve Duration: Medium term Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate |
| Surface water | Status: -ve Duration: Permanent Extent: Local Probability: Definite Severity: Moderate to high Significance: Moderate to high | Status: -ve Duration: Long term Extent: Local Probability: Definite Severity: Moderate to high Significance: Moderate to high | Status: -ve Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low | Status: -ve Duration: Medium to short term Extent: Local Probability: Definite Severity: Moderate to high Significance: Moderate to high |
| Groundwater | Status: -ve Duration: Permanent Extent: Local Probability: Definite Severity: Moderate Significance: Moderate | Status: -ve Duration: Long term Extent: Local Probability: Definite Severity: Slight to moderate Significance: Moderate to low | Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: - | Status: -ve Duration: Long term Extent: Local Probability: Definite Severity: High Significance: High |
| Air quality | Status: -ve | Status: -ve | Status: Neutral | Status: -ve |

| Aspect | Residential | Agriculture - crops | Agriculture - Stock | Mining |
|--------------------------|--|--|---|--|
| | Duration: Permanent Extent: Local Probability: Definite Severity: Slight Significance: Low | Duration: Long term Extent: Local Probability: Definite Severity: Slight to moderate Significance: Moderate to low | Duration: - Extent: - Probability: - Severity: - Significance: - | Duration: Medium to short term Extent: Local Probability: Definite Severity: Moderate to high Significance: Moderate to high |
| Noise | Status: -ve Duration: Permanent Extent: Local Probability: Definite Severity: Slight to moderate Significance: Moderate to low | Status: -ve Duration: Long term Extent: Local Probability: Definite Severity: Slight to moderate Significance: Moderate to low | Status: -ve Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low | Status: -ve Duration: Short term Extent: Local Probability: Definite Severity: Moderate to high Significance: Moderate to high |
| Flora and Fauna | Status: -ve Duration: Permanent Extent: Site specific Probability: Definite Severity: Slight to moderate Significance: Moderate | Status: -ve Duration: Long term Extent: Site specific Probability: Definite Severity: Moderate to high Significance: Moderate to high | Status: -ve Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low | Status: -ve Duration: Long term Extent: Site specific Probability: Definite Severity: Moderate to high Significance: Moderate to high |
| Archaeology and heritage | Status: -ve Duration: Permanent Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate | Status: -ve Duration: Long term Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate | Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: - | Status: -ve Duration: Long term Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate |
| Visual aspect | Status: -ve Duration: Permanent Extent: Local Probability: Definite Severity: Moderate Significance: Moderate | Status: -ve Duration: Long term Extent: Local Probability: Definite Severity: Slight to moderate Significance: Moderate to low | Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: - | Status: -ve Duration: Short term Extent: Local Probability: Definite Severity: Moderate to high Significance: Moderate to high |
| Traffic and safety | Status: -ve Duration: Permanent Extent: Local Probability: Definite | Status: -ve Duration: Long term Extent: Local Probability: Definite | Status: Neutral Duration: - Extent: - Probability: - | Status: -ve Duration: Short term Extent: Local Probability: Definite |

| Aspect | Residential | Agriculture - crops | Agriculture - Stock | Mining |
|--------------------------|---|--|--|--|
| | Severity: Moderate to high Significance: Moderate to high | Severity: Slight Significance: Low | Severity: - Significance: - | Severity: Slight to moderate Significance: Moderate to low |
| Regional socio-economics | Status: +ve Duration: Permanent Extent: Site specific Probability: Definite Severity: Slight Significance: Low | Status: +ve Duration: Long term Extent: Local Probability: Definite Severity: Moderate Significance: Moderate to high | Status: +ve Duration: Long term Extent: Local Probability: Definite Severity: Slight Significance: Low | Status: +ve Duration: Long term Extent: Local Probability: Definite Severity: Moderate Significance: Moderate to high |
| Cumulative assessment | The main cumulative effects of residential development will be around the permanent alteration of the area to residential. This means a permanent alteration of the soils, land capability, land use, floral and faunal biodiversity and a high risk of exotic species through gardening activities. The cumulative impacts are considered of moderate to high significance due to the permanent nature of the impacts. | The main cumulative effects of crop farming will be around the permanent alteration of the area to agricultural. Crop agriculture will alter chemical characteristics of soils and result in complete alteration of floral and faunal biodiversity. Continued agricultural activities will contribute significantly to dust, although this would depend on the type of produce grown. The cumulative impacts are considered of moderate to high significance due to the permanent nature of the impacts. | The main impact is that of water use for livestock watering and the erosion and floral community alteration that may occur through overgrazing. These impacts are considered negligible as are cumulative contributions. | The operation of a mine will contribute most significantly to cumulative impacts. The detailed cumulative assessment is detailed later, but the operations will significantly contribute to drops in groundwater levels, severely reduced groundwater quality if poorly managed and elevated dust and particulate matter. From a socio-economic perspective it will significantly improve livelihood of the several employees, but also negatively affect those who currently make a livelihood of affected properties and who reside near to the proposed mine. |

8 PUBLIC PARTICIPATION PROCESS

Table 13 highlights the requirements for a public participation process per NEMA. This will be followed as a minimal and has been further addressed below. The PPP aims to involve the authorities and I&APs in the project process, and determine their needs, expectations and perceptions which in turn ensures a complete and comprehensive environmental study. An open and transparent process will be followed at all times and will be based on reciprocal dissemination of information.

The timeframes given by the DMR to complete the scoping report in terms of the MPRDA did not allow for adequate time to complete the entire PPP requirements under NEMA. Thus, although this Scoping Report was compiled to fulfil the requirements of both NEMA and the MPRDA, it was necessary to run the review and comment periods for these submissions separately. All the required timeframes as stipulated by NEMA and its EIA Regulations have been followed and addressed through this Scoping Report in terms of NEMA for submission to MDEDET. Please refer to Table 13 below in this regard:

Table 13: NEMA minimum PPP requirements

| Legal and Regulatory Requirement: | Cross Reference: |
|---|-------------------------|
| NEMA Regulation 385, Section 56 – Public participation process | |
| (1) This regulation only applies where specifically required by a provision of these regulations | |
| (2) The person conducting the public participation process must take into account any guideline applicable to public participation and must give notice to all potential interested and affected parties of the application which is subjected to public participation by | |
| a. Fixing a notice board at a places conspicuous to the public at the boundary or fence of | 8.1.2.2 |
| i. The site where the activity to which the application relates is or is to be undertaken | 8.1.2.2 |
| ii. An alternative site mentioned | 8.1.2.2 |
| b. Giving written notice to | 8.1.2 |
| i. The owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site | 8.1.2.1 |
| ii. The owners and occupiers of land within 100 meters of the boundary of the site or alternative site who are or may be directly affected by the activity | 8.1.2.1 |
| iii. The municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area | 8.1.1 |
| iv. The municipality which has jurisdiction in the area | 8.1.1 |
| v. The organ of state having jurisdiction in respect of any aspect of the activity | |

| Legal and Regulatory Requirement: | Cross Reference: |
|--|-------------------------|
| c. Placing an advertisement in | 8.1.2.3 |
| i. One local newspaper; or | 8.1.2.3 |
| ii. Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations | N/A |
| d. Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in subregulation (c) (ii) | 8.1.2.3 |
| (3) A notice, notice board or advertisement referred to in subregulation (2) must - | 8.1.2.2 |
| a. Give details of the application which is subject to public participation | 8.1.2.2 |
| b. State - | |
| i. That the application has been or is to be submitted to the competent authority in terms of these regulations, as the case may be | 8.1.2.2 |
| ii. Whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation | 8.1.2.1 |
| iii. The nature and location of the activity to which the application relates | 8.1.2.1 |
| iv. Where further information on the application or activity can be obtained | 8.1.2.1 |
| v. The manner in which and the person to whom representations in respect of the application may be made | 8.1.2.1 |
| (4) A notice board referred to in subregulation (2) must - | |
| a. be of a size at least 60cm by 42 cm | 8.1.2.2 |
| b. Display the required information in lettering and in a format as may be determined by the competent authority | 8.1.2.2 |
| (5) If the application is for a linear or ocean-based activity...may deviate from the requirements...to the extent and in the manner as may be agreed to by the competent authority | N/A |
| (6) When complying with this regulation, the person conducting the public participation process must ensure that - | |
| a. Information containing all the relevant facts in respect of the application is made available to potential interested and affected parties | 8.1.2.1 |
| b. Participation by potential interested and affected parties is facilitated in such a manner that all potential interested and affected parties are provided with a reasonable opportunity to comment on the application. | 8.1.3 |

8.1 Scoping Phase

During the scoping phase for this particular project, the following steps were initiated and all relevant documents are attached in Appendix B.

8.1.1 Identifying Regulatory Authorities:

The authorities for this project were identified from similar projects in the past. The authorities contacted with regards to this project include:

- The Department of Mineral Resources (DMR);
- The Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET);
- The Department of Water Affairs (DWA);
- Mpumalanga Tourism & Parks Board (MTPB);
- Land Claims Commissioners Office;
- The South African Heritage Resources Agency (SAHRA);
- The Department of Public Works, Roads and Transport;
- Steve Tshwete Local Municipality (STLM);
- Nkangala District Municipality (NDM).

A copy of the BID that was forwarded to all the authorities listed above is attached in of Appendix BB -**Annexure III**.

8.1.2 Identifying all Interested and Affected Parties (I&AP's):

The public participation process (PPP) for this project was initiated in April 2012. An existing I&AP database was used and updated based on the responses received from the press advertisements, notices and the BID's sent out. The (I&APs) include a broad database of farmers, adjacent landowners, communities, local authorities, ward councillors and other interest groups. Please refer to of Appendix BB - **Annexure I**.

A process of engagement was followed in order to ensure that all I&APs were given the opportunity to raise concerns regarding the proposed activities. Consultation with I&APs took place by the following means:

8.1.2.1 Background Information Document (BID)

Background Information Documents and Response forms notifying I&AP's of the application were compiled in English and were distributed to the I&APs via e-mail, post and fax. Persons who did not have access to a computer, fax machine or postal service were notified via hand delivered documents and SMS. All adjacent landowners/occupiers/users were hand-delivered copies of the BID on the 19-04-2012.

The purpose of the Background Information Document was to:

- Invite members of the public to register as I&AP's;
- Identify I&AP's;

- Inform them of the current application;
- Initiate a process of public consultation to record perceptions and issues; and
- Invite I&AP's to attend the Public Meeting.

A copy of the BID is attached in Appendix B - **Annexure III**.

Following receipt of the reference number from MDEDET a letter was compiled and circulated to all I&APs, notifying them of this reference number and the final listed activities included within the application. In addition, this letter notified all I&AP's of this reports availability for public review and comment. See Appendix B – **Annexure IV**.

8.1.2.2 Notices

Further to this, A2 posters written in English and Afrikaans were erected and displayed on site (Farm Rietfontein 314 JS Ptn 17) as well as the Local Municipality, the Local Library, the Middelburg Chamber of Commerce and at a community adjacent to the proposed site. These posters informed the public of the proposed activities, invited (I&AP's) to attend the public meeting and requested people to register as I&AP's.

Copies of the Posters are attached in of Appendix BB - **Annexure V**.

8.1.2.3 Adverts

An advertisement, informing people of the proposed activities, the public meeting and requesting readers to register as I&AP's, was placed in one National and two local newspapers. An English advertisement was placed in "The Star Newspaper", on the 19th April 2012, another English advert was placed in the "Coal City News" on the 24th April 2012 and an Afrikaans advert was placed in "The Middelburg Observer" on the 20th April 2012. (Please refer to of Appendix BB - **Annexure II** for these advertisements).

8.1.3 Introductory Public Meeting

All I&AP's were invited to attend a public meeting that was held on the 10th May 2012 at the Middelburg Chamber of Commerce at the BusMid Building. Minutes of the meeting and a copy of the presentation are attached in Appendix B – **Annexure VI**.

8.1.4 Document Review

Section 56(4) of R.543 of NEMA and its EIA Regulations states that a draft version of all environmental reports pertaining to the application be submitted to the competent authority, prior to its availability to I&AP's for public review. As such this report has been submitted to MDEDET for review and comment.

In addition, this NEMA Scoping Report will be made available for public review and comment and all registered I&AP's will be informed of its availability. I&AP's will be given forty (40) days to submit their comments to the EAP. A copy of the report will be made available at the Local Library in Middelburg, as well as at the Shanduka

Coal Central Office on the Keiskamma Road in Middelburg. Electronic copies (Adobe PDF) will also be e-mailed through to I&AP's who request a copy in writing. Any comments and concerns received during this period will be addressed in the final Scoping Report for submission to the competent authority.

I&AP's will be notified in writing via fax, e-mail, post as well as SMS of the reports availability for public review and comment.

It should be noted that a separate public review and comment period was conducted for the Scoping report in terms of the MPRDA. Following submission of the Scoping Report to the DMR authorities, registered I&AP's were given the opportunity to review and comment on the report over a 40 day period (23rd May 2012 – 2nd July 2012).

The issues and response table as included below has been updated to include any comments and concerns as received during the MPRDA Scoping Report Process.

8.2 EIA Phase

During the EIA phase of this project, the following steps will be initiated during the PPP:

8.2.1 Follow-up Public Meeting

A follow up meeting will be held where all registered I&AP's will personally be invited. The public meeting will also be advertised in two local newspapers. Date of this public meeting is still to be confirmed. In this meeting the relevant specialist studies that were undertaken will be discussed and feedback on the findings will be given. I&AP's will be given the opportunity to raise any new comments, queries or concerns and these will be included in the EIA / EMP reports.

8.2.2 Micro-consultations

Micro-consultation meetings will be held with any I&AP who wishes to discuss the project one-to-one; these meetings will be minuted and recorded in the EIA/EMP phase. The comments will be included in the Issues and Response summary.

8.2.3 Document Review

Section 56(4) of R.543 of NEMA and its EIA Regulations states that a draft version of all environmental reports pertaining to the application be submitted to the competent authority, prior to its availability to I&AP's for public review. As such the EIA / EMP Report will be submitted to MDEDET for review and comment.

Following which, this report will be made available to I&AP's in terms of Section 56(2) for public review and comment for a period of forty (40) days.

A copy of the EIA / EMP reports will be made available at the Local Library in Middelburg for review; (I&APs) will be notified via fax and e-mail of the availability of the EIA / EMP Reports for review.

Any comments received from the I&AP's will be incorporated into the final EIA / EMP Report for submission to the MDEDET.

8.3 Issues and Response Summary

Table 14 below summarises the issues raised during the public participation process undertaken to date, as well as the relevant responses.

