CABANGA concepts
We plant the seed!

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



# SHANDUKA COAL (PTY) LTD

## GRASPAN EXTENSION: PORTION 31 OPENCAST MINING

## DRAFT SCOPING REPORT FOR REVIEW

***For the Proposed Mining of the Northern Part of the Remaining Extent of Portion 31 of the Farm Elandspruit 291 JS***

***NEMA Ref.: 17/2/3N-327***

***MP 30/5/1/2/2/10089 MR***

***April 2014***

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# 1 INTRODUCTION

Shanduka Coal (Pty) Ltd (Shanduka) has submitted a mining right application in terms of the Minerals and Petroleum Resources Development Act (No. 18 of 2002) (MPRDA) for the remaining extent of portion 31 of the farm Elandspruit 291 JS (here forth referred to as Graspan RE 31 or the mining area) which was accepted by the DMR on the 9th December 2013. The MPRDA process will require the submission of a scoping report followed by an Environmental Impact Assessment and Environmental Management Plan Report (EIA/EMP Report).

Construction activities that will be required to commence mining on Graspan RE 31 will trigger a series of scheduled activities under the various regulations of the National Environmental Management Act (no. 107 of 1998 – NEMA). Shanduka submitted an application with the Department of Environment, Tourism and Economic Development (DEDET, Mpumalanga) on the 20 November 2013 which has since been accepted (Reference Number 17/2/3N-327). As part of the initial phase of the application process under NEMA, a scoping report must be compiled (this report), which will also be followed by an EIA/EMP Report. The final EIA/EMP will be compiled to satisfy both the MPRDA and NEMA requirements.

This document forms the scoping report which has been compiled in accordance with Section 28 of Regulation 543 of NEMA. 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 MPRDA and also NEMA in order for Shanduka to obtain an environmental authorisation for its mining licence over portion 31 of Elandspruit 291 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 Report, Environmental Impact Assessment (EIA) and Environmental Management Programme (EMP) Report have been completed for the proposed operation. Furthermore, this process must include a Public Participation Process (PPP). The scoping report template provided by the DMR has been completed and submitted to the DMR on the 10 April 2014.

## 2.2 The National Environmental Management Act

In addition to the MPRDA, NEMA sets out the requirements for the environmental assessment of a range of activities, including mining. Although the Department of Mineral Resources (DMR) remains the primary decision making authority for the environmental authorisation for mines under the MPRDA, some of the mining-related activities will trigger NEMA scheduled activities, which require that a full scoping and EIA process be followed under NEMA. Table 1 indicates the requirements for the scoping phase of NEMA process.

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

**Table 1: Requirements for the scoping phase of NEMA**

| Legal and Regulatory Requirement: | Cross Reference: |
|---|---|
| **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 - | See section: |
| a. Details of - | 4.2 |
| i. The EAP who prepared the report | 4.2 & Appendix A |
| ii. The expertise of the EAP to carry out scoping procedures | 4.2 & Appendix A |
| b. A description of the proposed activity and of any feasible and reasonable alternatives that have been identified | 5 & 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 |
| 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 |

| Legal and Regulatory Requirement: | Cross Reference: |
|---|---|
| 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 | 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 & 11 |
| iii. A description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity | 7 & 11 |
| 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 | Noted |
| (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 | Table 2 & Table 16 Section 5 |



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

| Regulation | Activity | Description |
|---|---|---|
| R.544, 2010 | 12 | The construction of pollution control dams and associated water management features for the management of dirty and clean water on site– with a combined capacity of 50,000m3 or more. |
| R.544, 2010 | 22 | The construction of access and haul roads. |
| R.544, 2010 | 24 | The change of land use from agriculture to mining. |
| R.544, 2010 | 26 | The relocation of rare / endangered species (dependant on the outcome of the specialist studies). Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004. |

| Regulation | Activity | Description |
|---|---|---|
| R.544, 2010 | 47 | Existing farm roads will be widened and lengthened where necessary, so as to be utilised as haul / access roads. |
| R.545, 2010 | 5 | The construction of dirty water management facilities (Pollution Control Dams) which require a water use license in terms of the National Water Act, 1998. |
| R.545, 2010 | 10(i) | The construction of facilities or infrastructure for the transfer of 50 000 cubic metres or more water per day, from and to or between water catchments. The site lies on a watershed and water transfer between the two adjacent quaternary catchment is a possibilty, although volumes will still need to be confirmed at this stage. |
| R.545, 2010 | 17 | The transformation of undeveloped land to that of mining. The property falls within the urban edge of Middelburg. |
| R.546, 2010 | 4 | The construction of haul / access roads within an area identified in terms of R546. To be confirmed by the MDEDET. |
| R.546, 2010 | 12 | The clearance of vegetation within an area identified in terms of R546. To be confirmed by the MDEDET. |
| R.546, 2010 | 13 | The clearance of vegetation within an area identified in terms of R546. To be confirmed by the MDEDET. |
| R.546, 2010 | 14 | The clearance of indigenous vegetation within an area identified in terms of R546. To be confirmed by the MDEDET. |
| R.546, 2010 | 19 | Existing farm roads will be widened and lengthened where necessary within an area identified in termsofR546, so as to be utilised as haul / access roads. To be confirmed by the MDEDET. |



## 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. Where necessary the relevant exemptions will be applied for regarding GN704 which governs water use and management related to mining.

## 2.4 Atmospheric Regulations

### *2.4.1 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). No air emissions license applications will be required as all coal stockpiles will remain within the mining boundary and will be temporary in nature and are therefore excluded from the scheduled activities listed under the Air Quality Act.

### *2.4.2 Air Quality Regulations*

A four-band scale is used in the evaluation of dust fall (Table 3). Target, alert and action levels are indicated in Table 4. 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. These guidelines will apply on site. Surrounding areas can be considered as rural and mining, but findings will be discussed in terms of residential and industrial limits.

**Table 3: 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 4: 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. |

### *2.4.3 Noise Regulations*

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 5 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 6). For the purpose of the study, areas are classified as “Rural Districts”.

**Table 5: Typical rating levels for ambient noise in districts (extracted from the SANS cop 10103:2003)**

| Type of District | 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, business premises & 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 |

**Daytime – 06:00 to 22:00; Night-time – 22:00 to 06:00**

**Table 6: 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 |

## 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 Phase I assessment has been done in accordance with Section 38 of the National Heritage Resources Act, No. 25 of 1999 and will 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. Non-mine-related waste is expected to be below the stipulated thresholds and no further licensing is expected under this act. The relevant applications under this Act will be made by Shanduka 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, a desktop study and visual site assessment. Where specialist studies have been completed for the scoping phase, these have been detailed below.

## 3.2 Project Description and Alternatives

The scoping report includes a detailed project description, much of which will remain unchanged for the EIA/EMP due to the nature and position of the coal seams. Alternative sites and project alternatives have therefore not been discussed in great detail as the location is delimited by coal reserves and the type of mining that will be conducted (opencast mining) is determined by the depth of the coal seam. Therefore alternatives regarding these have not been elaborated further.

Where feasible project alternatives do exist, then these have been elaborated on in the relevant section.

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 is discussed under Section 11 and is the same process used for scoping and EIA and EMP report. Impact ratings in the EIA/EMP may change once specialist studies are completed.

## 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 and the MPRDA refers to NEMA regarding PPP required. The detailed PPP has been reported further under Section 8, where all PPP conducted to date and all future proposed PPP has been reported on.

## 3.5 Submission of Information

In accordance to NEMA, an application was submitted to DEDT in November 2013. Following which this application was accepted and a reference number issued. This scoping report forms the first phase of the environmental documentation required by DEDET.

In accordance with the MPRDA the applicant has thus far submitted a mining right application (including a mine works programme and Social and Labour Plan (S&LP)). This was accepted by the DMR on the 9$^{TH}$ December 013.

The DMR has requested that copies of the scoping report be submitted and that the EIA/EMP be completed by the 8th May 2014. The documents relevant under NEMA will also be submitted to DEDET around the same time if timeframes allow for this to ensure dual authorisation is obtained for the proposed mining.

# 4 APPLICANT, EAP AND PROPERTY DETAILS

## 4.1 Details of Applicant and Mineral Rights Holder

| | |
|---|---|
| *Name of Company:* | Shanduka Coal (Pty) Ltd |
| *Name of Mine:* | Graspan Colliery: RE 31 Opencast Mine |
| *Property:* | Elandspruit 291 JS portion 31 |
| *Postal Address:* | Postnet Suite MW113, Private Bag X 1838, Middelburg, 1050 |
| *Telephone:* | +27 (0) 13 244 8000 |
| *Fax Number:* | +27 (0) 86 666 5548 |
| *Responsible Persons:* | Sunil Mungaroo (Group Environmental Manager) |
| *E-mail:* | 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:* | Barbara Kasl (PhD, Pr.Sci.Nat) |
| *E-mail:* | info@cabangaconcepts.co.za<br>barbs@cabangaconcepts.co.za |

A summary CV and company profile has been included in

Appendix A.

## 4.3 Owner of the Land

Table 7 shows the surface right ownership. A subsidiary of Corobrik owns the property and Corobrik hold the Mining Right for clay on the property. Shanduka will strip and stockpile the clay for Corobrik's use during their excavations to extract coal.

**Table 7: Surface Right Ownership**

| Description | Area (ha) | Title deed number | Surface owner | Contact Details: |
|---|---|---|---|---|
| Elandspruit 291 JS Remaining Extent of Portion 31 | 268.9148 | T000001272/2009 | Lexshell 731 Inv (Pty) Ltd (owned by Corobrik)<br>Contact Person: Sam Mabizela | (013) 243 9310<br>083 441 3006<br>sam.mabizela@corobrik.co.za<br>P.O.Box 710, Middelburg, 1050 |

## 4.4 Location of Site

### *4.4.1 Regional setting (Plan 1)*

The proposed site is around 8km west of the town of Middelburg, on the western border (contiguous) of the Graspan Colliery which is also owned and operated by Shanduka.

### *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 8 shows the nearest towns and distances and direction to these towns.

**Table 8: Distances and directions to neighbouring towns**

| Town | Distance | Direction |
|---|---|---|
| Middleburg | 8 km | East |
| Witbank | 19 km | South west |
| Hendrina | 53 km | South east |
| Bethal | 74 km | South |
| Belfast | 66 km | East |

### *4.4.4 Local setting (Plan 2)*

The project area falls within the Olifants River catchment, primarily within the B11J quaternary catchment, with the north eastern corner of the property lying within quaternary catchment B12E.