Table 14: Issues and response table

| Concern: | Issues Raised: | Response: |
|------------------------------|--|---|
| Groundwater: Water Loss | The farmers are concerned with potential water loss, how will this be mitigated? | A full groundwater study will be undertaken and will be incorporated into the EIA/EMP. |
| Groundwater: Contamination | Acid mine drainage is hazardous to the environment, how will this be mitigated? | A full groundwater study will be undertaken, this will include an assessment of the AMD potential. Shanduka Coal (Pty) Ltd is currently in the process of installing a water treatment plant at the adjacent MTC Colliery to treat affected water. There is the potential that this plant may also treat affected water from the proposed Rietfontein Opencast operation. |
| Surface Water: Contamination | No spillages must leave the site and go into the wetland. | The area will be a closed system and no water or waste will leave the site. Surface water management measures will be proposed in the EIA / EMP Report. |
| Surface Water: In Pit | The pit will fill with water, where will it be pumped to? | Water from the pit will be recycled as far as possible. It is envisaged that this water will be used for dust suppression. A water balance will be compiled for the IWULA / IWWMP Report. Shanduka Coal (Pty) Ltd is currently in the process of installing a water treatment plant at the adjacent MTC Colliery to treat affected water. There is the potential that this plant may also treat affected water from the proposed Rietfontein Opencast operation. |
| Noise: Pollution | Noise generated by mines at night is a nuisance and must be addressed. | Mitigation measures will be included within the EIA / EMP Report. |
| Air: Pollution | Is there a plan in place to monitor dust and SponCom? | Dust monitoring will be done and the mine will measure up to 2.5 micron. The strip ratios are very low and as such no SponCom will take place. |

| Concern: | Issues Raised: | Response: |
|-------------------------|--|---|
| | | Mitigation measures as well as inspection/monitoring schedules will be included within the EIA / EMP Report in this regard. |
| Roads: R575 | Traffic on the road will be affected by slow trucks. | The mine will look at alternatives and address these in the EIA/EMP report. |
| Roads: R575 | Overloading will affect the R575, how will this be mitigated? | A weighbridge will be installed to ensure no overloading takes place. |
| Roads: R575 | Trucks must not be allowed on the roads during peak times. | Agreed, time frames will be set up and included within the EIA / EIA Report as a mitigation measure. |
| Roads: R575 | Will there be a roads inspector to monitor the trucks? | The mine will investigate the possibility of this. Mitigation measures will be included within the EIA/EMP report. |
| Roads: R575 | The mine must keep the R575 clean. | Mitigation measures will be included within the EIA/EMP report. |
| Roads: N4 | The N4 will be affected by the blasts and dust. Control measures need to be in place. A traffic impact study must be done. | A traffic study was done in the past by Shanduka Coal (Pty) Ltd and this information will be utilized where possible. Dust monitoring will be done and these results will be made available. Mitigation measures will be included within the EIA/EMP report. |
| Roads: Farm Roads | Will the farm access road be affected? The landowner and workers need to use the road. | A new road will be built. |
| Blasting: Damage | Blasting will affect the structures, what will be done? | Seismographs are in place to monitor all blasts. This information is available to I&AP's upon request. |
| Blasting: Relocation | Will the surrounding landowners in close proximity be evacuated during every blast, or will the mine relocate them. | The people within 500 meters not be relocated but rather they will be evacuated during a blast event. |
| Infrastructure: Fencing | The mine must put a fence around the mine area as well as fire breaks. | Both will be done in accordance with the Mine Health and Safety Act. |

| Concern: | Issues Raised: | Response: |
|---------------------------|---|---|
| Infrastructure: Pipelines | There are two pipelines on the northern boundary of the property. | The mine is aware of these and they have been considered in the mine plan. |
| Infrastructure: Conveyor | Has a conveyor option been considered so as to maintain the state of the roads? | A conveyor belt will have to travel over private land and as such has not been considered to date. |
| Fauna and Flora | Bull frogs have been identified in the Vaalbankspruit. | A full fauna and flora study will be done as part of the EIA/EMP Phase. |
| Rehabilitation: Methods | What rehabilitation methods will be done? | Roll-over rehabilitation will be done as the strip ratios are very low. |
| General | The landowner is against mining on his property and will do whatever it takes to stop mining from proceeding. | Attempts from the mine to meet with the landowner with regards to the application and the proposed mining activities have not been successful to date. The mine will continue to try and arrange a meeting to discuss this matter further. |

9 ENVIRONMENTAL IMPACT ASSESSMENT

Table 15 lists the activities of relevance during the different phases of the operation and the mining related activities and the details of the impacts and mitigation measures. This should be considered a draft impact assessment which will be refined as specialist and I&AP input is obtained through the EIA/EMP phase.

Table 15: Activity based impact assessment and proposed mitigation and monitoring activities

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|--|----------------|------------------------|
| | | | | | | | | | | | | | | | | | | | | | | | |
| PLANNING AND DESIGN PHASE | | | | | | | | | | | | | | | | | | | | | | | |
| ACTIVITY: Site visits | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Vehicle and foot traffic on site | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | Y | Low | A water cart will be used to spray relevant areas when dust levels are high. | 1 | 1 | 1 | 1 | 4 | 4 | 16 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Air quality | Dust generation | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | Y | Low | Speed limits will be established on the dirt road to minimise dust generation. All contractors will enforce speed limits. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Speed inspections | Sporadically | Running cost |
| Air quality | Emissions | Neg | 1 | 1 | 1 | 1 | 4 | 5 | 20 | Y | Low | All vehicles will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. | 1 | 1 | 1 | 1 | 4 | 4 | 16 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 2 | 2 | 1 | 3 | 8 | 3 | 24 | Y | Low | All vehicles will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks. All leaks will be cleaned up immediately using an absorbent material. Communications network will be established to ensure incidences are reported immediately. | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 5 | 25 | Y | - | Vehicles will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. | 1 | 1 | 1 | 1 | 4 | 4 | 16 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 2 | 16 | Site manager | Inspect area for erosion and soil compaction | Monthly | Running cost |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | All vehicles will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks. All leaks will be cleaned up immediately using an absorbent material. Communications network will be established to ensure incidences are reported immediately. | 3 | 1 | 1 | 3 | 8 | 2 | 16 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Y | Low | All vehicles will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks. All leaks will be cleaned up immediately using an absorbent material. Communications network will be established to ensure incidences are reported immediately. | 3 | 2 | 1 | 1 | 7 | 1 | 7 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - | All intersections with main tarred roads will be clearly signposted. Drivers will be enforced to keep to set speed limits. | 3 | 1 | 1 | 5 | 10 | 1 | 10 | Site manager | Inspect intersections and roads | Monthly | Running cost |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Trucks will be in road-worthy condition with reflective strips. | | | | | | | | | | | |
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - | A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from public roads. | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| CONSTRUCTION PHASE | | | | | | | | | | | | | | | | | | | | | | | |
| ACTIVITY: Construction of water management features and PCD [R.544, Activities 11, 12, 18(i) and 26; Reg 545, Activity 5; Reg 546, Activity 13(a)(ii)(cc)] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Truck and heavy machinery operation | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | Speed limits will be established on the dirt road to minimise dust generation. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Site manager | Speed trapping | Sporadically | Running cost |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low | Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. | 1 | 1 | 1 | 1 | 4 | 2 | 8 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site & Environmental manager | Ensure service plans are maintained. Groundwater monitoring. | Every 6 months & Quarterly | Contractors cost & R 200,000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Inspect area for erosion and soil compaction | Monthly | Running cost |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Site & Environmental manager | Ensure service plans are maintained, Surface water monitoring & Biomonitoring | Every 6 months, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - | All intersections with main tarred roads will be clearly signposted. Drivers will be enforced to keep to set speed limits. Trucks will be in road-worthy condition with reflective strips. | 3 | 1 | 1 | 5 | 10 | 1 | 10 | Site manager | Inspect intersections and roads | Monthly | Running cost |