### *4.4.5 Land Tenure and use of immediately adjacent land*

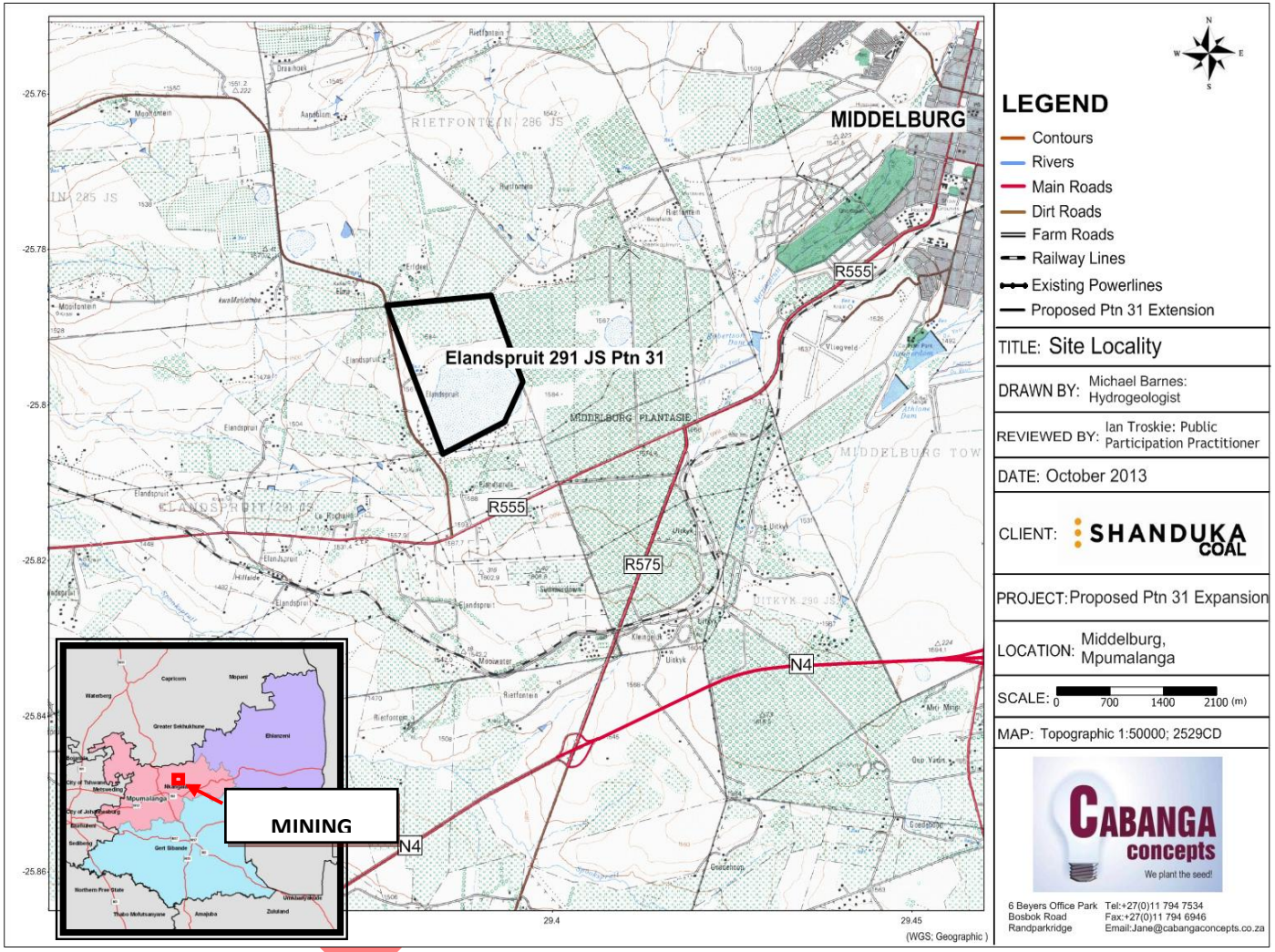
The project site appears to be old agricultural croplands currently used for grazing. The southern extent of the property is dominated by the Elandspruit Pan and associated wetlands. The western and southern areas are also utilised for agriculture and grasslands for grazing with some farm residences. To the east of, and immediately adjacent to, the property is the Graspan Colliery. Other land uses around the proposed site include wattle plantations, clay mining, brick making, rural residential areas and the urban and industrial activities of the town of Middelburg.

### *4.4.6 Surface infrastructure and servitudes*

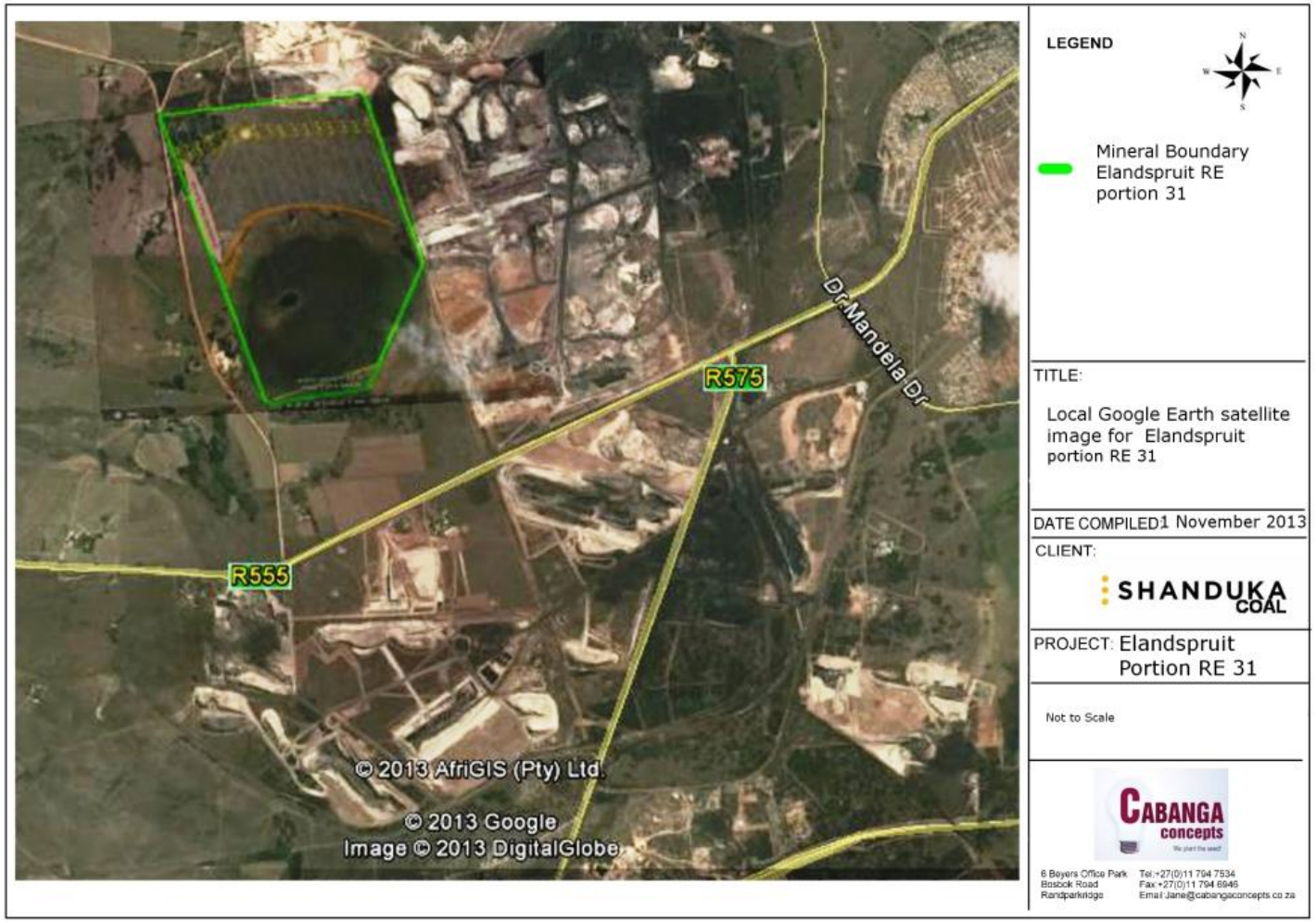
The site is adjacent to Graspan Colliery, north of the R555 connecting Witbank and Middleburg. The general area is also accessed by the N4 and R575. A railway line runs further south of the R555. Overhead power lines traverse the southern extent of the property, south of the Elandspruit Pan. Servitudes are associated with the above mentioned rail and power lines. Plan 1 indicates these servitudes in relation to the proposed property.

There are no structures or infrastructure on the property other than heritage sites (graves and an old farm building) and overhead powerlines discussed later in the report. There are some nearby and neighbouring dirt roads. These will not be affected by the proposed activity.

Other infrastructure further from the study site include various gas, water and power generation servitudes and infrastructure and the residential and industrial developments within the town of Middleburg.




**Plan 1: Regional and local setting**




**Plan 2: Local setting Google Earth Image**

# 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 3.

The existing Graspan Colliery, neighbouring the proposed mining area, is an operational coal mine near the town of Middleburg, Mpumalanga owned and operated by Shanduka. It has an approved mining right (MP 30/5/1/2/2/347 MR) over the following properties for the mining of coal and clay:

- Remaining Extent of Portion1 of the farm Rietfontein 286 JS; and
- Remaining Extent of Portion 27 of the farm Middelburg Town and Townlands 287 JS.

The current reserves at Graspan Colliery have a remaining life of mine of approximately 20 months. Thus, Shanduka Coal is applying for a new mining right for the adjacent coal reserves situated on the Remaining Extent of Portion 31 (RE 31) of the farm Elandspruit 291 JS (for which they hold a prospecting right). Corobrik is the landowner of the property in question. In addition, it must be noted that Corobrik hold the rights to mine the clay over the same portion (portion RE 31).

A natural pan (known as the Elandspruit Pan) occurs within the property, however, no mining will occur within the pan and buffer zones will be implemented around this pan. A topsoil berm will be constructed to demarcate this buffer zone as indicated in Plan 3.

The total area to be affected by the proposed opencast mining, which will be restricted to the northern parts of the property, is approximately 125 ha.