| Impacted Aspect | Impact | Positive/Negative/Neutral Impact | Affect (severe/beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|--|----------------------------------|----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|--|----------------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - | A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from public roads. | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| SUB ACTIVITY: Removal of herbaceous material with soil stripping | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 5 | 60 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 5 | 40 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Archaeological & cultural sites | Loss of and disturbance to surface archaeological sites | Neg | 5 | 1 | 5 | 5 | 16 | 5 | 80 | Y | High | Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |
| Archaeological & cultural sites | Potential disruption to grave sites | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Y | High | Should graves be observed on site during activity progress then all activity should cease and the area demarcated as a no-go zone. A specialists will need to be consulted and responsible action considered, whether grave relocation or ceasing activity completely within the area and a 50m buffer zone. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |
| Fauna | Loss of habitat, refuge and food for animals | Neg | 3 | 2 | 1 | 3 | 9 | 4 | 36 | Y | Low | Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. | 2 | 2 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Flora | Loss of biodiversity | Neg | 4 | 1 | 4 | 3 | 12 | 5 | 60 | Y | Mod | Ensure permits are obtained to remove and relocate protected species. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetate impacted areas as soon as possible. | 2 | 1 | 3 | 3 | 9 | 4 | 36 | Environmental manager | Inspect progress of construction & ensure activity is in designated areas | Monthly | Running cost |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for loss of soil & damage to soil characteristics | Neg | 4 | 1 | 1 | 3 | 9 | 5 | 45 | Y | Mod | Strip and stockpile soils as recommended by the soil specialist. Re-vegetate any bare soil immediately. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect stripping activities and ensure they are to specification of the pedology study. | Weekly | Running cost |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. | 4 | 2 | 1 | 3 | 10 | 3 | 30 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| SUB ACTIVITY: Berm and channel construction | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 5 | 60 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 4 | 32 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|---|----------------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling | Neg | 4 | 1 | 1 | 3 | 9 | 5 | 45 | Y | Mod | Re-vegetate any bare soil immediately. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect stripping activities and berm construction ensures they are to specification of the pedology study. | Weekly | Running cost |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. Clean out silt build up in trenches over dry season | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| SUB ACTIVITY: PCD Construction | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 2 | 8 | 5 | 40 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 2 | 2 | 1 | 2 | 7 | 4 | 28 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling | Neg | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Y | Low | Re-vegetate any bare soil immediately. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect stripping activities and ensure they are to specification of the pedology study. | Weekly | Running cost |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 4 | 2 | 1 | 3 | 10 | 2 | 20 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. Clean out silt build up in trenches over dry season | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Surface water and Wetlands | Downstream water quantity of catchment reduced | Neg | 4 | 2 | 3 | 1 | 10 | 5 | 50 | N | Mod | | 4 | 2 | 3 | 1 | 10 | 5 | 50 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R180,000.00 & R80,000.00 |
| Surface water and Wetlands | Containment of contaminated water | Pos | 4 | 1 | 3 | 1 | 9 | 4 | 36 | N | - | - | 4 | 1 | 3 | 1 | 9 | 4 | 36 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| ACTIVITY: Upgrade & construction of roads [Reg544, Activity 11, 18(i), 22 and 26; Reg 546, Activity 4(a)(ii)(cc); Reg 546, Activities 13(a)(ii)(cc) and 14(a)(i)] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Truck and heavy machinery operation | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | Speed limits will be established on the dirt road to minimise dust generation. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Site manager | Speed trapping | Sporadically | Running cost |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low | Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. | 1 | 1 | 1 | 1 | 4 | 2 | 8 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site & Environmental manager | Ensure service plans are maintained. Groundwater monitoring. | Every 6 months & Quarterly | Contractors cost & R 200,000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Inspect area for erosion and soil compaction | Monthly | Running cost |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Site & Environmental manager | Ensure service plans are maintained, Surface water monitoring & Biomonitoring | Every 6 months, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - | All intersections with main tarred roads will be clearly signposted. Drivers will be enforced to keep to set speed limits. Trucks will be in road-worthy condition with reflective strips. | 3 | 1 | 1 | 5 | 10 | 1 | 10 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - | A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from public roads. | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| SUB ACTIVITY: Removal of herbaceous material with soil stripping | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 5 | 60 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 5 | 40 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Archaeological & cultural sites | Loss of and disturbance to surface archaeological sites | Neg | 5 | 1 | 5 | 5 | 16 | 5 | 80 | Y | High | Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|---|----------------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Archaeological & cultural sites | Potential disruption to grave sites | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Y | High | Should graves be observed on site during activity progress then all activity should ceased and the area demarcated as a no-go zone. A specialists will need to be consulted and responsible action considered, whether grave relocation or ceasing activity completely within the area and a 50m buffer zone. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |
| Fauna | Loss of habitat, refuge and food for animals | Neg | 3 | 2 | 1 | 3 | 9 | 4 | 36 | Y | Low | Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. | 2 | 2 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Flora | Loss of biodiversity | Neg | 4 | 1 | 4 | 3 | 12 | 5 | 60 | Y | Mod | Ensure permits are obtained to remove and relocate protected species. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetate impacted areas as soon as possible. | 2 | 1 | 3 | 3 | 9 | 4 | 36 | Environmental manager | Inspect progress of construction & ensure activity is in designated areas | Monthly | Running cost |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for loss of soil & damage to soil characteristics | Neg | 4 | 1 | 1 | 3 | 9 | 5 | 45 | Y | Mod | Strip and stockpile soils as recommended by the soil specialist. Re-vegetate any bare soil immediately. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect stripping activities and ensure they are to specification of the pedology study. | Weekly | Running cost |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 3 | 33 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. | 4 | 2 | 1 | 3 | 10 | 2 | 20 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| SUB ACTIVITY: Berm and channel construction | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 5 | 60 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 4 | 32 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling | Neg | 4 | 1 | 1 | 3 | 9 | 5 | 45 | Y | Mod | Re-vegetate any bare soil immediately. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect stripping activities and berm construction ensures they are to specification of the pedology study. | Weekly | Running cost |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 3 | 33 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. Clean out silt build up in trenches over dry season | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| ACTIVITY: Preparation of mine infrastructure area [R.544, Activity 11, 18(i) and 26; Reg 545, Activity 15; Reg 546, Activities 13(a)(ii)(cc) and 14(a)(i)] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Truck and heavy machinery operation | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | Speed limits will be established on the dirt road to minimise dust generation. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Site manager | Speed trapping | Sporadically | Running cost |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low | Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. | 1 | 1 | 1 | 1 | 4 | 2 | 8 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site & Environmental manager | Ensure service plans are maintained. Groundwater monitoring. | Every 6 months & Quarterly | Contractors cost & R 200,000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Inspect area for erosion and soil compaction | Monthly | Running cost |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Site & Environmental manager | Ensure service plans are maintained, Surface water monitoring & Biomonitoring | Every 6 months, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - | All intersections with main tarred roads will be clearly signposted. Drivers will be enforced to keep to set speed limits. Trucks will be in road-worthy condition | 3 | 1 | 1 | 5 | 10 | 1 | 10 | Site manager | Inspect intersections and roads | Monthly | Running cost |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|--|----------------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | with reflective strips. | | | | | | | | | | | |
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - | A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from public roads. | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| SUB ACTIVITY: Removal of herbaceous material with soil stripping | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 5 | 60 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 5 | 40 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Archaeological & cultural sites | Loss of and disturbance to surface archaeological sites | Neg | 5 | 1 | 5 | 5 | 16 | 5 | 80 | Y | High | Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |
| Archaeological & cultural sites | Potential disruption to grave sites | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Y | High | Should graves be observed on site during activity progress then all activity should ceased and the area demarcated as a no-go zone. A specialists will need to be consulted and responsible action considered, whether grave relocation or ceasing activity completely within the area and a 50m buffer zone. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |
| Fauna | Loss of habitat, refuge and food for animals | Neg | 3 | 2 | 1 | 3 | 9 | 4 | 36 | Y | Low | Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. | 2 | 2 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Flora | Loss of biodiversity | Neg | 4 | 1 | 4 | 3 | 12 | 5 | 60 | Y | Mod | Ensure permits are obtained to remove and relocate protected species. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetate impacted areas as soon as possible. | 2 | 1 | 3 | 3 | 9 | 4 | 36 | Environmental manager | Inspect progress of construction & ensure activity is in designated areas | Monthly | Running cost |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for loss of soil & damage to soil characteristics | Neg | 4 | 1 | 1 | 3 | 9 | 5 | 45 | Y | Mod | Strip and stockpile soils as recommended by the soil specialist. Re-vegetate any bare soil immediately. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect stripping activities and ensure they are to specification of the pedology study. | Weekly | Running cost |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. | 4 | 2 | 1 | 3 | 10 | 3 | 30 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| SUB ACTIVITY: Berm and channel construction | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 5 | 60 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 4 | 32 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|----------------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling | Neg | 4 | 1 | 1 | 3 | 9 | 5 | 45 | Y | Mod | Re-vegetate any bare soil immediately. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect stripping activities and berm construction ensures they are to specification of the pedology study. | Weekly | Running cost |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. Clean out silt build up in trenches over dry season | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| SUB ACTIVITY: Levelling and compacting of areas for infrastructure | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for loss of soil characteristics, compaction of soil & soil degradation | Neg | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Y | Low | Remove and stockpile all useable soils prior to levelling. Stockpiles should be to the specifications of the pedological study. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect activities to ensure all soil stockpiled. | Weekly | Running cost |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 4 | 2 | 1 | 3 | 10 | 4 | 40 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Clean out silt build up in trenches over dry season | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| ACTIVITY: Construction of foundations and construction of infrastructure [R.544, Activity 11, 18(i) and 26; Reg 546 Activity 16(a)(ii)(dd)] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Truck and heavy machinery operation | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Low | A water cart will be used to spray relevant areas when dust levels are high. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Low | Speed limits will be established on the dirt road to minimise dust generation. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Site manager | Speed trapping | Sporadically | Running cost |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low | Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. | 1 | 1 | 1 | 1 | 4 | 2 | 8 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Groundwater | Potential hydrocarbon contamination leaching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site & Environmental manager | Ensure service plans are maintained. Groundwater monitoring. | Every 6 months & Quarterly | Contractors cost & R 200,000.00 |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | reported immediately. | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Inspect area for erosion and soil compaction | Monthly | Running cost |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Site & Environmental manager | Ensure service plans are maintained, Surface water monitoring & Biomonitoring | Every 6 months, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - | All intersections with main tarred roads will be clearly signposted. Drivers will be enforced to keep to set speed limits. Trucks will be in road-worthy condition with reflective strips. | 3 | 1 | 1 | 5 | 10 | 1 | 10 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - | A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from public roads. | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| SUB ACTIVITY: Construction of various infrastructure for administrative and security duties, wash bay, ablutions and installation of light masts | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Visual aspect | Deterioration in visual aesthetics of the area | Neg | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Y | Low | Screens will be considered if I&AP complaints are received. | 3 | 1 | 3 | 3 | 10 | 2 | 20 | Environmental manager | - | - | - |
| ACTIVITY: Drilling of boreholes for potable water supply | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Drilling | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 2 | 2 | 3 | 1 | 8 | 5 | 40 | Y | - | Equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 3 | 1 | 7 | 3 | 21 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | Mod | Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the | 2 | 2 | 3 | 3 | 10 | 3 | 30 | Site & Environmental manager | Ensure service plans are maintained. Groundwater monitoring. | Every 6 months & Quarterly | Contractors cost & R 200,000.00 |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|--|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | emergency response plan. For large spills Hazmat will called in. | | | | | | | | | | | |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 3 | 1 | 3 | 3 | 10 | 3 | 30 | Y | Low | Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 3 | 3 | 10 | 2 | 20 | Site manager | Inspect area for erosion and soil compaction | Monthly | Running cost |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 3 | 3 | 10 | 3 | 30 | Y | Low | Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will called in. | 3 | 1 | 3 | 3 | 10 | 2 | 20 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 5 | 2 | 3 | 3 | 13 | 4 | 52 | Y | Mod | Rigs will be regularly serviced to reduce risk of leaks. Pans will be placed under potential leak sites. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will called in. | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Site & Environmental manager | Ensure service plans are maintained, Surface water monitoring & Biomonitoring | Every 6 months, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| SUB ACTIVITY: Fitting of and operation of pumps | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | Y | - | Equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 1 | 1 | 1 | 1 | 4 | 5 | 20 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Groundwater | Reduction of local groundwater | Neg | 3 | 2 | 3 | 1 | 9 | 4 | 36 | Y | Mod | Utilise water on site responsibly. Record water usage by attaching meters to all pumps. | 2 | 2 | 3 | 1 | 8 | 4 | 32 | Environmental manager | Monitor water usage & Groundwater level monitoring. | Continuous & Quarterly | Part of running cost & R 200,000.00 |
| SUB ACTIVITY: Construction and utilisation of water storage tanks | | | | | | | | | | | | | | | | | | | | | | | |
| Visual aspect | Deterioration in visual aesthetics of the area | Neg | 2 | 1 | 3 | 1 | 7 | 2 | 14 | Y | Low | Screens will be considered if I&AP complaints are received. | 1 | 1 | 3 | 1 | 6 | 1 | 6 | Environmental manager | - | - | - |
| ACTIVITY: Construction and utilisation of toilets and change houses [R.544, Activity 11; Reg 546 Activity 16(a)(ii)(dd)] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Construction of bathrooms and change houses | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | Y | - | Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Visual aspect | Deterioration in visual aesthetics of the area | Neg | 2 | 1 | 3 | 3 | 9 | 2 | 18 | Y | Low | Screens will be considered if I&AP complaints are received. | 1 | 1 | 3 | 3 | 8 | 1 | 8 | Environmental manager | - | - | - |
| SUB ACTIVITY: Utilisation of change houses and bathrooms | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Irresponsible use of water will impact on groundwater quantity | Neg | 4 | 2 | 3 | 1 | 10 | 4 | 40 | Y | Low | Saving water initiatives will be included in environmental awareness training. Fit potable water areas with meters to record water use. | 3 | 2 | 2 | 1 | 8 | 2 | 16 | Environmental manager | Inspect all potable water works for leaks. Monitor water use. | Weekly | Running cost |
| Groundwater | Potential harm through sewage leaks | Neg | 4 | 2 | 3 | 1 | 10 | 3 | 30 | Y | Low | Portable toilets will be managed by reputable contractors and inspected for any potential leaks. | 3 | 1 | 2 | 1 | 7 | 2 | 14 | Environmental manager | Inspect toilets and related piping for leaks & Groundwater monitoring | Weekly & Quarterly | Part of running cost & R 200,000.00 |
| Soils | Potential harm through sewage leaks | Neg | 3 | 1 | 3 | 3 | 10 | 3 | 30 | Y | Low | Portable toilets will be managed by reputable contractors and inspected daily for any potential leaks. | 3 | 1 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Inspect toilets and related piping for leaks | Weekly | Contractors cost |
| Surface water and Wetlands | Potential harm through sewage leaks | Neg | 4 | 2 | 3 | 1 | 10 | 3 | 30 | Y | Low | Portable toilets will be managed by reputable contractors and inspected for any potential leaks. | 3 | 2 | 3 | 1 | 9 | 2 | 18 | Environmental manager | Inspect toilets and related piping for leaks, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|--|------------------------------------|---------------------------------|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Social | Potential biological hazards | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | High | Ensure all sewage is contained in septic tanks which are functioning adequately. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Monitor groundwater quality in vicinity and include bacterial monitoring of these downstream sites | Quarterly | R 20 000.00 |
| ACTIVITY: Diesel and hydrocarbon storage [R.544, Activity 11; Reg 546, Activities 10(a)(ii)(cc) and 16(a)(ii)(dd)] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Construction of bunded areas for hydrocarbon storage | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | Y | - | Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Visual aspect | Deterioration in visual aesthetics of the area | Neg | 2 | 1 | 3 | 3 | 9 | 2 | 18 | Y | Low | Screens will be considered if I&AP complaints are received. | 1 | 1 | 3 | 3 | 8 | 1 | 8 | Environmental manager | - | - | - |
| SUB ACTIVITY: Handling and initial storage of diesel | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | Mod | All hydrocarbons will be stored in concrete bunded areas fitted with taps and oil traps. Bunded areas will be to SABS standards, and bunded area will have adequate capacity to contain leaks. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Site & Environmental manager | Inspect bunded areas to ensure taps are closed and bunded areas are not flooded. Inspect integrity of bunding. | Weekly, after rainfalls & annually | Running cost |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Y | Mod | All hydrocarbons will be stored in concrete bunded areas fitted with taps and oil traps. Bunded areas will be to SABS standards, and bunded area will have adequate capacity to contain leaks. | 2 | 1 | 3 | 3 | 9 | 2 | 18 | Site & Environmental manager | Inspect bunded areas to ensure taps are closed and bunded areas are not flooded. Inspect integrity of bunding. | Weekly, after rainfalls & annually | Running cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | Mod | All hydrocarbons will be stored in concrete bunded areas fitted with taps and oil traps. Bunded areas will be to SABS standards, and bunded area will have adequate capacity to contain leaks. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Site & Environmental manager | Inspect bunded areas to ensure taps are closed and bunded areas are not flooded. Inspect integrity of bunding. | Weekly, after rainfalls & annually | Running cost |
| ACTIVITY: Preparation of opencast mining areas [Reg 544, Activities 11, 18(i) and 26; Reg 545, Activity 15; Reg 546, Activities 13(a)(ii)(cc) and 14(a)(i)] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Truck and heavy machinery operation | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Low | A water cart will be used to spray relevant areas when dust levels are high. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low | Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. | 1 | 1 | 1 | 1 | 4 | 2 | 8 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site & Environmental manager | Ensure service plans are maintained. Groundwater monitoring. | Every 6 months & Quarterly | Contractors cost & R 200,000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Inspect area for erosion and soil compaction | Monthly | Running cost |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|--|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Site & Environmental manager | Ensure service plans are maintained, Surface water monitoring & Biomonitoring | Every 6 months, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| SUB ACTIVITY: Removal of herbaceous material with soil stripping | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 5 | 60 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 5 | 40 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Archaeological & cultural sites | Loss of and disturbance to surface archaeological sites | Neg | 5 | 1 | 5 | 5 | 16 | 5 | 80 | Y | High | Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |
| Archaeological & cultural sites | Potential disruption to grave sites | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Y | High | Should graves be observed on site during activity progress then all activity should cease and the area demarcated as a no-go zone. A specialists will need to be consulted and responsible action considered, whether grave relocation or ceasing activity completely within the area and a 50m buffer zone. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |
| Fauna | Loss of habitat, refuge and food for animals | Neg | 3 | 2 | 1 | 3 | 9 | 4 | 36 | Y | Low | Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. | 2 | 2 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Flora | Loss of biodiversity | Neg | 4 | 1 | 4 | 3 | 12 | 5 | 60 | Y | Mod | Ensure permits are obtained to remove and relocate protected species. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetate impacted areas as soon as possible. | 2 | 1 | 3 | 3 | 9 | 4 | 36 | Environmental manager | Inspect progress of construction & ensure activity is in designated areas | Monthly | Running cost |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for loss of soil & damage to soil characteristics | Neg | 4 | 1 | 1 | 3 | 9 | 5 | 45 | Y | Mod | Strip and stockpile soils as recommended by the soil specialist. Re-vegetate any bare soil immediately. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect stripping activities and ensure they are to specification of the pedology study. | Weekly | Running cost |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|----------------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. | 4 | 2 | 1 | 3 | 10 | 3 | 30 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| SUB ACTIVITY: Topsoil and subsoil stockpiling | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 5 | 60 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 4 | 32 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling | Neg | 4 | 1 | 1 | 3 | 9 | 5 | 45 | Y | Mod | Re-vegetate any bare soil immediately, including stockpiles which will remain on site for more than 6 months. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect stripping activities and berm construction ensures they are to specification of the pedology study. | Weekly | Running cost |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. Clean out silt build up in trenches over dry season | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| SUB ACTIVITY: Removal and stockpiling of soft overburden | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 4 | 48 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 3 | 24 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 3 | 33 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. Clean out silt build up in trenches over dry season | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| ACTIVITY: Blasting of rock for the opencast pits & box cut area [Reg 544, Activity 18(i)] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Excavation of box cut and associated blasting | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 2 | 8 | 5 | 40 | Y | Low | A water cart will be used to spray relevant areas when dust levels are high. Alternative blasting methods will be considered to reduce dust generation. | 2 | 2 | 1 | 2 | 7 | 4 | 28 | Site & Environmental manager | Dust monitoring | Monthly | R 140 000.00 |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|----------------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Archaeological & cultural sites | Loss of and disturbance to surface archaeological sites | Neg | 5 | 1 | 5 | 5 | 16 | 4 | 64 | Y | High | Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |
| Geology | Disturbance of geological strata | Neg | 4 | 2 | 5 | 5 | 16 | 5 | 80 | N | High | - | 4 | 2 | 5 | 5 | 16 | 5 | 80 | Site manager | - | - | - |
| Groundwater | Generation of poor quality leachate which may contaminate aquifers | Neg | 5 | 2 | 5 | 3 | 15 | 5 | 75 | Y | High | Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Remove any water within the box cut to prevent contact time between carbonaceous material and water. Install monitoring boreholes. | 5 | 2 | 5 | 3 | 15 | 5 | 75 | N | Groundwater monitoring | Monthly | R 200 000.00 |
| Groundwater | Potential damage to groundwater aquifers and alteration of groundwater flow | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a quarterly basis. | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Site & Environmental manager | Groundwater monitoring | Monthly | R 200 000.00 |
| Noise | Increased noise levels | Neg | 5 | 3 | 4 | 1 | 13 | 5 | 65 | Y | - | Blasting alternatives will be considered to reduce noise and associated vibrations | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Site & Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Social | Vibrations may damage structures in the area | Neg | 4 | 1 | 4 | 3 | 12 | 4 | 48 | Y | Mod | Ensure baseline photographs are taken of all structures which may be impacted for photographic evidence prior to any blasting. Ensure procedures in place to compensate for damage. | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Environmental manager | Inspect all complaints received and compare against photographic evidence. | As required | Running costs & dependent on extent of damage. |
| Topography | Alteration of topography | Neg | 3 | 1 | 1 | 1 | 6 | 5 | 30 | N | - | - | 3 | 1 | 1 | 1 | 6 | 5 | 30 | Environmental manager | - | - | - |
| SUB ACTIVITY: Removal and stockpiling of hard overburden | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 4 | 48 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 3 | 24 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 3 | 33 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. Clean out silt build up in trenches over dry season | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| ACTIVITY: Construction of in-pit infrastructure Construction of in-pit infrastructure [Reg 545, Activity 5] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Construction and installation of sump and pump | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | - | Equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Site & Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| SUB ACTIVITY: Pumping of in-pit water | | | | | | | | | | | | | | | | | | | | | | | |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|----------------------|-------------------------------------|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | - | Equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Site & Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Groundwater | Reduction of local groundwater | Neg | 4 | 2 | 5 | 5 | 16 | 5 | 80 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a quarterly basis. | 4 | 2 | 5 | 5 | 16 | 5 | 80 | Site & Environmental manager | Inspect all water pipelines and water containment facilities for leaks & groundwater level monitoring | Weekly & monthly | Part of running cost & R 200,000.00 |
| Groundwater | Alteration of groundwater flow | Neg | 4 | 2 | 5 | 5 | 16 | 4 | 64 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a quarterly basis. | 4 | 2 | 5 | 5 | 16 | 4 | 64 | Environmental manager | Groundwater monitoring | Monthly | R 200 000.00 |
| Groundwater | Limiting contact time with carbonaceous material and water and preventing possible contamination | Pos | 3 | 2 | 3 | 3 | 11 | 4 | 44 | N | - | - | 3 | 2 | 3 | 3 | 11 | 4 | 44 | Environmental manager | Groundwater monitoring | Monthly | R 200 000.00 |
| ACTIVITY: Waste generation | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Domestic and industrial waste generation | | | | | | | | | | | | | | | | | | | | | | | |
| Fauna | Potential harm through littering | Neg | 4 | 2 | 1 | 3 | 10 | 3 | 30 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Groundwater | Potential contamination through littering | Neg | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 3 | 1 | 2 | 1 | 7 | 2 | 14 | Environmental manager | Inspect area for illegal littering and dumping | Monthly | Running cost |
| Soils | Potential contamination through littering | Neg | 3 | 1 | 3 | 3 | 10 | 3 | 30 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 3 | 1 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Inspect area for illegal littering and dumping | Monthly | Running cost |
| Surface water and Wetlands | Potential contamination through littering | Neg | 3 | 2 | 3 | 3 | 11 | 1 | 11 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 3 | 2 | 3 | 1 | 9 | 1 | 9 | | Inspect area for illegal littering and dumping | Monthly | Running cost |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|---|-------------------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Visual Aspect | Loss of aesthetics | Neg | 3 | 1 | 3 | 3 | 10 | 3 | 30 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 1 | 3 | 3 | 9 | 2 | 18 | | Inspect area for illegal littering and dumping | Monthly | Running cost |
| ACTIVITY: General activities | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: General activities | | | | | | | | | | | | | | | | | | | | | | | |
| Fauna | Alienation of animals from the area | Neg | 2 | 2 | 3 | 3 | 10 | 4 | 40 | Y | Low | Inform staff, contractors and visitors to not harm fauna in the area. | 1 | 1 | 1 | 3 | 6 | 3 | 18 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Flora | Alien invasive encroachment | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | High | Eradicate and control all alien invasive species on site. Rehabilitate and revegetate all areas where alien invasive species were removed. | 4 | 2 | 3 | 3 | 12 | 3 | 36 | Environmental manager | Establish alien invasive monitoring programme | Every 6 months depending on species | R 100 000.00 |
| Social | Potential for more employment | Pos | 4 | 2 | 3 | 1 | 10 | 5 | 50 | Y | - | Labourers should initially be sought locally and only regionally if skills are not available. Employ as per SLP. | 4 | 2 | 3 | 1 | 10 | 5 | 50 | Social Manager | Ensure employment is in line with SLP initiatives | As required | Running cost |
| Social | Multiplier effect - improved livelihoods | Pos | 4 | 2 | 3 | 1 | 10 | 5 | 50 | N | - | - | 4 | 2 | 3 | 1 | 10 | 5 | 50 | Social Manager | - | - | - |
| Social | Influx of unsuccessful job seekers which may informally settle in area | Neg | 4 | 3 | 5 | 3 | 15 | 3 | 45 | Y | - | Ensure advertising is limited to local and regional areas, and only specifically advertise for Jobs nationally if skills are not available. Employ as per SLP. | 3 | 2 | 5 | 3 | 13 | 3 | 39 | Social Manager | Ensure employment is in line with SLP initiatives | As required | Running cost |
| Visual aspect | Deterioration in visual aesthetics of the area | Neg | 3 | 1 | 3 | 1 | 8 | 5 | 40 | Y | Mod | Consider use of screens if I&AP complaints are received | 1 | 1 | 3 | 1 | 6 | 3 | 18 | Environmental manager | - | - | - |
| OPERATION PHASE | | | | | | | | | | | | | | | | | | | | | | | |
| ACTIVITY: Operation water management facilities [R.544, Activity 12; Reg 545, Activity 5] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Operation of berms and trenches | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Potential infiltration of contaminated water into groundwater table if leaks occur | Neg | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Y | Mod | Ensure water management facilities are operating adequately. Clear out silt build-up to prevent compromising structure capacity and reduce water accumulation in structures. | 3 | 2 | 3 | 3 | 11 | 2 | 22 | Environmental manager | Inspect water management features & Groundwater monitoring | Weekly & Quarterly | R 200,000.00 & part of running cost |
| Soils | Containment of dirty water within dirty footprint area | Pos | 4 | 1 | 3 | 1 | 9 | 5 | 45 | N | - | - | 4 | 1 | 3 | 1 | 9 | 5 | 45 | Environmental manager | - | - | - |
| Soils | Potential contamination of soils if dirty water escapes into environment | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Low | Ensure water management facilities are operating adequately. Clear out silt build-up to prevent compromising structure capacity and reduce water accumulation in structures. | 4 | 2 | 1 | 3 | 10 | 2 | 20 | Environmental manager | Inspect water management features | Weekly | Running cost |
| Soils | Erosion | Neg | 3 | 2 | 3 | 3 | 11 | 2 | 22 | Y | Low | Re-vegetate any bare soil immediately. Consider use of erosion control measures such as gabions in high risk or persistent areas. | 2 | 2 | 3 | 3 | 10 | 1 | 10 | Environmental manager | Inspect area for soil erosion | Monthly | Running cost |
| Surface water and Wetlands | Containment of dirty water within dirty footprint area | Pos | 4 | 2 | 3 | 1 | 10 | 4 | 40 | N | - | - | 4 | 2 | 3 | 1 | 10 | 4 | 40 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R180,000.00 & R80,000.00 |
| Surface water and Wetlands | Potential surface water contamination if leaks escape into the environment | Neg | 3 | 2 | 3 | 3 | 11 | 2 | 22 | Y | Mod | Ensure water management facilities are operating adequately. Clear out silt build-up to prevent compromising structure capacity and reduce water accumulation in structures. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Inspect water management features, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running costs, R 180,000.00 & R80,000.00 |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|---|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Y | Mod | Ensure water management facilities are operating adequately. Clear out silt build-up to prevent compromising structure capacity and reduce water accumulation in structures. Follow erosion control measures and soil management principals. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R180,000.00 & R80,000.00 |
| Surface water and Wetlands | Downstream water quantity of catchment reduced | Neg | 3 | 2 | 3 | 1 | 9 | 5 | 45 | N | Mod | - | 4 | 2 | 3 | 1 | 10 | 5 | 50 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R180,000.00 & R80,000.00 |
| SUB ACTIVITY: Operation of PCD/in-pit sump | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Potential infiltration of contaminated water into groundwater table if leaks occur | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | Mod | Ensure water management facilities are operating adequately. Ensure PCD is adequately lined and ensure integrity of any lining is not compromised. Install monitoring borehole downgradient of PCD. | 4 | 2 | 3 | 3 | 12 | 2 | 24 | Environmental manager | Groundwater monitoring. Inspect lining of containment facilities. | Quarterly & annually | R 200,000.00 & part of running cost |
| Soils | Potential contamination of soils if dirty water escapes into environment | Neg | 4 | 2 | 1 | 3 | 10 | 3 | 30 | Y | Low | Ensure water management facilities are operating adequately. Clear out silt build-up to prevent compromising structure capacity and reduce water accumulation in structures. | 4 | 2 | 1 | 3 | 10 | 2 | 20 | Environmental manager | Inspect water management features | Weekly | Running cost |
| Surface water and Wetlands | Potential surface water contamination if leaks escape into the environment | Neg | 4 | 2 | 3 | 3 | 12 | 2 | 24 | Y | Mod | Ensure water management facilities are operating adequately. Clear out silt build up over dry season. Test for integrity of lining and management structures. Install monitoring borehole downgradient of PCD. | 2 | 2 | 3 | 3 | 10 | 1 | 10 | Environmental manager | Test integrity of water management structures, Surface water monitoring & Biomonitoring | In the dry season, Monthly & Every 6 months | Running costs, R 180,000.00 & R80,000.00 |
| Surface water and Wetlands | Downstream water quantity of catchment reduced | Neg | 4 | 2 | 3 | 1 | 10 | 5 | 50 | N | Mod | - | 4 | 2 | 3 | 1 | 10 | 5 | 50 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R180,000.00 & R80,000.00 |
| ACTIVITY: Utilisation of roads | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Truck and heavy machinery operation | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | Speed limits will be established on the dirt road to minimise dust generation. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Site manager | Speed trapping | Sporadically | Running cost |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low | Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. | 1 | 1 | 1 | 1 | 4 | 2 | 8 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site & Environmental manager | Ensure service plans are maintained. Groundwater monitoring. | Every 6 months & Quarterly | Contractors cost & R 200,000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Inspect area for erosion and soil compaction | Monthly | Running cost |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | indigenous plants. | | | | | | | | | | | |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Site & Environmental manager | Ensure service plans are maintained, Surface water monitoring & Biomonitoring | Every 6 months, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - | All intersections with main tarred roads will be clearly signposted. Drivers will be enforced to keep to set speed limits. Trucks will be in road-worthy condition with reflective strips. | 3 | 1 | 1 | 5 | 10 | 1 | 10 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - | A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from public roads. | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| SUB ACTIVITY: Coal Transportation | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 4 | 1 | 10 | 4 | 40 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Groundwater | Potential contamination leeching into the water table if coal dust and spillage not cleared from road | Neg | 3 | 2 | 4 | 3 | 12 | 3 | 36 | Y | Low | Clean roads utilised for coal transportation. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Inspect roads for spillages | Monthly | Running cost |
| Soils | Potential contamination of surrounding areas with coal dust | Neg | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Y | Low | A water cart will be used to spray when dust levels are high. Clean roads utilised for coal transportation. | 2 | 1 | 3 | 3 | 9 | 2 | 18 | Environmental manager | Dust monitoring & inspect roads | Monthly | R 140 000.00 |
| Surface water and Wetlands | Potential contamination of surrounding surface water bodies with coal dust and transported coal spillage | Neg | 4 | 2 | 3 | 1 | 10 | 4 | 40 | Y | Low | Dust management will be applied. Clean roads utilised for coal transportation. | 3 | 2 | 3 | 1 | 9 | 2 | 18 | Environmental manager | Dust monitoring & inspect roads | Monthly | R 140 000.00 |
| ACTIVITY: Pumping and conveyance of groundwater for potable use | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Operation of pumps | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 2 | 1 | 3 | 1 | 7 | 5 | 35 | Y | - | Equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 1 | 1 | 1 | 1 | 4 | 5 | 20 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Groundwater | Reduction of local groundwater | Neg | 3 | 2 | 3 | 1 | 9 | 4 | 36 | Y | Low | Utilise water on site responsibly. Record water usage by attaching meters to all pumps. | 2 | 2 | 3 | 1 | 8 | 4 | 32 | Environmental manager | Monitor water usage & Groundwater level monitoring. | Continuous & Quarterly | Part of running cost & R 200,000.00 |
| SUB ACTIVITY: Groundwater conveyance and temporary storage | | | | | | | | | | | | | | | | | | | | | | | |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|--|------------------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Water wastage should leaks occur | Neg | 2 | 2 | 3 | 1 | 8 | 5 | 40 | Y | Low | Utilise water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Record water usage by attaching meters to all pumps. | 2 | 2 | 3 | 1 | 8 | 5 | 40 | Environmental manager | Inspect tank for leaks & groundwater monitoring | Weekly & Quarterly | Part of running cost & R 200,000.00 |
| ACTIVITY: Utilisation of change houses and bathrooms | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Utilisation of change houses and bathrooms | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Irresponsible use of water will impact on groundwater quantity | Neg | 4 | 2 | 3 | 1 | 10 | 4 | 40 | Y | Low | Saving water initiatives will be included in environmental awareness training. Fit potable water areas with meters to record water use. | 3 | 2 | 2 | 1 | 8 | 2 | 16 | Environmental manager | Inspect all potable water works for leaks. Monitor water use. | Weekly | Running cost |
| Groundwater | Potential harm through sewage leaks | Neg | 4 | 2 | 3 | 1 | 10 | 3 | 30 | Y | Low | Portable toilets will be managed by reputable contractors and inspected for any potential leaks. | 3 | 1 | 2 | 1 | 7 | 2 | 14 | Environmental manager | Inspect toilets and related piping for leaks & Groundwater monitoring | Weekly & Quarterly | Part of running cost & R 200,000.00 |
| Soils | Potential harm through sewage leaks | Neg | 3 | 1 | 3 | 3 | 10 | 3 | 30 | Y | Low | Portable toilets will be managed by reputable contractors and inspected daily for any potential leaks. | 3 | 1 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Inspect toilets and related piping for leaks | Weekly | Contractors cost |
| Surface water and Wetlands | Potential harm through sewage leaks | Neg | 4 | 2 | 3 | 1 | 10 | 3 | 30 | Y | Low | Portable toilets will be managed by reputable contractors and inspected for any potential leaks. | 3 | 2 | 3 | 1 | 9 | 2 | 18 | Environmental manager | Inspect toilets and related piping for leaks, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| Social | Potential biological hazards | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | High | Ensure all sewage is contained in septic tanks which are functioning adequately. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Monitor groundwater quality in vicinity and include bacterial monitoring of these downstream sites | Quarterly | R 20 000.00 |
| ACTIVITY: Diesel and hydrocarbon storage [Reg 546, Activity 10(a)(ii)(cc)] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Handling and initial storage of diesel | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | Mod | All hydrocarbons will be stored in concrete bunded areas fitted with taps and oil traps. Bunded areas will be to SABS standards, and bunded area will have adequate capacity to contain leaks. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Site & Environmental manager | Inspect bunded areas to ensure taps are closed and bunded areas are not flooded. Inspect integrity of bunding. | Weekly, after rainfalls & annually | Running cost |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Y | Mod | All hydrocarbons will be stored in concrete bunded areas fitted with taps and oil traps. Bunded areas will be to SABS standards, and bunded area will have adequate capacity to contain leaks. | 2 | 1 | 3 | 3 | 9 | 2 | 18 | Site & Environmental manager | Inspect bunded areas to ensure taps are closed and bunded areas are not flooded. Inspect integrity of bunding. | Weekly, after rainfalls & annually | Running cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | Low | All hydrocarbons will be stored in concrete bunded areas fitted with taps and oil traps. Bunded areas will be to SABS standards, and bunded area will have adequate capacity to contain leaks. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Site & Environmental manager | Inspect bunded areas to ensure taps are closed and bunded areas are not flooded. Inspect integrity of bunding. | Weekly, after rainfalls & annually | Running cost |
| ACTIVITY: Opencast mining and related in-pit water management [Reg 545, Activity 5] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Blasting activities and opencast mining | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 1 | 2 | 9 | 5 | 45 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. Alternative blasting methods will be considered to reduce dust generation. | 2 | 2 | 1 | 2 | 7 | 4 | 28 | Site & Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Archaeological & cultural sites | Loss of and disturbance to surface archaeological sites | Neg | 5 | 1 | 5 | 5 | 16 | 4 | 64 | Y | High | Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Geology | Disturbance of geological strata | Neg | 4 | 2 | 5 | 5 | 16 | 5 | 80 | N | High | - | 4 | 2 | 5 | 5 | 16 | 5 | 80 | Site manager | - | - | - |
| Groundwater | Generation of poor quality leachate which may contaminate aquifers | Neg | 5 | 2 | 5 | 3 | 15 | 5 | 75 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Place all carbonaceous material in the bottom of the pit if relevant exemption is obtained from DWA. Compact carbonaceous layer. Remove groundwater seepage/ water build up in pits to avoid contact time with carbonaceous material. | 5 | 2 | 5 | 3 | 15 | 5 | 75 | N | Groundwater monitoring | Monthly | R 200 000.00 |
| Groundwater | Potential damage to groundwater aquifers and alteration of groundwater flow | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a quarterly basis. | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Site & Environmental manager | Groundwater monitoring | Monthly | R 200 000.00 |
| Noise | Increased noise levels | Neg | 5 | 3 | 4 | 1 | 13 | 5 | 65 | Y | - | Blasting alternatives will be considered to reduce noise and associated vibrations | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Site & Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Social | Vibrations may damage structures in the area | Neg | 4 | 1 | 4 | 3 | 12 | 4 | 48 | Y | Mod | Ensure baseline photographs are taken of all structures which may be impacted for photographic evidence prior to any blasting. Ensure procedures in place to compensate for damage. | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Environmental manager | Inspect all complaints received and compare against photographic evidence. | As required | Running costs & dependent on extent of damage. |
| Topography | Alteration of topography | Neg | 3 | 1 | 1 | 1 | 6 | 5 | 30 | N | - | - | 3 | 1 | 1 | 1 | 6 | 5 | 30 | Environmental manager | - | - | - |
| SUB ACTIVITY: Removal of coal seams | | | | | | | | | | | | | | | | | | | | | | | |
| Geology | Removal of coal seam and alteration of geological strata | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | High | - | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Mine manager | - | - | - |
| Groundwater | Potential damage to groundwater aquifers and alteration of groundwater flow | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a quarterly basis. | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Environmental manager | Groundwater monitoring | Quarterly | R 200 000.00 |
| Groundwater | Potential contamination plume of groundwater | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a quarterly basis. | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Site & Environmental manager | Groundwater monitoring | Quarterly | R 200 000.00 |
| SUB ACTIVITY: Pumping of in-pit water | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | - | Equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Site & Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Groundwater | Reduction of local groundwater | Neg | 4 | 2 | 5 | 5 | 16 | 5 | 80 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a quarterly basis. | 4 | 2 | 5 | 5 | 16 | 5 | 80 | Site & Environmental manager | Inspect all water pipelines and water containment facilities for leaks & groundwater level monitoring | Weekly & monthly | Part of running cost & R 200,000.00 |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Alteration of groundwater flow | Neg | 4 | 2 | 5 | 5 | 16 | 4 | 64 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a quarterly basis. | 4 | 2 | 5 | 5 | 16 | 4 | 64 | Environmental manager | Groundwater monitoring | Monthly | R 200 000.00 |
| ACTIVITY: Creation of new opencast cuts [Reg 544, Activities 11, 18(i) and 26; Reg 545, Activities 5 and 15; Reg 546, Activities 13(a)(ii)(cc) and 14(a)(i)] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Truck and heavy machinery operation | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Mod | Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. | 1 | 1 | 1 | 1 | 4 | 2 | 8 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site & Environmental manager | Ensure service plans are maintained. Groundwater monitoring. | Every 6 months & Quarterly | Contractors cost & R 200,000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Inspect area for erosion and soil compaction | Monthly | Running cost |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 4 | 2 | 1 | 3 | 10 | 4 | 40 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Site & Environmental manager | Ensure service plans are maintained, Surface water monitoring & Biomonitoring | Every 6 months, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| SUB ACTIVITY: Removal of herbaceous material with soil stripping | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 5 | 60 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 5 | 40 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Archaeological & cultural sites | Loss of and disturbance to surface archaeological sites | Neg | 5 | 1 | 5 | 5 | 16 | 5 | 80 | Y | High | Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialist consulted prior to any further activity. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|---|----------------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Archaeological & cultural sites | Potential disruption to grave sites | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Y | High | Should graves be observed on site during activity progress then all activity should ceased and the area demarcated as a no-go zone. A specialist will need to be consulted and responsible action considered, whether grave relocation or ceasing activity completely within the area and a 50m buffer zone. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |
| Fauna | Loss of habitat, refuge and food for animals | Neg | 3 | 2 | 1 | 3 | 9 | 4 | 36 | Y | Low | Relocate larger animals with the aid of specialists. Ensure relevant permits are in place. | 2 | 2 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Flora | Loss of biodiversity | Neg | 4 | 1 | 4 | 3 | 12 | 5 | 60 | Y | Mod | Ensure permits are obtained to remove and relocate protected species. Plan activities carefully so that only vegetation that needs to be impacted is impacted. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of disturbance and revegetate impacted areas as soon as possible. | 2 | 1 | 3 | 3 | 9 | 4 | 36 | Environmental manager | Inspect progress of construction & ensure activity is in designated areas | Monthly | Running cost |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for loss of soil & damage to soil characteristics | Neg | 4 | 1 | 1 | 3 | 9 | 5 | 45 | Y | Mod | Strip and stockpile soils as recommended by the soil specialist. Re-vegetate any bare soil immediately. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect stripping activities and ensure they are to specification of the pedology study. | Weekly | Running cost |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. | 4 | 2 | 1 | 3 | 10 | 3 | 30 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| SUB ACTIVITY: Soil mobilisation | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 5 | 60 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 1 | 2 | 8 | 4 | 32 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling | Neg | 4 | 1 | 1 | 3 | 9 | 5 | 45 | Y | Mod | Re-vegetate any bare soil immediately. Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 3 | 1 | 1 | 3 | 8 | 4 | 32 | Environmental manager | Inspect stripping activities and berm construction ensures they are to specification of the pedology study. | Weekly | Running cost |