The surface disturbance related to opencast mining will trigger scheduled NEMA activities. The following activities are relevant:

- R.544, Listing 24: The change of land use from agriculture to mining.
- R.544, Listing 26: The relocation of rare / endangered species (dependant on the outcome of the specialist studies). Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004.
- R.545, Listing 17: The transformation of undeveloped land to that of mining. The property falls within the urban edge of Middelburg.
- R.546, Listing 12: The clearance of vegetation within an area identified in terms of R546. To be confirmed by the MDEDET.
- R.546, Listing 13: The clearance of vegetation within an area identified in terms of R546. To be confirmed by the MDEDET.
- R.546, Listing 14: The clearance of indigenous vegetation within an area identified in terms of R546. To be confirmed by the MDEDET.

## 5.1 Coal Extraction

The mineral being mined is coal from the No. 4 lower (4L), No. 2 lower (2L) and No. 1 seams. The clay will also be removed and stockpiled for Corobrik's use.

Mining will be conducted by means of rollover opencast, truck and shovel method. The mine will be operated from east to west as indicated in Plan 3. The site will be accessed as part of the roll-over operations from Graspan Colliery opencast immediately east of the proposed site and steady-state mining should be obtained for the large part from the onset. Overburden stockpiles may still be created on the western boundary for infilling of the final void. The general procedure will be as follows:

- Remove maximum topsoil and either place directly on levelled and compacted spoil from previous mine cuts (steady-state operation) or place on a topsoil stockpile, as close to the final void as possible (applicable to initial mining cuts).
- Remove soft overburden with excavator and trucks. Place directly on hard overburden in previous mine cuts (steady-state operation) or place onto soft overburden stockpile, as close to the final void as possible (applicable to initial mining cuts).
- Drill and blast the remaining overburden and remove all overburden with an excavator and truck operation to expose the coal. Place directly into previous mine cuts (steady-state operation) or place onto overburden stockpile, as close to the final void as possible (applicable to initial mining cuts).
- Remove and stockpile clay for Corobrik where this is present (3 seams are interspersed with the overburden).
- Exposed coal is drilled and blasted only when necessary and then temporarily stockpiled within the pit for transport by truck to the existing Graspan processing facilities. It is expected that most of the coal can be excavated without blasting (free digging) which should be prioritised as this will assist in the reduction of fine coal dust emission and noise and vibration associated with blasting.
- Bullet 3 to Bullet 5 is repeated to access the next seam down (No. 2L) and then again for the final seam (No.1).

The *in situ* tonnes for No. 4L is 1 867 712 tonnes, for No. 2L is 9 799 535 tonnes, and for Seam 1 is 5 168 767 tonnes, totalling 16 836 014 tonnes of coal reserves targeted for extraction with 15 408 704 tonnes mineable (after various geological and mining losses).

With removal of 3 seams of clay and the removal of three seams of coal, the bulking factor of material placed in the pits post-mining will not be sufficient to attain original pre-mining topography. The detailed rehabilitation model will need to take cognisance of this and the final shape of the area must allow for proper drainage of the area.


**Plan 3: Local Setting with the mining area and proposed mine plan indicated**

## 5.2 Coal Conveyance and Processing

No processing will take place on site. The temporarily stockpiled ROM coal will be transported directly to the existing Graspan Colliery's plant on 30 ton trucks. Here the coal will be crushed, screened and washed. The final product will be loaded onto 30 ton trucks and transported by road to the designated Eskom power station/siding.

Coarse discard and slurry will be disposed of on the existing facilities at Graspan Colliery.

## 5.3 Planned Life of Mine

The additional reserves gained through Elandspruit portion RE 31 will extend the life of mine of Graspan Colliery by approximately 3 years, excluding the closure phase.

## 5.4 Labour Force

Labour force will remain largely unaltered and existing staff and contractors from the Graspan Colliery will be utilized at the proposed mine site. The mine will result in the continued employment of staff for the life of mine.

## 5.5 Associated Infrastructure and Services

Infrastructure to be constructed on site will be limited to that of water management facilities, access / haul roads and material stockpiles and the essential supporting infrastructure such as light masts and portable toilet facilities.

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 the existing bulk storage facilities at Graspan Colliery. No additional supply and storage areas will be constructed at the proposed mine site.

Drill rods and drill bits will be used to drill the hard overburden above the coal seam. The biggest consumable during the mining operation will be the explosives required to break the hard overburden. Explosives will be obtained from the existing Graspan Colliery and no additional magazine will be constructed for the proposed mining operation.

Administration facilities, change houses, workshops and weighbridge at the current Graspan Colliery will be utilised and thus no additional facilities will be required on portion RE 31.

### *5.5.1 Material stockpiles*

The main material stockpiles are indicated in Plan 3. A topsoil berm will be constructed to demarcate the buffer zone around the Elandspruit Pan as illustrated in Plan 3. The overburden stockpile will be placed on the western boundary where it will be used to fill the final void. Temporary coal stockpiles will be created in the pits for transport to Graspan Colliery.

The stockpiling of coal and possibly overburden will require 21(g) water use licences in terms of the NWA and will trigger scheduled NEMA activities. The following activity is relevant:

- R.545, Listing 5: The construction of dirty water management facilities (Pollution Control Dams) which require a water use license in terms of the National Water Act, 1998.

### *5.5.2 Haul and access roads*

The mine will construct haul and access roads to link Graspan Portion 31 with the existing Graspan Colliery. The positions of the roads will be finalised following the specialist studies that will be conducted as part of the EIA process. It is most likely that the main access roads will be constructed along the northern boundary to enable stockpiling of coal to the north for Corobrik and a haul road through the centre of mining with access and ramps required to access the active cut areas moving along as the successive cuts are mined.

The construction and expansion of roads will trigger scheduled NEMA activities. The following activities are relevant

- R.544, Listing 22: The construction of access and haul roads.
- R.544, Listing 26: The relocation of rare / endangered species (dependant on the outcome of the specialist studies). Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004.

- R.544, Listing 47: Existing farm roads will be widened and lengthened where necessary, so as to be utilised as haul / access roads.
- R.546, Listing 4: The construction of haul / access roads within an area identified in terms of R546. To be confirmed by the MDEDET.
- R.546, Listing 19: Existing farm roads will be widened and lengthened where necessary within an area identified in termsofR546, so as to be utilised as haul / access roads. To be confirmed by the MDEDET.

### *5.5.3 Sumps, pumps and PCD*

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 in-pit sumps and a lined pollution control dam (PCD).

The sumps and PCD will trigger scheduled NEMA activities. The following activities may be relevant:

- R.544, Listing 12: The construction of pollution control dams and associated water management features for the management of dirty and clean water on site– with a combined capacity of 50,000m3 or more.
- R.545, Listing 5: The construction of dirty water management facilities (Pollution Control Dams) which require a water use license in terms of the National Water Act, 1998.
- R.545, Listing 10(i): The construction of facilities or infrastructure for the transfer of 50 000 m3 or more water per day, from and to or between water catchments.

### *5.5.4 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.

### *5.5.5 Lighting*

Light masts will be erected at various locations to provide lighting at times of poor visibility and during the night as the mine will be in operation 24 hours a day. Lights will be powered by diesel gensets.

### *5.5.6 Ablution facilities*

Portable toilets will be erected on site and will be serviced and maintained by a contractor.

### *5.5.7 Security and access*

The site will be fenced off and will be patrolled on a 24hr basis. Access to site will be via the existing Graspan Colliery.

## 5.6 Water Management and Handling

### *5.6.1 Storm water management*

A hydraulically designed and ecologically sensitive storm water management system will be established on site prior to any other construction activities taking place. The Elandspruit Pan will form the focus point for protection and the storm water management measures will be designed to ensure that no water from the active footprint will runoff or seep into this pan and associated wetland areas. All storm water drainage infrastructure and containment facilities will accommodate at least a 1:50 year, 24hr storm event as required by legislation and should in this case be over-designed to ensure protection of the pan.

Dirty and clean water on site will be separated by means of diversion berms and trenches that divert clean water back into the surrounding environment.

The pollution control dam will receive dirty water runoff from site. The mine pit will have an in-pit sump to contain dewatered mine water. Pumps and pipelines will be established between the pit and PCD to allow for water transfer between these two facilities as need be.

Dirty water collected in PCD and in-pit sumps will be reused for on-site dust suppression along the haul roads and around the mining area. It will also be utilized for any mining requirements such as drilling for blasting.

Water handling and management on site will trigger scheduled NEMA activities. The following activities may be relevant:

- R.544, Listing 12: The construction of pollution control dams and associated water management features for the management of dirty and clean water on site– with a combined capacity of 50,000m3 or more.
- R.545, Listing 5: The construction of dirty water management facilities (Pollution Control Dams) which require a water use license in terms of the National Water Act, 1998.

### *5.6.2 Potable water supply*

Potable water is supplied to the Graspan Colliery by the local municipality.

### *5.6.3 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 Graspan Colliery as and when needed. Any water requirements which may be needed for drilling or other on-site activities will be sourced from the water within in-pit sumps.

## 5.7 Gaseous, Solid Waste & Liquid Effluent

### *5.7.1 Solid Waste Management Facilities*

All domestic, industrial and hazardous waste will be collected in clearly demarcated bins on site and removed to the Graspan facilities for removal by reputable contractors for disposal at the respective licensed disposal facilities.

The discard material from the Graspan wash plant will be disposed of as per the approved Graspan Colliery EMP.

### *5.7.2 Liquid Effluent Management*

Other than small volumes of waste hydrocarbons, no other liquid effluent is expected on site. Used hydrocarbons will be collected in drums on site and removed to Graspan Colliery's hydrocarbon waste stream. Where possible, hydrocarbons are returned to the suppliers for recycling purposes.

The slurry material from the wash plant at Graspan Colliery will be disposed of into a dedicated slurry dam as per the approved Graspan Colliery EMP.

Portable toilets will be erected on site and will be serviced and maintained by a contractor.

**Table 9: Waste management plan**

| Waste type | Waste treatment |
|---|---|
| **CONSTRUCTION** | |
| Construction waste | Will be removed from site by contractors. |
| Domestic waste | Is expected to be minimal but will be locally collected in bins and transferred to skips at Graspan Colliery for disposal at the municipal waste site.<br>Recycling will be done as far as possible with regards to paper, glass, tins/cans, plastics, batteries and inflorescent lights. |
| Hydrocarbon waste | These will be collected in drums and stored within the bunded area at Graspan Colliery. The waste will be collected and removed from site by a reputable contractor. |
| **OPERATIONS** | |
| Domestic and office waste | Is expected to be minimal but will be locally collected in bins and transferred to skips at Graspan Colliery for disposal at the municipal waste site.<br>Recycling will be done as far as possible with regards to paper, glass, tins/cans, plastics, batteries and inflorescent lights. |
| Hydrocarbon waste | These will be collected in drums and stored within the bunded area at Graspan Colliery. The waste will be collected and removed from site by a reputable contractor. |
| Old tyres | These will be collected and temporarily stored at Graspan Colliery in an allotted area in the scrap yard for recycling by a reputable contractor. |
| Scrap metal | These will be collected and temporarily stored at Graspan Colliery in an allotted 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 at Graspan Colliery in an allocated area in the scrap yard for recycling by a reputable contractor. |
| **DECOMMISSIONING AND CLOSURE** | |
| Building | All building rubble will be removed from site and disposed of by the contractor. Where the |

| Waste type | Waste treatment |
|---|---|
| rubble | material is safe to use for filling of final voids, then this will be done. |
| Domestic waste | Is expected to be minimal but will be locally collected in bins and transferred to skips at Graspan Colliery for disposal at the municipal waste site.<br>Recycling will be done as far as possible with regards to paper, glass, tins/cans, plastics, batteries and inflorescent lights. |
| Hydrocarbon waste | These will be collected in drums and stored within the bunded area at Graspan Colliery. The waste will be collected and removed from site by a reputable contractor. |

### *5.7.3 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 DEAT. Being within the Witbank Priority Air Quality Area, stricter standards and fewer exceedance frequencies will be allowed.

## 5.8 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:

**Table 10: Mine phases and associated activities, including NEMA activities**

| Activity | Sub-activity |
|---|---|
| **PLANNING AND DESIGN PHASE** | |
| Site visits | Vehicle and foot traffic on site |
| Geohydrological Assessment | Drill rig delivery to site and set up for drilling in the area |
| | Drilling activities within the pan to determine groundwater connectivity to the pan |
| **CONSTRUCTION PHASE** | |
| Site preparation | Truck and heavy machinery operation |
| | Removal of herbaceous material with soil stripping |
| | Topsoil Stockpiling or placement into soil berms |
| Construction of water management features and PCD<br>NEMA R.544 Listing 12; R.545 Listing 5 & Listing 10; R.546 Listing 14 | Berm and channel construction |
| | PCD Construction |
| Upgrade & construction of roads<br>NEMA R.544 Listing 22 & Listing 47; R.546 Listing 4, Listing 14 & Listing 19 | Levelling and compacting of roads |
| Preparation of material stockpile area | Levelling and compacting of areas for stockpiles |

| Activity | Sub-activity |
|---|---|
| NEMA R.544 Listing 24; R.545 Listing 5 & Listing 17; R.546 Listing 14 | |
| Construction and utilisation of portable toilets | Installation of portable toilets |
| | Utilisation of portable toilets |
| Waste generation | Domestic and industrial waste generation |
| General activities<br>NEMA R.544 Listing 24 & Listing 26; R.545 Listing 17; R.546 Listing 12, Listing 13 & Listing 14 | Overall construction and development of site |
| **OPERATION PHASE** | |
| Operation water management facilities<br>NEMA R.544 Listing 12; R.545 Listing 5 & Listing 10; R.546 Listing 14 | Operation of berms and trenches |
| | Operation of PCD |
| Utilisation of roads | Truck and heavy machinery operation |
| | Coal Transportation |
| Utilisation of portable toilets | Utilisation of portable toilets |
| Opencast mining through rollover mining<br>NEMA R.544 Listing 24; R.545 Listing 17; R.546 Listing 14 | Removal of subsoil and stockpiling (initial mine cuts) or mobilizing to mine cuts filled with hard and soft overburden |
| | Subsoil stockpiling |
| | Removal of soft overburden and stockpiling (initial mine cuts) or mobilizing to previously mined cuts filled with hards |
| | Soft overburden stockpiling |
| | Blasting |
| | Removal of overburden and stockpiling (initial mine cuts) or mobilizing to previously mined cuts |
| | Hard overburden stockpiling |
| | Successive removal of clay layers and stockpiling clay for Corobrik |
| | Mining and temporary in-pit stockpiling of coal |
| Construction of in-pit infrastructure<br>NEMA R.545 Listing 5 & Listing 10 | Construction and installation of sump and pump |
| | Pumping of in-pit water |
| Rehabilitation from roll-over mining | Truck activity and operation of machinery |
| | Backfilling and reprofiling of all disturbed areas |
| | Application of topsoil |
| | Amelioration of topsoil |
| | Construction of contour berms (where necessary) |
| | Seeding all rehabilitated areas |
| Clay handling | Clay stockpiling and handling |
| Raw coal handling | Coal stockpiling and handling |
| Operation of floodlights | Operation of floodlights |

| Activity | Sub-activity |
|---|---|
| Waste generation | Waste generation |
| Overall mining activities at the site<br>NEMA R.544 Listing 24 & Listing 26; R.545 Listing 17; R.546 Listing 12, Listing 13 & Listing 14 | Mobilisation of vehicles and contractors to and from site |
| **DECOMMISSIONING PHASE** | |
| Removal of portable toilets | Sewage removal |
| Filling the final opencast voids | Mobilisation of overburden and subsoils |
| | Backfilling and profiling of final voids |
| Roads | Ripping/discing of all roads no longer required |
| | Application of topsoil |
| Rehabilitation of unnecessary water management facilities | Final removal of all berms |
| | Mobilisation of soils for infilling of PCD and trenches |
| Final surface rehabilitation of all disturbed areas | Truck activity and operation of machinery |
| | Removal of all carbonaceous material and cleaning all surface areas |
| | Ripping/discing of all levelled 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 |
| Overall decommissioning of site | Decommissioning and eventual closure of the site and mobilisation of vehicles and contractors on site |
| **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 and from preliminary site visits. 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). Portion 31 is situated adjacent to Graspan and near MTC collieries, in the Mpumalanga Highveld (Table 11).

**Table 11: 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 |
| **Annual** | **658.6 total** | **28.5 average** | **2.0 average** | **15.2 average** | **1494 total** |

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 12).

**Table 12: Wind speed and direction (Middelburg – South African Weather Bureau)**

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

## 6.2 Topography

Figure 1 indicates the contour lines (light brown) and approximate location of quaternary sub-catchment divides (green). Topography is gently undulating. Portion 31 is located on a hilltop, with predominant drainage in a westerly direction, with local drainage into the Elandspruit Pan in the south. The north-eastern corner of Portion 31 drains in a north-easterly direction. Average elevation is from around 1,550 m to 1,585m above mean sea level (mamsl).

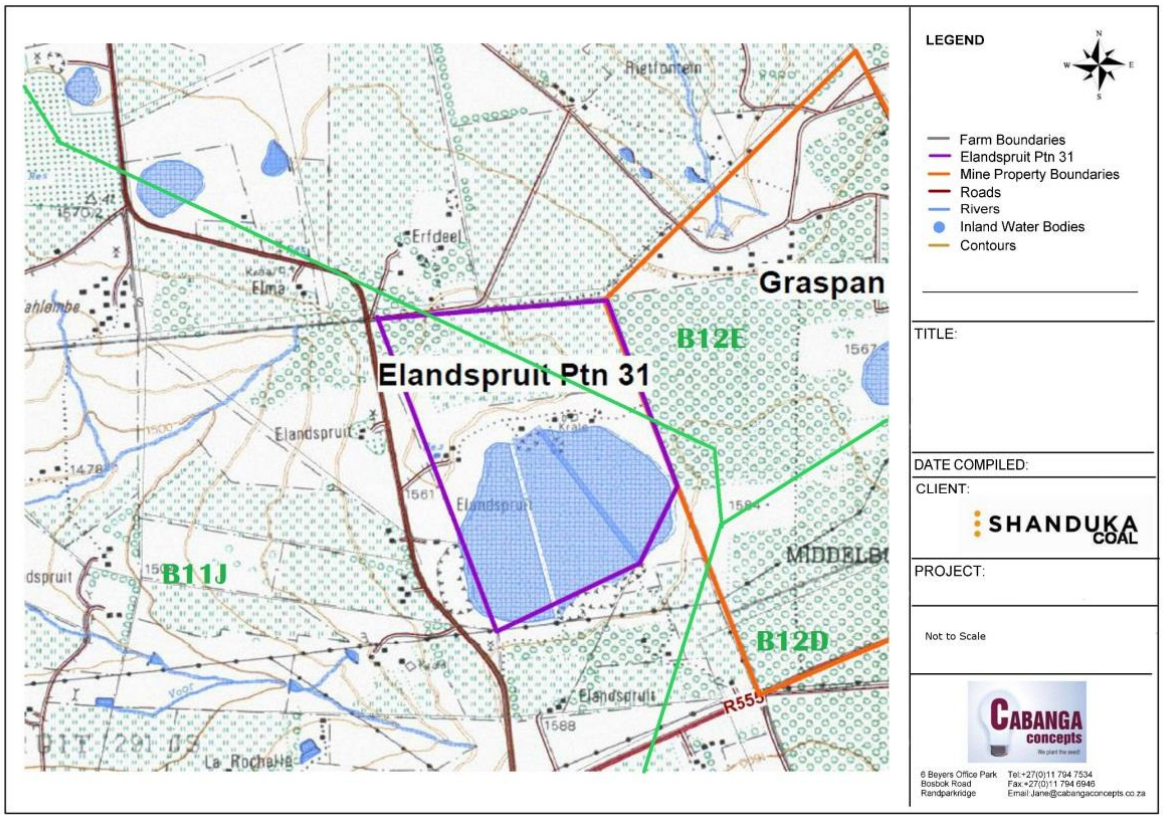



**Figure 1: Topography of the proposed site and approximate catchment divides (in green)**

## 6.3 Geology

### *6.3.1 Regional 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 predominantly 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.

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).

### *6.3.2 Local geology*

A total of 15 evenly spaced boreholes were drilled across the property to the north of the pan during prospecting. Five of the boreholes were drilled in 2011 and ten in 2012, by Shanduka Coal.

In the immediate area the Number 5 Coal Seam has been eroded while the Number 3 and Number 4 Coal Seams are present only in areas of elevated topography. The Number 1 and Number 2 Coal Seams are continuous over most of the property. Specifically, the No. 4 Seam Lower has an average thickness of 0.53m, the No. 2 Seam Lower has an average thickness of 4.78m, and No. 1 Seam an average thickness of 2.45m.

The parting thickness between the No. 2 Seam Lower and Number 1 Seam varies over the area, with a maximum thickness of 17.23m and a minimum thickness of 0.62m, with an average thickness of 7.30 m. The parting consists predominantly of sandstone, with minor mudstone layers. Figure 2 shows the general stratigraphy of one of the holes drilled in the resource area.