| Impacted Aspect | Impact | Positive / Negative / Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|--|--------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|--|----------------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Consider silt traps in major flow areas. Clean out silt build up in trenches over dry season | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - | - | 2 | 1 | 1 | 1 | 5 | 5 | 25 | - | - | - | - |
| SUB ACTIVITY: Blasting of overburden | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 1 | 2 | 9 | 5 | 45 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. Alternative blasting methods will be considered to reduce dust generation. | 2 | 2 | 1 | 2 | 7 | 4 | 28 | Site & Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Archaeological & cultural sites | Loss of and disturbance to surface archaeological sites | Neg | 5 | 1 | 5 | 5 | 16 | 4 | 64 | Y | High | Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity. | 3 | 1 | 5 | 5 | 14 | 2 | 28 | Environmental manager | Inspect surface area to be disturbed | Prior to disruption of new sites | Dependent on findings |
| Geology | Disturbance of geological strata | Neg | 4 | 2 | 5 | 5 | 16 | 5 | 80 | N | High | - | 4 | 2 | 5 | 5 | 16 | 5 | 80 | Site manager | - | - | - |
| Groundwater | Generation of poor quality leachate which may contaminate aquifers | Neg | 5 | 2 | 5 | 3 | 15 | 5 | 75 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a quarterly basis. | 5 | 2 | 5 | 3 | 15 | 5 | 75 | N | Groundwater monitoring | Monthly | R 200 000.00 |
| Groundwater | Potential damage to groundwater aquifers and alteration of groundwater flow | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a quarterly basis. | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Site & Environmental manager | Groundwater monitoring | Monthly | R 200 000.00 |
| Noise | Increased noise levels | Neg | 5 | 3 | 4 | 1 | 13 | 5 | 65 | Y | - | Blasting alternatives will be considered to reduce noise and associated vibrations | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Site & Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Social | Vibrations may damage structures in the area | Neg | 4 | 1 | 4 | 3 | 12 | 4 | 48 | Y | Mod | Ensure baseline photographs are taken of all structures which may be impacted for photographic evidence prior to any blasting. Ensure procedures in place to compensate for damage. | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Environmental manager | Inspect all complaints received and compare against photographic evidence. | As required | Running costs & dependent on extent of damage. |
| SUB ACTIVITY: Overburden mobilisation through roll over mining | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 3 | 3 | 3 | 12 | 5 | 60 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 4 | 2 | 11 | 3 | 33 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 4 | 1 | 10 | 4 | 40 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 4 | 1 | 8 | 2 | 16 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling | Neg | 5 | 1 | 4 | 3 | 13 | 4 | 52 | Y | Mod | Re-vegetate any bare soil immediately. Herbaceous plant mater should be stockpiled to retain organic content of soil. Stockpiles should be to the specifications of the pedological study. | 2 | 1 | 4 | 3 | 10 | 2 | 20 | Environmental manager | Inspect stripping activities and ensure they are to specification of the pedology study. | Weekly | Running cost |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|--|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 4 | 2 | 4 | 3 | 13 | 2 | 26 | Y | Mod | Ensure clean and dirty water separation and storm water management systems are established on site prior to other construction activities taking place. Clean out silt build up in trenches over dry season. | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Environmental manager | Inspect all water management features on site, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running cost & R 180,000.00 & R80,000.00 |
| Topography | Alteration of topography | Neg | 3 | 1 | 1 | 1 | 6 | 5 | 30 | N | - | - | 3 | 1 | 1 | 1 | 6 | 5 | 30 | Environmental manager | - | - | - |
| SUB ACTIVITY: Removal of coal seams | | | | | | | | | | | | | | | | | | | | | | | |
| Geology | Removal of coal seam and alteration of geological strata | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | High | - | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Mine manager | - | - | - |
| Groundwater | Potential damage to groundwater aquifers and alteration of groundwater flow | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a quarterly basis. | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Environmental manager | Groundwater monitoring | Quarterly | R 200 000.00 |
| Groundwater | Potential contamination plume of groundwater | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Y | High | Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Remove any water within the box cut to prevent contact time between carbonaceous material and water. Install monitoring boreholes. | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Site & Environmental manager | Groundwater monitoring | Quarterly | R 200 000.00 |
| ACTIVITY: Rehabilitation from roll-over mining | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Rehabilitation of mined out areas | | | | | | | | | | | | | | | | | | | | | | | |
| Flora | Reintroduction of vegetation in rehabilitated areas | Pos | 4 | 1 | 3 | 3 | 11 | 4 | 44 | - | - | Rehabilitate disturbed areas with natural indigenous flora. Monitor for cover abundance. | 4 | 1 | 3 | 3 | 11 | 4 | 44 | Environmental manager | Floral surveys need to be conducted to monitor cover abundance, plant succession and community structure | Annually | R 80 000.00 |
| Fauna | Reintroduction of flora to the area | Pos | 3 | 2 | 3 | 3 | 11 | 3 | 33 | - | - | | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Environmental manager | Visually monitor vegetation cover | Monthly | Rehab cost |
| Soils | Soils replaced and ameliorated | Pos | 4 | 1 | 3 | 3 | 11 | 4 | 44 | - | - | Ensure soils are replaced to an adequate depth and ensure soil quality is adequate. | 4 | 1 | 3 | 3 | 11 | 4 | 44 | Environmental manager | Soil survey and soil quality and depth monitoring | Annually | R 45 000.00 |
| Surface water | Revegetation of areas mined out reduces risk of silt loading on downstream water bodies | Pos | 4 | 2 | 3 | 3 | 12 | 3 | 36 | - | - | Monitor area for erosion and pooling and rehabilitate if necessary. Continue with Surface water monitoring. | 4 | 2 | 3 | 3 | 12 | 3 | 36 | Environmental manager | Inspect area for erosion and pooling, Surface water monitoring & Biomonitoring | After rainfall, monthly & Every 6 months | Rehab cost & R 180,000.00 & R80,000.00 |
| ACTIVITY: Raw coal handling [Reg 545, Activity 5] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Coal stockpiling and handling | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 3 | 1 | 10 | 4 | 40 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 3 | 2 | 3 | 1 | 9 | 3 | 27 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Groundwater | Ingression of poor quality, low pH leachate into water table | Neg | 5 | 2 | 4 | 5 | 16 | 3 | 48 | Y | Mod | Ensure water management facilities are operating adequately. Ensure integrity of sacrificial layer or other impermeable layer. | 4 | 2 | 4 | 3 | 13 | 3 | 39 | Environmental manager | Groundwater monitoring & test integrity of coal stockpile layer | Quarterly & annually | R 200,000.00 & part of running cost |
| Noise | Increased noise levels | Neg | 2 | 2 | 3 | 1 | 8 | 5 | 40 | Y | - | Screens will be considered if I&AP complaints are received. | 2 | 2 | 3 | 1 | 8 | 5 | 40 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Topography | Alteration of topography | Neg | 3 | 1 | 3 | 1 | 8 | 5 | 40 | N | - | - | 2 | 1 | 3 | 1 | 7 | 5 | 35 | Environmental manager | - | - | - |
| ACTIVITY: Operation of floodlights | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Operation of floodlights | | | | | | | | | | | | | | | | | | | | | | | |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Fauna | Hindrance to nocturnal animals | Neg | 3 | 2 | 4 | 3 | 12 | 3 | 36 | Y | Low | Ensure directional floodlights are utilised that focus light on the necessary areas and reduce light pollution to surrounding environment. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Noise | Increased noise levels | Neg | 2 | 2 | 3 | 1 | 8 | 4 | 32 | Y | - | Ensure gensets are adequately buffered to reduce excessive noise generation. | 1 | 2 | 3 | 1 | 7 | 3 | 21 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Traffic & safety | Potential distraction to road users | Neg | 3 | 2 | 4 | 1 | 10 | 2 | 20 | Y | - | Ensure directional floodlights are utilised that focus light on the necessary areas and reduce light pollution to surrounding environment. | 2 | 1 | 2 | 1 | 6 | 2 | 12 | Environmental manager | - | - | - |
| Visual Aspect | Increased visibility of the site | Neg | 4 | 2 | 4 | 1 | 11 | 4 | 44 | Y | Low | Ensure directional floodlights are utilised that focus light on the necessary areas and reduce light pollution to surrounding environment. | 2 | 1 | 3 | 1 | 7 | 3 | 21 | Environmental manager | - | - | - |
| ACTIVITY: Washing at service station, wash bays, hard park and workshop | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Truck and heavy machinery activity | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 4 | 3 | 12 | 3 | 36 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will called in. The workshop will be erected on concrete base and the area will drain to sumps and PCD via oil traps erected at the facility. Oil traps will be cleared of excess oil which will be collected in drums for collection by reputable recycling company | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site & Environmental manager | Ensure service plans are maintained, inspect oil traps for oil accumulation, inspect integrity of concrete workshop base & Groundwater monitoring. | Every 6 months, weekly, annually & Quarterly | Contractors cost & R 200,000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 4 | 1 | 10 | 4 | 40 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 4 | 3 | 11 | 3 | 33 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will called in. The workshop will be erected on concrete base and the area will drain to sumps and PCD via oil traps erected at the facility. Oil traps will be cleared of excess oil which will be collected in drums for collection by reputable recycling company | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site manager | Ensure service plans are maintained, inspect oil traps for oil accumulation, inspect integrity of concrete workshop base & | Every 6 months, weekly & annually | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 4 | 2 | 4 | 3 | 13 | 3 | 39 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will called in. The workshop will be erected on concrete base and the area will drain to sumps and PCD via oil traps erected at the facility. Oil traps will be cleared of excess oil which will be collected in drums for collection by reputable recycling company | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Site & Environmental manager | Ensure service plans are maintained, inspect oil traps for oil accumulation, inspect integrity of concrete workshop base & , Surface water monitoring & Biomonitoring | Every 6 months, weekly, annually, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| ACTIVITY: Waste generation | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Waste generation | | | | | | | | | | | | | | | | | | | | | | | |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|--|-------------------------------------|------------------------|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Fauna | Potential harm through littering | Neg | 4 | 2 | 4 | 3 | 13 | 3 | 39 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Groundwater | Potential contamination through littering | Neg | 3 | 2 | 4 | 3 | 12 | 3 | 36 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 1 | 4 | 1 | 8 | 2 | 16 | Environmental manager | Inspect area for illegal littering and dumping | Monthly | Running cost |
| Soils | Potential contamination through littering | Neg | 3 | 1 | 4 | 3 | 11 | 3 | 33 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 1 | 4 | 3 | 10 | 2 | 20 | Environmental manager | Inspect area for illegal littering and dumping | Monthly | Running cost |
| Surface water and Wetlands | Potential contamination through littering | Neg | 3 | 2 | 4 | 3 | 12 | 1 | 12 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 2 | 4 | 1 | 9 | 1 | 9 | Environmental manager | Inspect area for illegal littering and dumping | Monthly | Running cost |
| Visual Aspect | Loss of aesthetics | Neg | 3 | 1 | 4 | 3 | 11 | 3 | 33 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 1 | 4 | 3 | 10 | 2 | 20 | Environmental manager | Inspect area for illegal littering and dumping | Monthly | Running cost |
| ACTIVITY: General activities | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: General activities | | | | | | | | | | | | | | | | | | | | | | | |
| Fauna | Alienation of animals from the area | Neg | 2 | 2 | 3 | 3 | 10 | 4 | 40 | Y | Low | Inform staff, contractors and visitors to not harm fauna in the area. | 1 | 1 | 1 | 3 | 6 | 3 | 18 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Flora | Alien invasive encroachment | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | High | Eradicate and control all alien invasive species on site. Rehabilitate and revegetate all areas where alien invasive species were removed. | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Environmental manager | Establish alien invasive monitoring programme | Every 6 months depending on species | Running cost |
| Social | Potential for more employment | Pos | 4 | 2 | 3 | 1 | 10 | 3 | 30 | Y | - | Labourers should initially be sought locally and only regionally if skills are not available. Employ as per SLP. | 4 | 2 | 3 | 1 | 10 | 3 | 30 | Social Manager | Ensure employment is in line with SLP initiatives | As required | Running cost |
| Social | Multiplier effect - improved livelihoods | Pos | 4 | 2 | 3 | 1 | 10 | 3 | 30 | N | - | - | 4 | 2 | 3 | 1 | 10 | 3 | 30 | Social Manager | - | - | - |
| Social | Influx of unsuccessful job seekers which may informally settle in area | Neg | 4 | 3 | 5 | 3 | 15 | 3 | 45 | Y | - | Ensure advertising is limited to local and regional areas, and only specifically advertise for Jobs nationally if skills are not available. Employ as per SLP. | 3 | 2 | 5 | 3 | 13 | 3 | 39 | Social Manager | Ensure employment is in line with SLP initiatives | As required | Running cost |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|---|---|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Visual aspect | Deterioration in visual aesthetics of the area | Neg | 3 | 1 | 3 | 1 | 8 | 5 | 40 | Y | Mod | Consider use of screens if I&AP complaints are received | 1 | 1 | 3 | 1 | 6 | 3 | 18 | Environmental manager | - | - | - |
| DECOMMISSIONING PHASE | | | | | | | | | | | | | | | | | | | | | | | |
| ACTIVITY: Operation water management facilities [R.544, Activity 12; Reg 545, Activity 5] | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Operation of berms and trenches | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Potential infiltration of contaminated water into groundwater table if leaks occur | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Ensure water management facilities are operating adequately. Clear out silt build-up to prevent compromising structure capacity and reduce water accumulation in structures. | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Environmental manager | Inspect water management features & Groundwater monitoring | Weekly & Quarterly | R 200,000.00 & part of running cost |
| Soils | Containment of dirty water within dirty footprint area | Pos | 4 | 1 | 1 | 1 | 7 | 5 | 35 | N | - | - | 4 | 1 | 1 | 1 | 7 | 5 | 35 | Environmental manager | - | - | - |
| Soils | Potential contamination of soils if dirty water escapes into environment | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Low | Ensure water management facilities are operating adequately. Clear out silt build-up to prevent compromising structure capacity and reduce water accumulation in structures. | 4 | 2 | 1 | 3 | 10 | 2 | 20 | Environmental manager | Inspect water management features | Weekly | Running cost |
| Soils | Erosion | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | Low | Re-vegetate any bare soil immediately. Consider use of erosion control measures such as gabions in high risk or persistent areas. | 2 | 2 | 1 | 3 | 8 | 1 | 8 | Environmental manager | Inspect area for soil erosion | Monthly | Running cost |
| Surface water and Wetlands | Containment of dirty water within dirty footprint area | Pos | 4 | 2 | 1 | 1 | 8 | 4 | 32 | N | - | - | 4 | 2 | 1 | 1 | 8 | 4 | 32 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R180,000.00 & R80,000.00 |
| Surface water and Wetlands | Potential surface water contamination if leaks escape into the environment | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | Mod | Ensure water management facilities are operating adequately. Clear out silt build-up to prevent compromising structure capacity and reduce water accumulation in structures. | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Environmental manager | Inspect water management features, Surface water monitoring & Biomonitoring | Weekly, Monthly & Every 6 months | Running costs, R 180,000.00 & R80,000.00 |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Ensure water management facilities are operating adequately. Clear out silt build-up to prevent compromising structure capacity and reduce water accumulation in structures. Follow erosion control measures and soil management principals. | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R180,000.00 & R80,000.00 |
| Surface water and Wetlands | Downstream water quantity of catchment reduced | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | N | Mod | - | 4 | 2 | 1 | 1 | 8 | 5 | 40 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R180,000.00 & R80,000.00 |
| SUB ACTIVITY: Operation of PCD | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Potential infiltration of contaminated water into groundwater table if leaks occur | Neg | 4 | 2 | 1 | 3 | 10 | 4 | 40 | Y | Mod | Ensure water management facilities are operating adequately. Ensure PCD is adequately lined and ensure integrity of any lining is not compromised. Install monitoring borehole downgradient of PCD. | 4 | 2 | 1 | 3 | 10 | 2 | 20 | Environmental manager | Groundwater monitoring. Inspect lining of containment facilities. | Quarterly & annually | R 200,000.00 & part of running cost |
| Soils | Potential contamination of soils if dirty water escapes into environment | Neg | 4 | 2 | 1 | 3 | 10 | 3 | 30 | Y | Low | Ensure water management facilities are operating adequately. Clear out silt build-up to prevent compromising structure capacity and reduce water accumulation in structures. | 4 | 2 | 1 | 3 | 10 | 2 | 20 | Environmental manager | Inspect water management features | Weekly | Running cost |
| Surface water and Wetlands | Potential surface water contamination if leaks escape into the environment | Neg | 4 | 2 | 1 | 3 | 10 | 2 | 20 | Y | Mod | Ensure water management facilities are operating adequately. Clear out silt build up over dry season. Test for integrity of lining and management structures | 2 | 2 | 1 | 3 | 8 | 1 | 8 | Environmental manager | Test integrity of water management structures, Surface water monitoring & Biomonitoring | In the dry season, Monthly & Every 6 months | Running costs, R 180,000.00 & R80,000.00 |
| Surface water and Wetlands | Downstream water quantity of catchment reduced | Neg | 4 | 2 | 1 | 1 | 8 | 5 | 40 | N | Mod | - | 4 | 2 | 1 | 1 | 8 | 5 | 40 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R180,000.00 & R80,000.00 |