No dolerite was intersected in any of the boreholes drilled over the property.

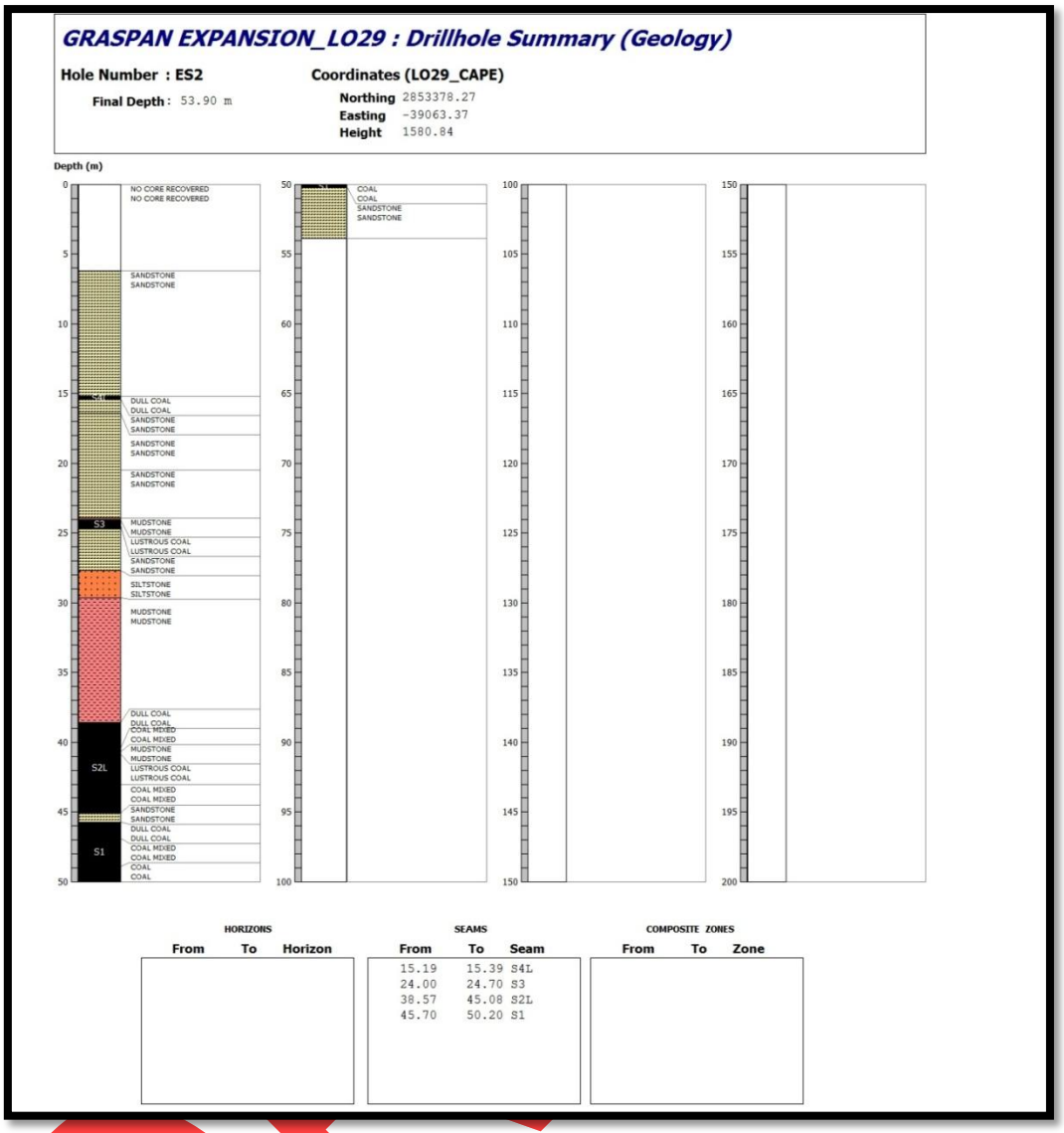



**Figure 2: Borehole log indicating local stratigraphic column**

## 6.4 Soil Assessment

The soil study was completed by Cabanga Concepts (2014a) and a full description is provided below.

### *6.4.1 Soil Forms*

Four distinct soil forms were identified namely, Dresden (Dr), Westleigh (We), Glencoe (Gc) and Katspruit (Ka). Table 13 and Figure 3Figure 3 show the soil distribution over the property. The Katspruit soil form was only augured to a depth of 1200mm and thereof the area was demarcated as the Endorheic Elandspruit pan as shown in Figure 3.

**Table 13: Soil distribution of Portion 3**

| Portion | Soil name | Soil depth | Soil Code | Area (ha) | Area (%) |
|---|---|---|---|---|---|
| Elandspruit | Dresden | 100 mm | Dr | 16.65 | 6.19 |
| | Glencoe | 900 mm | Gc | 36.95 | 13.74 |
| | Westleigh | 600 mm | We | 75.34 | 28.01 |
| | Katspruit | 900 – 1200mm | Ka | 35.58 | 13.23 |
| | Hard rock | - | R | 23.62 | 8.78 |
| | Endorheic pan | - | | 80.86 | 30.06 |
| **Total** | | | | **269.00** | **100.00** |

**Westleigh (We):** The Westleigh soil form comprises of shallow Orthic A-horizon, underlain by a soft Plinthic B horizon. In general, these soils are high in transported clay in the lower "B" horizon with highly leached topsoil's and pale denuded horizons at shallow depths.

**Glencoe (Gc):** The Glencoe soil form comprises of a shallow Orthic A-horizon, underlain by yellow apedal and hard plinthic B-horizon. The yellow-brown Apedal B horizon is relatively shallow with an underlying Hard Plinthic.

**Dresden (Dr):** The Dresden soil form comprises of a shallow Orthic A-horizon 100-150mm in depth, underlain by hard Plinthic B-horizon.

**Katspruit (Ka):** The soil is made up of an Orthic A-horizon over a diagnostic G-horizon saturated with water for long periods unless drained.

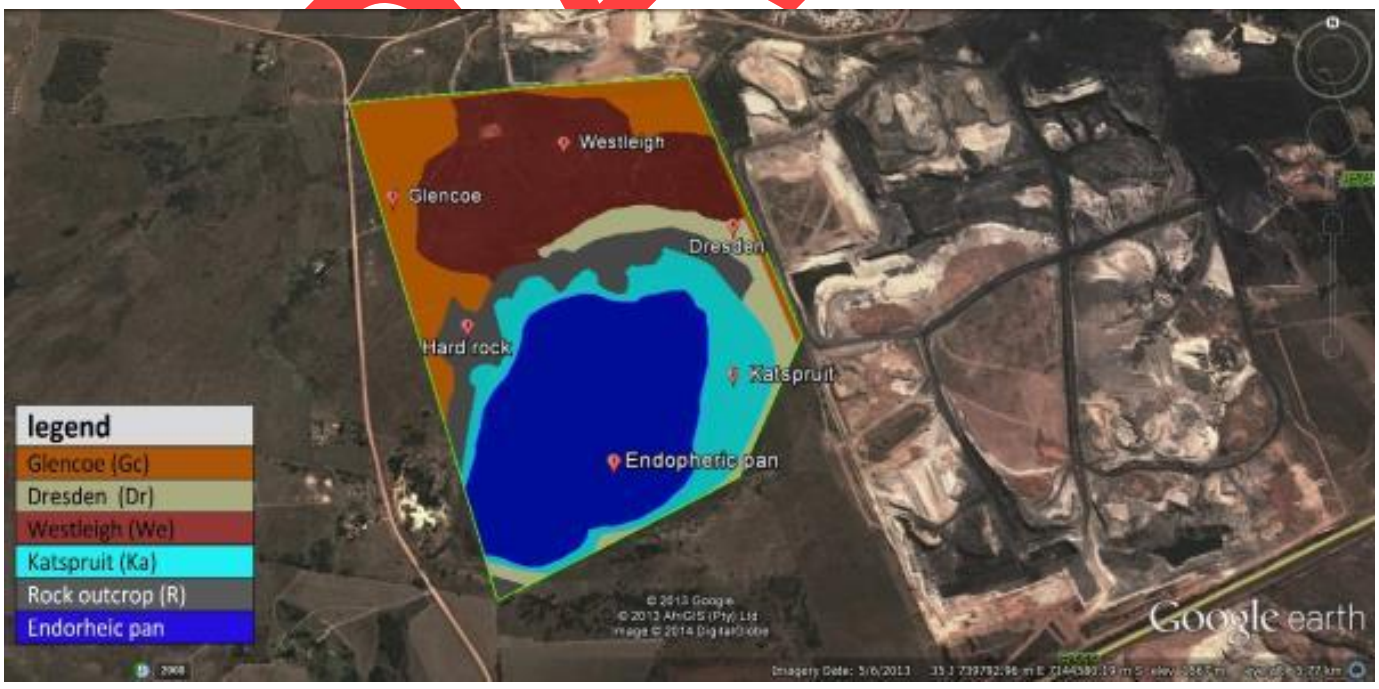



**Figure 3: Soil profile layout of Portion 31**

### *6.4.2 Soil Chemical and Physical Analysis*

Five representative soil samples were collected, and analysed for pH, phosphorus content, macro nutrients (calcium, magnesium, and potassium), clay %, organic carbon and electrical conductivity (resistance) (Table 14).

**Table 14: Soil laboratory results**

| Sample | P mg/kg | Ca mg/kg | Mg mg/kg | Na mg/kg | pH Water | R ohms | T Acid cmol(+)/kg | SA / SV % | Totals(CEC) cmol(+)/kg | Clay % | Organic C % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **G17** | 9.50 | 259 | 52.0 | 1.60 | 5.95 | 2790 | 0.00 | 0.00 | 5.65 | 14 | 0.80 |
| **G19** | 28.9 | 135 | 15.0 | 12.4 | 4.2 | 8910 | 1.36 | 60.8 | 8.26 | 18 | 2.03 |
| **G34** | 24.4 | 189 | 49.0 | 4.40 | 6.04 | 2730 | 0.00 | 0.00 | 5.15 | 12 | 0.60 |
| **G53** | 19.5 | 370 | 34.0 | 0.54 | 5.35 | 3180 | 0.21 | 8.77 | 5.25 | 14 | 1.07 |
| **G87** | 1.40 | 85.0 | 16.0 | 1.10 | 4.96 | 3030 | 0.60 | 50.5 | 3.51 | 14 | 0.99 |

#### *6.4.2.1 pH*

The soil pH is in the order of 4.2 – 6.04 with an average pH value of 5.30 indicating acidic soil conditions. The low pH also indicates that calcium is abundant in the soil solution, with low sodium ion in solution. Values of pH 5.0 to 5.5 could also indicate soluble, toxic levels of $Al^{3+}$ and $Mn^{2+}$. Acidic soils create production problems and poor crop performance and failure.