| Impacted Aspect | Impact | Positive/Negative/Neutral Impact | Affect (severe/beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|---|----------------------------------|----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|--|----------------------------|---------------------------------|
| | | | | | | | | | | | | | | | | | | | | | | | |
| ACTIVITY: Removal of final sewage from septic tanks | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Sewage removal | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Potential for sewage contamination removed | Pos | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - | Ensure reputable contractors are utilised for removal of substances from site and that these are adequately transported. | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Environmental manager | Groundwater monitoring | Quarterly | R 200 000.00 |
| Noise | Increased noise levels | Neg | 3 | 1 | 1 | 1 | 6 | 5 | 30 | Y | - | Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for sewage contamination removed | Pos | 3 | 1 | 1 | 3 | 8 | 2 | 16 | Y | - | Ensure reputable contractors are utilised for removal of substances from site and that these are adequately transported. | 3 | 1 | 1 | 3 | 8 | 2 | 16 | Environmental manager | - | - | - |
| Surface water and Wetlands | Potential for sewage contamination removed | Pos | 3 | 2 | 3 | 3 | 11 | 1 | 11 | N | - | Ensure reputable contractors are utilised for removal of substances from site and that these are adequately transported. | 3 | 2 | 3 | 3 | 11 | 1 | 11 | Environmental manager | Surface water monitoring | Monthly | R 180 000.00 |
| ACTIVITY: Hazardous substances handling (hydrocarbons) | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Removal of hydrocarbons from site | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Potential for hydrocarbon contamination removed | Pos | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - | Ensure reputable contractors are utilised for removal of substances from site and that these are adequately transported. | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Environmental manager | Groundwater monitoring | Quarterly | R 200 000.00 |
| Noise | Potential for hydrocarbon contamination removed | Neg | 3 | 1 | 1 | 1 | 6 | 5 | 30 | Y | - | Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential for hydrocarbon contamination removed | Pos | 3 | 1 | 1 | 3 | 8 | 2 | 16 | Y | - | Ensure reputable contractors are utilised for removal of substances from site and that these are adequately transported. | 3 | 1 | 1 | 3 | 8 | 2 | 16 | Environmental manager | - | - | - |
| Surface water and Wetlands | Potential for hydrocarbon contamination removed | Pos | 3 | 2 | 3 | 3 | 11 | 1 | 11 | N | - | Ensure reputable contractors are utilised for removal of substances from site and that these are adequately transported. | 3 | 2 | 3 | 3 | 11 | 1 | 11 | Environmental manager | Surface water monitoring | Monthly | R 180 000.00 |
| ACTIVITY: Dismantling, removal and rehabilitation of unnecessary infrastructure | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Truck and heavy machinery activity | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | Speed limits will be established on the dirt road to minimise dust generation. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Site manager | Speed trapping | Sporadically | Running cost |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low | Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. | 1 | 1 | 1 | 1 | 4 | 2 | 8 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site & Environmental manager | Ensure service plans are maintained. Groundwater monitoring. | Every 6 months & Quarterly | Contractors cost & R 200,000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|---|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Inspect area for erosion and soil compaction | Monthly | Running cost |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Site & Environmental manager | Ensure service plans are maintained, Surface water monitoring & Biomonitoring | Every 6 months, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - | All intersections with main tarred roads will be clearly signposted. Drivers will be enforced to keep to set speed limits. Trucks will be in road-worthy condition with reflective strips. | 3 | 1 | 1 | 5 | 10 | 1 | 10 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - | A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from public roads. | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| SUB ACTIVITY: Removal of infrastructure | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | - | Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Visual Aspect | Altered aesthetics | Pos | 3 | 2 | 3 | 3 | 11 | 5 | 55 | N | - | - | 3 | 2 | 3 | 3 | 11 | 5 | 55 | Environmental manager | - | - | - |
| ACTIVITY: Borehole water | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Sealing and closure of boreholes as borehole water requirements cease | | | | | | | | | | | | | | | | | | | | | | | |
| Groundwater | Groundwater levels rebound | Pos | 3 | 2 | 3 | 3 | 11 | 3 | 33 | N | - | - | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Environmental manager | Groundwater monitoring | Quarterly | R 200 000.00 |
| ACTIVITY: Filling the final opencast voids | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Filling of access voids | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 2 | 1 | 9 | 5 | 45 | Y | Low | A water cart will be used to spray relevant areas when dust levels are high. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | - | Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Topography | Eradication of voids | Pos | 3 | 1 | 3 | 3 | 10 | 4 | 40 | N | - | - | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Environmental manager | - | - | - |
| Visual Aspect | Improved aesthetics through rehabilitation | Pos | 3 | 1 | 1 | 1 | 6 | 5 | 30 | N | - | - | 3 | 1 | 1 | 1 | 6 | 5 | 30 | Environmental manager | - | - | - |
| Groundwater | Potential contamination plume from mining areas | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | High | No mitigation. Ensure registered affected water users are compensated in some way, either with alternative water supply or monetary equivalent. Install monitoring boreholes and measure water levels on a | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Environmental manager | Groundwater monitoring | Quarterly | R 200 000.00 |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum | |
|--|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|---------------------------------|--------------|------------------------|--|
| | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | quarterly basis. | | | | | | | | | | | | |
| SUB ACTIVITY: Mobilisation of overburden and subsoils | | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 2 | 1 | 9 | 5 | 45 | Y | Low | A water cart will be used to spray relevant areas when dust levels are high. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Environmental manager | Dust monitoring | Monthly | As above | |
| Noise | Increased noise levels | Neg | 2 | 2 | 1 | 1 | 6 | 5 | 30 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. | 2 | 2 | 1 | 1 | 6 | 4 | 24 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 | |
| Topography | Eradication of stockpiles | Pos | 3 | 1 | 3 | 3 | 10 | 4 | 40 | N | - | | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Environmental manager | | | | |
| Visual Aspect | Improved aesthetics through removal of stockpiles | Pos | 3 | 1 | 1 | 1 | 6 | 5 | 30 | N | - | | 3 | 1 | 1 | 1 | 6 | 5 | 30 | Environmental manager | | | | |
| ACTIVITY: Roads | | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Final rehabilitation of roads no longer required | | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 2 | 1 | 9 | 5 | 45 | Y | Low | A water cart will be used to spray relevant areas when dust levels are high. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 | |
| Noise | Increased noise levels | Neg | 2 | 2 | 1 | 1 | 6 | 5 | 30 | Y | - | Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 | |
| Visual Aspect | Improved aesthetics through rehabilitation | Pos | 3 | 1 | 5 | 1 | 10 | 2 | 20 | N | - | - | 3 | 1 | 5 | 1 | 10 | 2 | 20 | Environmental manager | - | - | | |
| ACTIVITY: Rehabilitation of unnecessary water management facilities | | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Final removal of all berms, trenches and filling of PCD | | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 2 | 1 | 9 | 5 | 45 | Y | Low | A water cart will be used to spray relevant areas when dust levels are high. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 | |
| Noise | Increased noise levels | Neg | 2 | 2 | 1 | 1 | 6 | 5 | 30 | Y | - | Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 | |
| Topography | Eradication of trenches and berms | Pos | 3 | 1 | 3 | 3 | 10 | 4 | 40 | N | - | - | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Environmental manager | - | - | | |
| Visual Aspect | Improved aesthetics through rehabilitation | Pos | 3 | 1 | 5 | 1 | 10 | 2 | 20 | N | - | - | 3 | 1 | 5 | 1 | 10 | 2 | 20 | Environmental manager | - | - | | |
| SUB ACTIVITY: Mobilisation of soils for infilling of PCD | | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 2 | 1 | 9 | 5 | 45 | Y | Low | A water cart will be used to spray relevant areas when dust levels are high. | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Environmental manager | Dust monitoring | Monthly | As above | |
| Noise | Increased noise levels | Neg | 2 | 2 | 1 | 1 | 6 | 5 | 30 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. | 2 | 2 | 1 | 1 | 6 | 4 | 24 | Environmental manager | Environmental noise monitoring. | Quarterly | R 90 000.00 | |
| Topography | Eradication of stockpiles | Pos | 3 | 1 | 3 | 3 | 10 | 4 | 40 | N | - | | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Environmental manager | | | | |
| Visual Aspect | Improved aesthetics through removal of stockpiles | Pos | 3 | 1 | 1 | 1 | 6 | 5 | 30 | N | - | | 3 | 1 | 1 | 1 | 6 | 5 | 30 | Environmental manager | | | | |
| ACTIVITY: Final surface rehabilitation of all disturbed areas | | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Truck activity and operation of machinery | | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | A water cart will be used to spray relevant areas when dust levels are high. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Environmental manager | Dust monitoring | Monthly | R 140 000.00 | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod | Speed limits will be established on the dirt road to minimise dust generation. | 1 | 1 | 1 | 1 | 4 | 3 | 12 | Site manager | Speed trapping | Sporadically | Running cost | |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|---|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|---|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|------------------------------|--|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low | Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. | 1 | 1 | 1 | 1 | 4 | 2 | 8 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site & Environmental manager | Ensure service plans are maintained. Groundwater monitoring. | Every 6 months & Quarterly | Contractors cost & R 200,000.00 |
| Noise | Increased noise levels | Neg | 3 | 2 | 1 | 1 | 7 | 4 | 28 | Y | - | Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible. Point sources will be enclosed where possible. Screens will be considered if I&AP complaints are received. | 2 | 1 | 1 | 1 | 5 | 3 | 15 | Site manager | Environmental noise monitoring. | Quarterly | R 90 000.00 |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Inspect area for erosion and soil compaction | Monthly | Running cost |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Site manager | Ensure service plans are maintained | Every 6 months | Contractors cost |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod | Truck, machinery and equipment will be regularly serviced to reduce risk of leaks. Any leakages should be reported and treated as per the emergency response plan. For large spills Hazmat will be called in. Communications network will be established to ensure incidences are reported immediately. | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Site & Environmental manager | Ensure service plans are maintained, Surface water monitoring & Biomonitoring | Every 6 months, Monthly & Every 6 months | Contractors cost & R 180,000.00 & R80,000.00 |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - | All intersections with main tarred roads will be clearly signposted. Drivers will be enforced to keep to set speed limits. Trucks will be in road-worthy condition with reflective strips. | 3 | 1 | 1 | 5 | 10 | 1 | 10 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - | A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from public roads. | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Site manager | Inspect intersections and roads | Monthly | Running cost |
| SUB ACTIVITY: Ripping/discing of all levelled or compacted areas where required | | | | | | | | | | | | | | | | | | | | | | | |
| Fauna | Reintroduction of flora to the area | Pos | 1 | 1 | 2 | 3 | 7 | 2 | 14 | N | - | | 1 | 1 | 2 | 3 | 7 | 2 | 14 | Environmental manager | Monitor vegetation cover | Monthly | Rehab cost |
| Flora | Reintroduction of vegetation in rehabilitated areas | Pos | 3 | 1 | 2 | 1 | 7 | 4 | 28 | Y | - | Rehabilitate disturbed areas with natural indigenous flora. Monitor for cover abundance. | 3 | 1 | 2 | 1 | 7 | 4 | 28 | Environmental manager | Floral surveys need to be conducted to monitor cover abundance, plant succession and community structure | Annually | R 120 000.00 |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|--|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|--|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Soils | Soils replaced and ameliorated | Pos | 3 | 1 | 2 | 3 | 9 | 4 | 36 | Y | - | Ensure soils are replaced to an adequate depth and ensure soil quality is adequate. | 3 | 1 | 2 | 3 | 9 | 4 | 36 | Environmental manager | Soil survey and soil quality and depth monitoring | Annually | R 45 000.00 |
| Surface water and Wetlands | Revegetation of areas mined out reduces risk of silt loading on downstream water bodies | Pos | 2 | 2 | 2 | 3 | 9 | 2 | 18 | Y | - | Monitor area for erosion and pooling and rehabilitate if necessary. Continue with Surface water monitoring. | 2 | 2 | 2 | 3 | 9 | 2 | 18 | Environmental manager | Inspect area for erosion and pooling. Surface water monitoring & Biomonitoring | After rainfall, monthly & Every 6 months | Rehab cost & R 180,000.00 & R80,000.00 |
| Topography | Re-contouring of area for free surface water drainage | Pos | 2 | 1 | 2 | 3 | 8 | 4 | 32 | Y | - | Monitor, especially after first heavy rain falls to ensure adequate surface water drainage. | 2 | 1 | 2 | 3 | 8 | 4 | 32 | Environmental manager | Inspect area for erosion and pooling. | After rain. | Running cost |
| Visual Aspect | Improved aesthetics through rehabilitation | Pos | 2 | 1 | 2 | 3 | 8 | 4 | 32 | N | - | | 2 | 1 | 2 | 3 | 8 | 4 | 32 | Environmental manager | | | |
| SUB ACTIVITY: Reprofiting of all disturbed areas | | | | | | | | | | | | | | | | | | | | | | | |
| Topography | Re-contouring of area for free surface water drainage | Pos | 2 | 1 | 3 | 3 | 9 | 4 | 36 | Y | - | Monitor, especially after first heavy rain falls to ensure adequate surface water drainage. | 2 | 1 | 3 | 3 | 9 | 4 | 36 | Environmental manager | Inspect area for erosion and pooling. | After rain. | Running cost |
| Surface water | Free drainage restored to area | pos | 3 | 2 | 3 | 3 | 11 | 5 | 55 | Y | - | Monitor area for erosion and pooling and rehabilitate if necessary. Continue with Surface water monitoring. | 3 | 2 | 3 | 3 | 11 | 5 | 55 | Environmental manager | Inspect area for erosion and pooling. Surface water monitoring & Biomonitoring | After rainfall, monthly & Every 6 months | Rehab cost & R 180,000.00 & R80,000.00 |
| Surface water and Wetlands | Large areas of surface water runoff return to catchment | pos | 4 | 2 | 3 | 3 | 12 | 5 | 60 | Y | - | Monitor area for erosion and pooling and rehabilitate if necessary. Continue with Surface water monitoring. | 4 | 2 | 3 | 3 | 12 | 5 | 60 | Environmental manager | Inspect area for erosion and pooling. Surface water monitoring. | After rain & monthly | Rehab cost & As above |
| Surface water and Wetlands | Reduced risk of contaminated water entering wetland areas and impairing ecological function. | pos | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | - | Monitor area for erosion and pooling and rehabilitate if necessary. Continue with Surface water monitoring. | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Environmental manager | Inspect area for erosion and pooling. Surface water monitoring & Biomonitoring | After rainfall, monthly & Every 6 months | Rehab cost & R 180,000.00 & R80,000.00 |
| SUB ACTIVITY: Application of topsoil | | | | | | | | | | | | | | | | | | | | | | | |
| Soils | Initial increased potential for loss of soil and soil erosion | Neg | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Y | Low | Re-vegetate any bare soil immediately. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Inspect area for soil erosion | Monthly | Running cost |
| Soils | Soils replaced and ameliorated | Pos | 3 | 1 | 3 | 3 | 10 | 5 | 50 | Y | - | Ensure soils are replaced to an adequate depth and ensure soil quality is adequate. | 3 | 1 | 3 | 3 | 10 | 5 | 50 | Environmental manager | Soil survey and soil quality and depth monitoring | Annually | R 45 000.00 |
| Surface water and Wetlands | Potential for silt loading of surrounding surface water bodies | Neg | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Y | Low | Ensure water management facilities are operating adequately until such time that these get rehabilitated to prevent silt loading of surrounding areas. | 2 | 2 | 3 | 3 | 10 | 1 | 10 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R 180,000.00 & R80,000.00 |
| SUB ACTIVITY: Amelioration of topsoil | | | | | | | | | | | | | | | | | | | | | | | |
| Flora | Create adequate environment for flora to establish | Pos | 4 | 2 | 3 | 3 | 12 | 5 | 60 | N | - | | 4 | 2 | 3 | 3 | 12 | 5 | 60 | Environmental manager | | | |
| Soils | Soils replaced and ameliorated | Pos | 3 | 1 | 3 | 3 | 10 | 5 | 50 | Y | - | Ensure soils are replaced to an adequate depth and ensure soil quality is adequate. | 3 | 1 | 3 | 3 | 10 | 5 | 50 | Environmental manager | Soil survey and soil quality and depth monitoring | Annually | R 45 000.00 |
| SUB ACTIVITY: Construction of contour berms (where necessary) | | | | | | | | | | | | | | | | | | | | | | | |
| Soils | Potential for loss of soil and soil erosion reduced | Pos | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Y | - | Re-vegetate any bare soil immediately. | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Environmental manager | Inspect area for soil erosion | Monthly | Running cost |
| Surface water and Wetlands | Surface water runoff drainage controlled and erosion and associated silt loading of water reduced. | Pos | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Y | - | Inspect area for erosion and attend to problem areas immediately. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R 180,000.00 & R80,000.00 |