#### *6.4.2.2 Cation Exchange Capacity*

The measure of CEC is the ability of a soil to hold exchangeable cations. In general as soil acidity increases (pH decreases), more $H^{+}$ ions are attached to the colloids and push other cations from the colloids into the soil solution (CEC decreases). The average CEC for samples G17, G34 & G53 F is 5.36. The high CEC value of 8.26 measured for G19 is attributed to the high clay and organic matter. The higher the clay and organic matter, the greater the negative charges that can hold and release positively charged nutrients. The low CEC in sample G87 is as a result of sandy soil with little organic matter. Generally a sandy soil with little organic matter will have a very low CEC.

#### *6.4.2.3 Percentage Clay %*

The average clay content is 14.4 %. The higher clay content at G19 - 18% clay - is due to the transportation of clay material due to the slopping topography.

#### *6.4.2.4 Percentage (%) organic matter*

The organic matter content of the soils is at best described as low, with values ranging from 0.6% – 2.03%. “Normal” productive soils have an organic matter content of above 2 %.

#### *6.4.2.5 Soil Texture*

Soils differ in their susceptibility to erosion (erodibility) based on texture. Table 15 shows a transition from loamy sandy to sandy loamy within the planned opencast area. The loamy sandy soils are typically the Glencoe and Westleigh soil form with average clay content. The Dresden soil form constituted the sandy loamy texture class.

**Table 15: Soil textural classes**

| Sample | Soil texture |
|---|---|
| G1 | Loamy sandy |
| G2 | Loamy sandy |
| G3 | Loamy sandy |
| G4 | Loamy sandy |
| G5 | Sandy loamy |

#### *6.4.2.6 Soil erodibility*

The soil analytical data in Table 14 and the soil erodibility nomograph of Wischmeier, Johnson and Cross (1971) were used to calculate the minimum erosion slope of the four identified topsoil's.

The broad-based erodibility of the different forms is tabulated in the Table 16. The Glencoe soil form mapped can be classified as having a low - moderate erodibility index. This is largely ascribed to the moderate clay content of the "A" horizons. The low organic matter in the Westleigh and Dresden soil forms gave yield to the moderate erodibility index taking into account the sloping topography.

**Table 16: Soil erodibility index**

| Soil Form | Erodibility Index |
|---|---|
| Dresden | Moderate |
| Westleigh | Moderate |
| Glencoe | Low - moderate |
| Katspruit | Low |



## 6.5 Land Capability

The land capability assessment was completed by Cabanga Concepts (2014a) and a full description is provided below.

The extent of land capability classes is shown in the pre-mining capability map Figure 4 with details provided in Table 17.

**Table 17: Pre mining land capability classes**

| Portion | Land capability class | Land capability code | Soil type | Broad Soil Description | Area (ha) | Area (%) |
|---|---|---|---|---|---|---|
| Portion 31 | Grazing | G | We | Shallow Orthic A-horizon, 100-300mm in depth underlain by a soft Plinthic B horizon. | 75.36 | 28.00 |
| | | | Dr | Shallow Orthic A-horizon, 100-150mm in depth, underlain by hard Plinthic B-horizon. | 16.64 | 6.14 |
| | | | Gc | Moderately well-drained, yellow brown, loamy sand soils underlain by hard plinthite. | 28.69 | 10.67 |
| | Wetland | We | Ka | Grey, imperfectly to poorly drained, sandy soils mainly associated with leached E-horizons and percolating water tables in temporary, seasonal and permanent wetland zones. | 110 | 40.89 |
| | Wilderness | R | - | Hard rock | 23.62 | 8.78 |
| | Wilderness | W | Gc | Moderately well-drained, yellow brown, loamy sand soils underlain by hard plinthite. | 14.69 | 5.46 |
| **Total** | | | | | **269** | **100** |


**Figure 4: Current land capability map within Portion 31**

## 6.6 Land Use

The land use assessment was completed by Cabanga Concepts (2014a) and a full description is provided below.

The localities and extents of current land uses on Portion 31 are shown in Figure 5 and are summarized in Table 18. A small section of the north-eastern section was previously a Black wattle (*Acacia Mernsii*) plantation and has since been cleared. A prospecting quarry is evident in the north-central portion of the area. The south section of Portion 31 is the occupied by the Seasonal Elandspruit Pan: Endorheic Pan with assosciated lateral seepage wetlands. Kikuyu (*Pennisetum clandestinum*) was observed at the Old farmstead, currently occupied by an illegal resident. Dirt roads run across the northern section of Portion 31. Perimeter berms have been constructed by the adjacent Graspan Colliery as well as in the northern area by Corobrik. A clean water trench runs from the northern boundary to the western boundary of the property.

**Table 18: Land uses within Portion 31**

| Legend | Area | Area % |
|---|---|---|
| Grazing | 142.63 | 53.02 |
| Prospecting quarry | 0.65 | 0.24 |
| Dirt roads | 0.71 | 0.26 |
| Water trenches | 0.34 | 0.13 |
| Old farmstead | 1.67 | 0.62 |
| Hard rock area | 23.63 | 8.78 |
| Old wattle plantation | 17.00 | 6.32 |
| Perimeter berms | 8.70 | 3.23 |
| Elandspruit pan (Endorheic pan) | 73.67 | 27.34 |
| **Total** | **269** | **100** |


**Figure 5: Current land use map within Portion 31**

## 6.7 Surface Water

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

Figure 1 indicates the contour lines (brown) and approximate location of quaternary sub-catchment divides (green). Portion 31 is located on a hilltop, near to the watershed between quaternary catchments B11J and B12E, with the bulk of the farm portion lying within the first quaternary catchment. Drainage is predominantly in a westerly direction, associated with the B11J sub-catchment, into an un-named tributary of the Spookspruit, which eventually confluences with the Olifants River further west of the site. The north-eastern corner of Portion 31 drains in a north-easterly direction.

Most of the tributaries are ephemeral and only flow during the rainy season, fed directly by rainfall and also springs through groundwater recharge in the rainy season. Dry weather flow in these streams can be considered as zero.

A pan, the Elandspruit Pan, occupies the southern extent of the. It is believed that this pan is fed directly by rain water and may also be connected to the groundwater aquifers and feed various springs in the immediate area. This will need to be confirmed by geohydrological studies. The pan and its associated wetland areas can be considered as a sensitive area.

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.

## 6.8 Groundwater

A groundwater study is underway. A regional desktop assessment is provided below.

The coal fields of the Witbank area can generally be subdivided into three main aquifers (Hodgson & Krantz, 1998 in GCS, 2008):

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 Dwyka tillite, 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.

Investigation will also be undertaken regarding the groundwater interaction with the Elandspruit Pan, which is believed to feed local springs in the area.

Groundwater use, other than that associated with mining, within the area is mainly for domestic use, watering gardens, stock watering and irrigation. This will also be further detailed during the hydrocensus.

## 6.9 Air Quality

In general, the Witbank and Middleburg area has poor air quality, especially in winter, due to the prevailing climatic conditions combined with the vast amount of industrial, mining, power generation activities, but also due to informal residential activities such as heating in winter. The area has been targeted as a priority area with regards to air quality, which is governed at the municipal level, and activities are subject to stricter control regarding air quality.

Current activities which contribute to dust in the general area are utilisation of dirt roads, mining and farming-related activities. A dust dispersion study will be conducted during the EIA and EMP phase of this application process. Past dust sampling has generally indicated that dust levels in the surrounding areas are within target thresholds (600mg/m$^2$/day residential limit). Past dispersion modelling done (Airshed, 2008) for Graspan and MTC Collieries indicate that exceeded dust levels are only likely within the mine perimeters if dust management measures are applied appropriately and should not exceed thresholds beyond mine boundaries. It is expected that with proper mitigation measures applied frequently, that

dust deposition and associated PM10 can be easily mitigated and kept localised to the area of activity.

## 6.10 Noise

The current activities which contribute to elevated noise levels in the area include traffic on the N4, R555 and R575, farming activities, residential activities near farm houses, animal noises and mining activities. Baseline noise surveys have been completed and the findings are briefly summarized below.

Figure 6 indicates the locations of noise monitoring points round the site and at sensitive receptors (SR). Table 19 shows the levels recorded at the various locations.

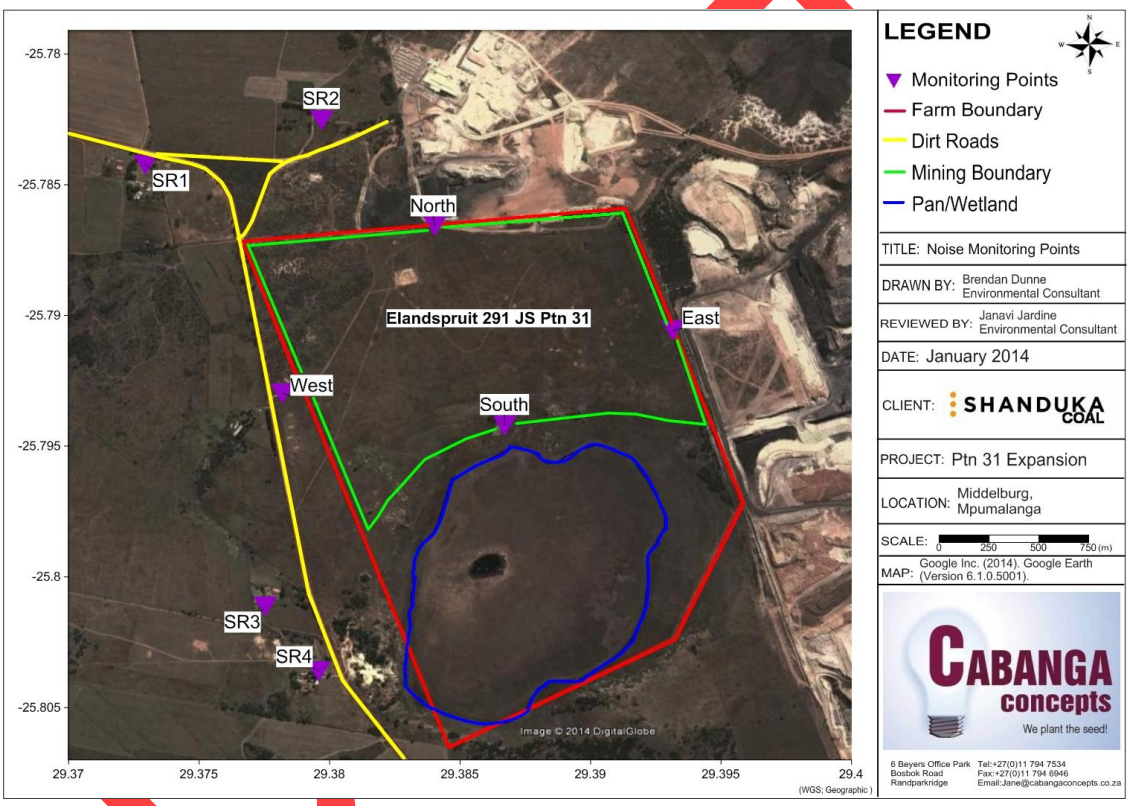



**Figure 6: Noise monitoring points and sensitive receptors identified within a 500m radius of the proposed mine boundary**

**Table 19: Average daytime noise measurements performed for the site**

| Direction of Reading/ Sample point | Position | Recorded dB (A) | | | | Excess Lr dBA potential action response | Comments |
|---|---|---|---|---|---|---|---|
| | | Limit | Leq | Max | Min | | |
| North | -25.786591° 29.384019° | 45 | 42.9 | 64.9 | 41.9 | Level recorded below acceptable limit. No Action Response Expected | Vehicles at brick factory and along roadway and animal noise (along brick factory boundary) |
| South | -25.794232° 29.386703° | 45 | 42.1 | 89.6 | 40.9 | Level recorded below acceptable limit. No Action Response Expected | Animal noise and high wind noise (natural open space) |
| East | -25.790586° 29.393168° | 45 | 47.5 | 75.7 | 43.5 | Level recorded is 2.5dB above acceptable limit. Little response category: Sporadic Complaints None expected as no sensitive receptors at this location. | Mining vehicles and activities (drilling), animal noise and high wind noise (along active mine boundary) |
| West | -25.792986° 29.378190° | 45 | 43.5 | 77.2 | 40.4 | Level recorded below acceptable limit. No Action Response Expected | Vehicles on roadway (boundary parallel to roadway) |
| SR1 | -25.784239° 29.372955° | 45 | 43.1 | 69.2 | 42.1 | Level recorded below acceptable limit. No Action Response Expected | Vehicles on roadway and animal noise |
| SR2 | -25.782536° 29.379689° | 45 | 44.7 | 68.4 | 42.7 | Level recorded below acceptable limit. No Action Response Expected | Vehicles at brick factory and along roadway and animal noise |
| SR3 | -25.801136° 29.377540° | 45 | 42.4 | 91.7 | 39.8 | Level recorded below acceptable limit. No Action Response Expected | Vehicles on roadway, animal noise and high wind noise |
| SR4 | -25.803617° 29.379598° | 45 | 40.3 | 60.9 | 38.8 | Level recorded below acceptable limit. No Action Response Expected | Vehicles on roadway and animal noise |

Despite the neighbouring active mining operations, noise levels recorded in the area were largely within the SANS limits except at the northern location along the road and adjacent to the brick making factory.

Noise levels are therefore considered acceptable.

## 6.11 Flora

The area is situated in the Grassland Biome of South Africa, specifically within the Rand Highveld Grassland. Grasslands are usually the dominant vegetation type and can consist of natural or disturbed grasslands, rocky grasslands associated with rocky areas or outcrops, and moist grasslands often associated with wetlands, dominated by hydrophilic vegetation. Grass species generally include *Aristida*, *Digitaria*, *Eragrostis*, *Themeda* and *Tristachya*. Woody species include *Acacia caffra, Celtis Africana*, *Diospyros lycioides lycioides*, *Parinari capensis*, *Protea caffra*, *Protea welwitschii* and *Rhus magalis montanum* (GCS, 2008).

From Mpumalanga Biodiversity Conservation Plans (SANBI), the pan and wetland area is classed as “important and necessary” and the northern area is listed as “no natural habitat remaining” (terrestrial categories as indicated in Figure 7). The entire farm portion falls within a sub-catchment area rated as “highly significant” with the north-eastern corner not rated (Aquatic categories as indicated in Figure 8).

Much of the site appears to be dominated by disturbed grassland and moist grassland vegetation type, with hydrophilic vegetation associated with the Elandspruit Pan. More natural grasslands are expected around the rocky outcrop area on the south-eastern boundary of the Elandspruit Pan. The status of the site will be confirmed through detailed flora and fauna assessment which will be carried out for the EIA/EMP phase.



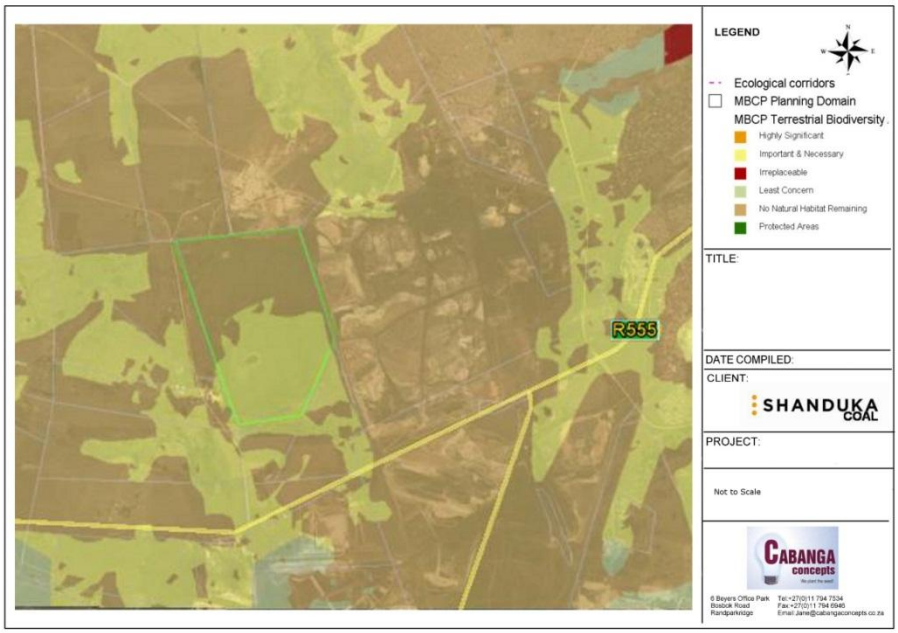



**Figure 7: Terrestrial MBCP areas (SANBI MBCP overlay on Google Earth Image)**

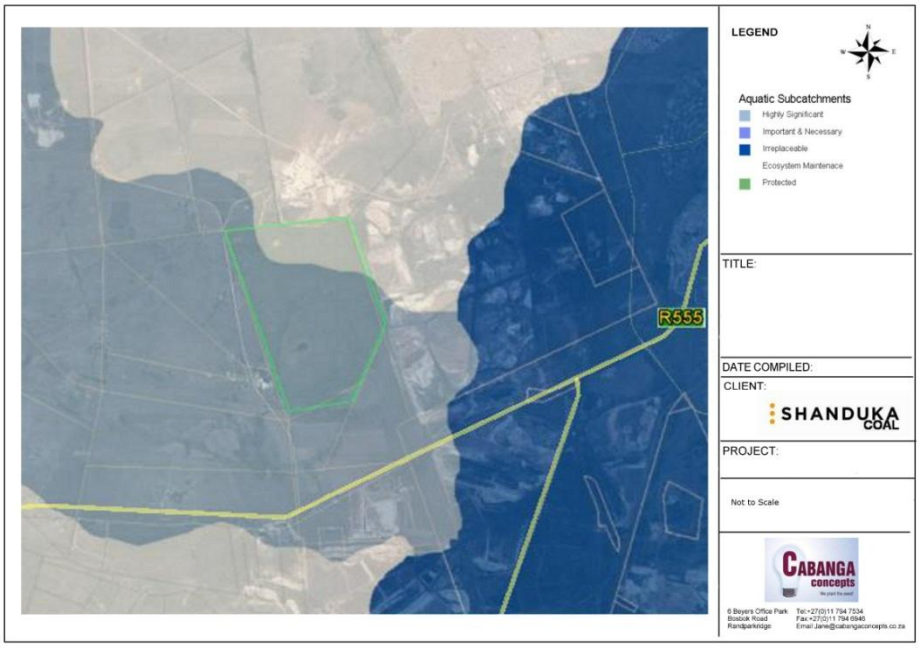



**Figure 8: Aquatic MBCP areas (SANBI MBCP overlay on Google Earth Image)**



During past surveys, *Callilepis leptophylla* (Least Concern), a species of herb, was observed in the Elandspruit Pan area. The plant was previously on the Mpumalanga Tourism and Parks Agency (MTPA) Red Data list but subsequently removed. The species remains on the National list, but as Least Concern as it is widespread and common in Mpumalanga. Numerous plants were found in rocky grassland adjacent the wetland along the eastern perimeter and adjacent to Elandspruit Pan. In addition, four species of plants that are listed as Protected in the Mpumalanga Nature Conservation Act were observed within the Elandspruit Pan area. The diversity of plants was highest in the sandstone outcrops and grasslands adjacent to Elandspruit Pan.

## 6.12 Fauna

Past surveys have indicated that only a few mammal species were present in the area. Smaller mammals or generalist and less sensitive mammals are more likely to occur on site due to the general surrounding land uses of farming and mining and associated human activity. Bird life is extensive but protected bird species known to occur in the general area, tend to be more specific in their habitat, foraging and roosting/nesting requirements and will only occur on site if the necessary habitat is available. Due to the presence of the Elandspruit Pan, wetland bird species which are associated with such habitats are likely to occur on site. Detailed faunal assessments will be carried out on site during the EIA/EMP phase.

During past surveys for the existing Graspan Colliery, three protected fauna species were recorded within the area of interest. The Giant Bullfrog (Near-Threatened) was recorded at Elandspruit Pan and adjacent seepage wetlands and is listed as a Red Data species and

protected under the Mpumalanga Nature Conservation Act (MNCA) and National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA). The Serval (Near-Threatened) was recorded on the basis of fairly fresh scats at one of the rocky outcrops adjacent Elandspruit Pan. The Oribi (Endangered), as much as the pan is not ideal habitat for Oribi.