| Impacted Aspect | Impact | Positive / Negative / Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|---|--------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|--|-------------------------------------|---------------------------|
| | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Establishment of artificial wetlands (if deemed necessary for water flowing into the natural drainage lines) | | | | | | | | | | | | | | | | | | | | | | | |
| Surface water and Wetlands | Surface water runoff drainage captured and treated through artificial wetlands before entering natural drainage lines and tributaries | Pos | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Y | - | Ensure water stays within artificial wetlands long enough to adequately treat water quality. Continue with surface water monitoring. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Surface water monitoring & Biomonitoring | Monthly & Every 6 months | R 180,000.00 & R80,000.00 |
| SUB ACTIVITY: Seeding all rehabilitated areas | | | | | | | | | | | | | | | | | | | | | | | |
| Fauna | New habitat available to fauna in the area and reduced activity should result in influx of animals to the area | Pos | 2 | 2 | 3 | 3 | 10 | 2 | 20 | N | - | Conduct annual surveys to monitor faunal biodiversity. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Flora | Area re-vegetated with indigenous plants | Pos | 3 | 1 | 2 | 3 | 9 | 4 | 36 | Y | - | Rehabilitate disturbed areas with natural indigenous flora. Monitor for cover abundance. | 3 | 1 | 2 | 3 | 9 | 4 | 36 | Environmental manager | Floral surveys need to be conducted to monitor cover abundance, plant succession and community structure | Annually | As above |
| Flora | Alien invasive encroachment | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | Mod | Eradicate and control all alien invasive species on site. Rehabilitate and revegetate all areas where alien invasive species were removed. | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Environmental manager | Establish alien invasive monitoring programme | Every 6 months depending on species | Running cost |
| ACTIVITY: Waste generation | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Waste generation | | | | | | | | | | | | | | | | | | | | | | | |
| Fauna | Potential harm through littering | Neg | 4 | 2 | 1 | 3 | 10 | 3 | 30 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Groundwater | Potential contamination through littering | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 1 | 1 | 1 | 5 | 2 | 10 | Environmental manager | Inspect area for illegal littering and dumping | Monthly | Running cost |
| Soils | Potential contamination through littering | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Inspect area for illegal littering and dumping | Monthly | Running cost |
| Surface water and Wetlands | Potential contamination through littering | Neg | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 2 | 1 | 1 | 6 | 1 | 6 | Environmental manager | Inspect area for illegal littering and dumping | Monthly | Running cost |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Degree of irreplaceable loss of resource | Mitigation | Affect (severe/ beneficial) | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE (post mitigation) | Responsible person | Monitoring & inspection | Frequency | Estimated cost / annum |
|---|--|------------------------------------|-----------------------------|--------|----------|---------------|-------------|-------------|--------------|------------|--|--|-----------------------------|--------|----------|---------------|-------------|-------------|--------------------------------|-----------------------|--|-------------------------------------|------------------------|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Visual Aspect | Loss of aesthetics | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low | Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality. | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Environmental manager | Inspect area for illegal littering and dumping | Monthly | Running cost |
| ACTIVITY: General activities | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: General activities | | | | | | | | | | | | | | | | | | | | | | | |
| Flora | Alien invasive encroachment | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | High | Eradicate and control all alien invasive species on site. Rehabilitate and revegetate all areas where alien invasive species were removed. | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Environmental manager | Establish alien invasive monitoring programme | Every 6 months depending on species | Running cost |
| Fauna | Alienation of animals from the area | Neg | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Y | Low | Inform staff, contractors and visitors to not harm fauna in the area. | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Groundwater | Irresponsible use of water will impact on groundwater quantity | Neg | 3 | 2 | 2 | 1 | 8 | 2 | 16 | Y | Low | Saving water initiatives will be included in environmental awareness training. | 2 | 2 | 2 | 1 | 7 | 2 | 14 | Environmental manager | Inspect all potable water works for leaks | Weekly | Running cost |
| Groundwater | Rebound of water levels | Pos | 3 | 3 | 5 | 3 | 14 | 4 | 56 | N | - | - | 3 | 3 | 5 | 3 | 14 | 4 | 56 | Environmental manager | Groundwater monitoring | Quarterly | R 200 000.00 |
| Groundwater | Flow of contaminated groundwater away from mine into neighbouring areas and potential for decant | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | High | | 5 | 2 | 5 | 5 | 17 | 5 | 85 | Environmental manager | Groundwater monitoring | Quarterly | R 200 000.00 |
| Social | Steady reduction in employment | Neg | 4 | 2 | 3 | 1 | 10 | 5 | 50 | Y | High | SLP retrenchment plan and training should be followed. Employ staff at other operations if feasible. | 3 | 2 | 3 | 1 | 9 | 4 | 36 | Environmental manager | Ensure retrenchment is in line with SLP initiatives | As required | Running cost |
| CLOSURE AND POST CLOSURE PHASES | | | | | | | | | | | | | | | | | | | | | | | |
| ACTIVITY: Managing and monitoring for all post mining impacts to prevent any further pollution | | | | | | | | | | | | | | | | | | | | | | | |
| SUB ACTIVITY: Monitoring and addressing problem areas | | | | | | | | | | | | | | | | | | | | | | | |
| Air quality | | | | | | | | | | | | | | | | | | | | Environmental manager | Dust monitoring | Monthly | R 140 000.00 |
| Fauna | | | | | | | | | | | | | | | | | | | | Environmental manager | Monitor any ecologically sensitive species should they be observed on site | As and when required | Running cost |
| Flora | | | | | | | | | | | | | | | | | | | | Environmental manager | Floral surveys need to be conducted to monitor cover abundance, plant succession and community structure | Annually | R 120 000.00 |
| Groundwater | | | | | | | | | | | | | | | | | | | | Environmental manager | Groundwater monitoring | Quarterly | R 200 000.00 |
| Surface water | | | | | | | | | | | | | | | | | | | | Environmental manager | Surface water monitoring | Monthly | R 180 000.00 |
| Topography | | | | | | | | | | | | | | | | | | | | Environmental manager | Surface elevation surveying | Annually | Running cost |
| Wetlands | | | | | | | | | | | | | | | | | | | | Environmental manager | Biomonitoring | Every 6 months | R 80 000.00 |

10 CUMULATIVE IMPACT ASSESSMENT

10.1 Topography

Mining, stock farming, and town development activities associated with Middleburg are the main activities in the immediate area and the topography has already been impacted through these activities. The cumulative effect of the temporary stockpiling of soils, overburden and coal and of the opencast voids and will be minimal and is of low significance. The main reasons are that the stockpiles and the opencast mining voids will be temporary in nature and the topography will be largely restored after mining. The impact is negative, site specific, definite, of short term duration and of low significance.

10.2 Geology

The removal of the coal reserves results in a reduction of the overall coal resources. The cumulative effect is of moderate to high significance, as coal reserves in South Africa are diminishing and are non-renewable. The impact is negative, national, definite, permanent and of moderate to high significance.

10.3 Soils and Land Capability

The opencast mining activities will impact on both the soils and the land capability. Opencast mining impacts soil structure and soil chemical properties. Mining, stock farming, and town development activities associated with Middleburg and limited ploughing of lands for crops have impacted on the soil in the greater area. Soils have therefore been impacted on in the area and in some opencast and surface mining areas the soil profile has been completely altered. The cumulative impacts on soils in the area are therefore moderate to high. The impact is negative, local, definite, of medium term duration and of moderate to high significance.

Soils which are correctly stripped and stockpiled and then re-applied and ameliorated correctly in rehabilitated areas can result in lands that can be utilised for grazing. The cumulative effect on land capability is moderate to low due to the fact that rehabilitation can restore the land to grazing allowing for continued stock farming on the lands post mining. The impact is negative, local, definite, of medium term duration and of moderate to low significance.

10.4 Surface Water

10.4.1 Surface water quantity

The mine will make use of recycled water as far as possible with make-up water coming from MTC for dust suppression if needed. The main impact on surface water quantity will be the loss of water from the catchment due to confinement of the dirty footprint area. Other plants and mines in the area should all have dirty footprint areas

managed as contained systems. As the number of these in the area increases, the surface water runoff into the affected catchments will decrease proportionally, decreasing water quantity to other users. Due to the currently small area affected the cumulative effect on surface water quantity is of moderate to low significance. The impact is negative, regional, highly probable, of medium term duration and of moderate to low significance.

10.4.2 Surface water quality

The mining will impact on surface water quality, but all water within the dirty water footprint will be diverted to and contained in the pollution control dam. Contamination of water quality to the surrounding areas will therefore be minimal. Many other activities in the area including other mining activities, power generation, town development and agriculture all impact on water quality and therefore any contribution to surface water contamination will result in cumulative impacts. The impact is negative, regional, probable, of short to medium term duration and of moderate significance.

10.5 Groundwater

10.5.1 Groundwater quantity

The proposed mining operation will utilise minimal groundwater, limited to abstraction of water from boreholes for potable use. Groundwater infiltrating the mine workings will be pumped out and diverted to in-pit sumps, which will impact on groundwater quantity in the area as a draw-down cone develops around the mining area. Other mining activities and domestic use in the area contribute to reductions and alteration in groundwater flow and the cumulative impact on groundwater quantity is of moderate. The impact is negative, local, highly probable, of medium term duration and of moderate significance.

10.5.2 Groundwater quality

The proposed mining operation will impact on groundwater quality, as contaminated water may ingress into the surrounding groundwater post mining. The water falling within the dirty footprint will be diverted to the pollution control dam. The areas will be contoured to ensure adequate surface water flow and reduce ingress of contaminated water and therefore the impact is to some extent mitigated. Many other activities in the area including mining activities, town development and agriculture, all contribute to impacts on groundwater quality and therefore any contribution to groundwater contamination will result in cumulative impacts of moderate to high significance. The impact is negative, local to regional, highly probable, of long term duration and of moderate to high significance.

10.6 Air Quality

Many activities in the area including other mining activities, power generation, town development and agriculture contribute to atmospheric pollution in the area. Coal mining contributes predominantly to elevated dust levels. Without adequate dust suppression on site the cumulative effect on dust levels will increase with increased mining activities in the area. Good dust suppression management practices should keep dust levels low and very localised. The impact is negative, local, definite, of short term duration and of moderate to low significance.

10.7 Noise

Many activities in the area including mining activities, power generation, town development and agriculture contribute to the increase in ambient noise levels. Due to the high mining activities and road traffic in the area in general, the cumulative impacts regarding noise can be considered to be of low significance. The impact is negative, local, definite, of short term duration and of low significance. Any blasting will cause nuisance noise and local residents must be alerted to blasting times.

10.8 Vegetation and Fauna

The grassland Biome is one of the least preserved and most impacted biomes in South Africa. The grassland area coincides with much of the coal fields and prime agricultural land in South Africa and has therefore been highly impacted on by various activities. The opencast and surface mining activities, town development, and to a limited extent, agriculture have in the past impacted on the flora. The cumulative impact is of moderate significance. The impact is negative, local, definite, of long term duration and of moderate significance.

Impacts to flora will result in impacts on the fauna dependent on that flora for food and shelter and therefore the impacts extend to fauna. The cumulative impacts on fauna are of moderate to low significance; however it must be stressed that more sensitive or specialist species will be more affected than less sensitive or generalist species. The impact is negative, local, highly probable, of medium term duration and of moderate significance.

10.9 Site of Archaeological and Cultural Interest

Past studies have indicated that the sites within the area are limited to historical sites associated with farming and mining. Many activities in the area including other mining activities, power generation, town development and agriculture contribute to loss of cultural and archaeological sites. Therefore the cumulative impact on sites of archaeological and cultural interest will be of moderate to high significance. Should the presence of grave sites be confirmed then the cumulative impact will be of high significance as these sites would have to be moved. The impact is negative, site specific, possible, permanent and of moderate to high significance.

10.10 Visual aspects

Many activities in the area including mining activities, power generation, town development and limited agriculture contribute to alteration of the visual aesthetics of the area. The proposed mining operation within the disturbed landscape will impact minimally on the overall aesthetics of the area. The cumulative impact is negative, local, definite of short term duration and of low significance.

10.11 Traffic and Safety

The roads in the area are handling more and more traffic as mining and power plants are constructed and becoming operational. The proposed operation will result in increased traffic on the roads, but only for the brief period of construction and decommissioning when goods and infrastructure are brought to and taken from site. This will result in traffic and safety issues to other road users and increase the risk of road degradation. The cumulative impact on traffic and safety is negative, local, definite, of short term duration and of moderate to low significance.

10.12 Regional Socio- Economic structure

The high unemployment and the high multiplier effect in the region means that the financial input of the proposed mining operation has a huge, positive impact on the socio-economic aspect of the area. This will be through direct employment of staff and contractors and indirectly through the use of suppliers. This will feed through to other sectors and other people in the area through the multiplier effect. With the implementation of the SLP, there will also be a direct positive impact on communities in the area with regards to infrastructure, training and small businesses. The cumulative impact is positive, regional, highly probable, of short to medium term duration and of moderate to high significance.

11 SCOPE OF WORK FOR EIA

All specialist studies will be conducted to certain levels of confidence, and in all instances known methodologies will be used and confidence levels will generally be high. This means that the pre-mining environmental description in the EIA/EMP will be accurate at high certainty levels, but there will always exist a low probability that some issues have not been identified during the studies. Such situations cannot be avoided simply due to the nature of field work and have therefore not been further discussed. Furthermore, statistical analyses and mathematical models are merely tools which assist the researcher in assessing field observations and have innate assumptions which can reduce objectivity of the results obtained. This is not seen as a major flaw but should always be considered when assessing results.

The following specialist studies will be completed for the EIA/EMP phase:

- Hydrological (Ground and Surface Water);
- Pedological (Soils);
- Fauna and Flora;
- Phase 1 Heritage Assessment;
- Wetland Delineation;
- Aquatic Assessment;
- Noise; and
- Air Quality.

11.1 Public Participation Process

Current and future PPP has been discussed under the PPP section (chapter 8). A full NEMA PPP process will be followed.

11.2 Impact assessment and Management of Impacts

The impact assessment for the EIA report will be conducted as above. Any impacts identified through the PPP process and through specialists studies will be included within the assessment table. This table will be utilised as the basis for the management plan and monitoring and action plan which will be elaborated in the EIA/EMP phase of the report.

12 CONCLUSION

Studies have been conducted to determine the baseline status of the current environment and broadly assess potential impacts which the proposed mining operation may have on the surrounding environment. This scoping report details current general knowledge of the area and specifies the studies which will be undertaken as part of the EIA/EMP process.

Additional feedback obtained through the PPP process and the specialist investigations will provide a better understanding of the pre-mining environment and therefore allow for better quantification of impacts that may be associated with the proposed opencast mine. This will allow for a more specific management plan to be compiled for the proposed opencast development on the farm Rietfontein.

13 REFERENCES

Ground water Consulting (GCS) (2008). SHANDUKA COAL (Pty) Ltd: AMENDMENT TO MIDDELBURG TOWNLANDS COLLIERY – EMP: ENVIRONMENTAL SCOPING REPORT. October 2008. Report number 00024/000/001/08-214.

Ground water Consulting (GCS) (2002). SHANDUKA COAL (Pty) Ltd: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT: MIDDELBURG TOWNLANDS COLLIERY. July 2002. Report number 2001-12-382.

Appendix A: Cabanga Concepts Company Profile and EAP CV

Appendix B: Public Participation Process Report and Related Documents