## 6.13 Site of Archaeological and Cultural Interest (Archaetnos, 2013)

Past surveys in the area have indicated no Stone Age or Iron Age sites. Historical sites that have been observed in surrounding areas include homesteads, farming related structures and historical mining features attributed to the recent past.

A full Phase I assessment has been completed for the relevant area and summary of findings provided below. The locations of the sites identified are included in Figure 9.

Site 1 contained at least 2 graves, one with a granite border and headstone and the other a cement border and headstone. Only the one with the granite headstone has legible information. The surname of the deceased is Mtimuye and the date of death 1950. Both the grave older than 60 years and the unknown grave are treated as heritage graves. Graves are always regarded as having a high cultural significance. It should be included in the heritage register. Mitigation is required.

Site 2 is a historical farm yard consisting of an old farm house, a kraal, a silo, a dam and some outbuildings. Only the silo is in a good condition. The house is in a bad state and some of the inner walls have already collapsed. The kraal is a fairly recent addition to the site. The outbuildings can only be made out from a few piles of bricks and stone lying around. The site is regarded as having a low cultural significance. It is not very unique, but most likely older than 60 years. It should be included in the heritage register and it may therefore be demolished once a permit from the Provincial Heritage Resources Agency (PHRA) of Mpumalanga is obtained.

Site 3 contains at least 25 graves. These are all stone packed and only some have headstones, also made of stone. None of the graves have any legible information and are considered as heritage graves. Graves are always regarded as having a high cultural significance. It should be included in the heritage register. Mitigation is required.


**Figure 9: Location of heritage sites in relation to the proposed mine plan**

## 6.14 Sensitive landscapes

The NFEPA project has assessed the Elandspruit Pan as a Rank 2 FEPA wetland, which means it is critical to biodiversity aspects. Furthermore, Quaternary catchment B12E associated with the north-eastern part of Elandspruit RE31 has been classified as a Phase 2 FEPA (Figure 10). Phase 2 FEPAs are catchment areas associated with moderately modified (C) rivers. These FEPAs should not be degraded further, as they may in future be considered for rehabilitation once good condition FEPAs (in an A or B ecological category) are considered fully rehabilitated.

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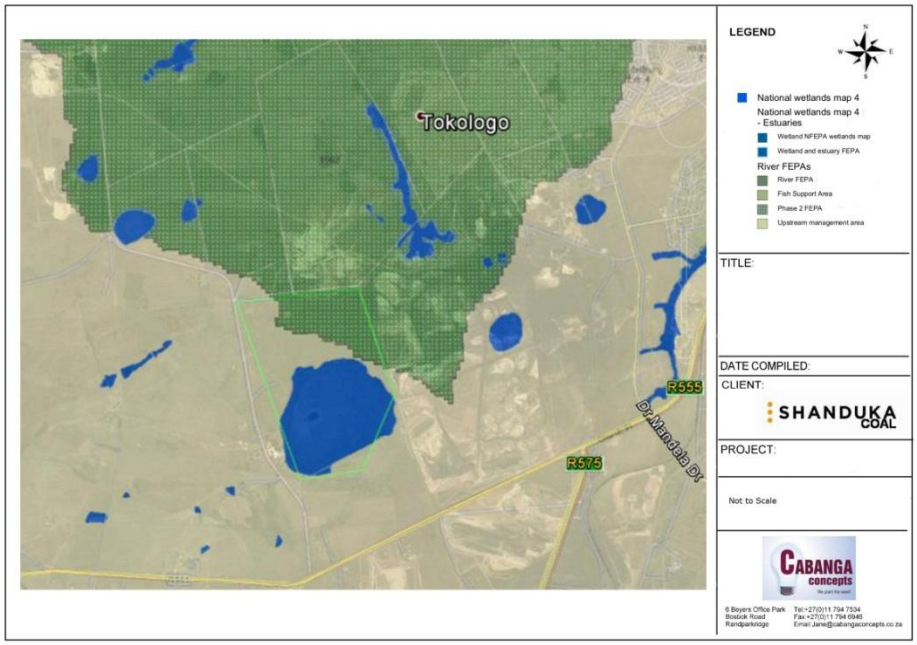


**Figure 10: FEPA areas (SANBI FEPA overlay on Google Earth Image)**



### *6.14.1 Characteristics of the Elandspruit Pan*

Elandspruit Pan is a seasonal pan that covers an area of 124 ha. A number of lateral seepage wetlands surround the pan, including one that has been invaded by a small grove of black wattle trees, and one that had been impounded. A deep trench was noted to the east of the pan, channelling storm water into the pan. It is assumed that this trench was dug by the landowner. Part of the trench was constructed within the pan's perimeter and extended through lateral seepage wetland adjacent to the pan.

According to past surveys undertaken in the area in-stream and riparian habitat integrity for the pan was classified as 'Largely Natural' (Category B), with the major impacts including grazing and trampling by cattle, nutrient enrichment from cattle and veld burning. The channelization of storm water runoff into the pan and the modification of flow as a result of the farm dam also compromised the hydrological integrity of the pan. Aquatic habitats are limited to submerged grass. The maximum depth in the pan at the time of sampling was about 10 cm.

Habitats available to aquatic invertebrates were limited to submerged and emergent grass. The invertebrates in the pan were typical of seasonal pans in the region as they included ostracods, copepods, notostracans, anostracans, conchostracans and cladocera.

### *6.14.2 Characteristics of the seepage wetland associated with Elandspruit Pan*

The site is a system of lateral seepage wetlands associated with Elandspruit Pan. Historically, water flowed from a spring through the wetland into the pan but a small farm dam now intercepts the flow. Cattle are watered at this site and the structural integrity of the wetland has been affected by excavations along the edge of the pan.

Water emerging from the spring had fairly good quality, with a low salinity (conductivity = 5mS/m) and near-neutral pH (6.6) during the 2007 surveys.

Habitat integrity was classified as 'Moderately Modified' (Category C), with the main impacts due to the farm dam which has modified the flow regime, and from channel modifications designed to facilitate water collection for livestock watering. Trampling by cattle has modified the channel bed and nutrient enrichment has resulted from the presence of cattle.

The diversity of invertebrates was fairly low and no sensitive taxa were collected. This is not entirely unexpected given the poor diversity of habitats, but water quality has clearly been impacted. The site was therefore classified as 'Moderately Modified' (Category C) for invertebrates.

No fish were expected or collected from this site.

Giant Bullfrogs were present within this wetland during the 2007 surveys. Juveniles and adults were encountered, indicating a breeding population.

### *6.14.3 Wetland Delineation*

Figure 11 indicates the wetland areas as per the 2007 delineation conducted by Nepid Consultants (2007). These delineations would be considered as the wetland boundaries and the associated buffer zones would extend a further 100m from these boundaries.

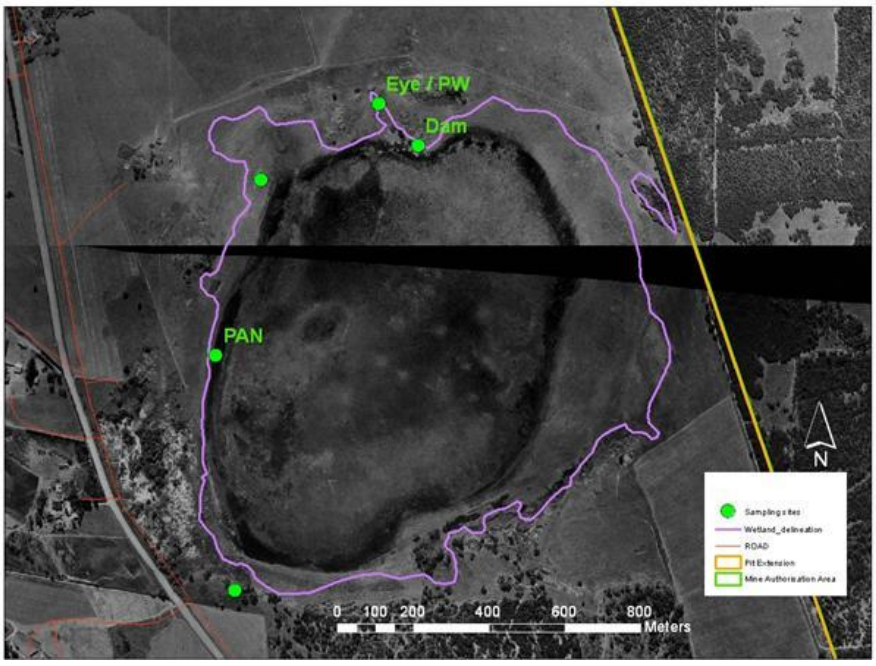


**Figure 11: Delineation of Elandspruit Pan and its associated perennial midslope seepage wetlands to the west of Graspan Mine, Middelburg (Nepid Consultant, 2007)**

## 6.15 Visual aspects

The site is surrounded by predominantly mining and agricultural areas. Due to the Elandspruit Pan on the property and associated rocky habitats, the visual properties in the area can be considered more natural and unique. A detailed visual assessment will be

carried out as part of the EIA/EMP phase which will highlight and describe the visual character of the area in more detail and elaborate on the expected visual impacts that could be associated with the proposed mining development.

## 6.16 Traffic and Safety

As the existing Graspan fleet/contractors will be utilized at this site, traffic should be minimally impacted on, and no additional traffic load is expected. Current main provincial roads include the N4 highway and R575, which will only be required briefly for transportation of goods and infrastructure as required. Haul roads will be constructed from the proposed mine to the existing Graspan wash plant and public roads will be avoided due to the proximity (immediately west and contiguous) of the proposed mine to the existing Graspan Colliery. 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 additional new populated areas will be traversed for coal haulage. Existing routes will be utilised as currently used from the Graspan Colliery to target destinations.

## 6.17 Regional Socio- Economic structure

The project area falls under the Steve Tshwete Local Municipality area, which in turn is under the jurisdiction of the Nkangala District Municipality in the Mpumalanga Province. The information below was obtained from the Social and Labour Plan (S&LP).

### *6.17.1 Population demographics*

The population in the 2001 census was estimated at 142 770, with current population estimated at 147 000. The majority of this population lives in Middelburg (17%) and Mhluzi (41%). At the time of the census 80% was African, 16% White. Around 32% spoke isiZulu, 18% Ndebele and 17% Afrikaans. Figure 12 shows that most (67%) of the population is within the “economically active” age group with gender distribution being fairly similar. However many are unemployed. Of the formally employed population (<50% within the 15-65 age group), most were employed within quarrying and mining.

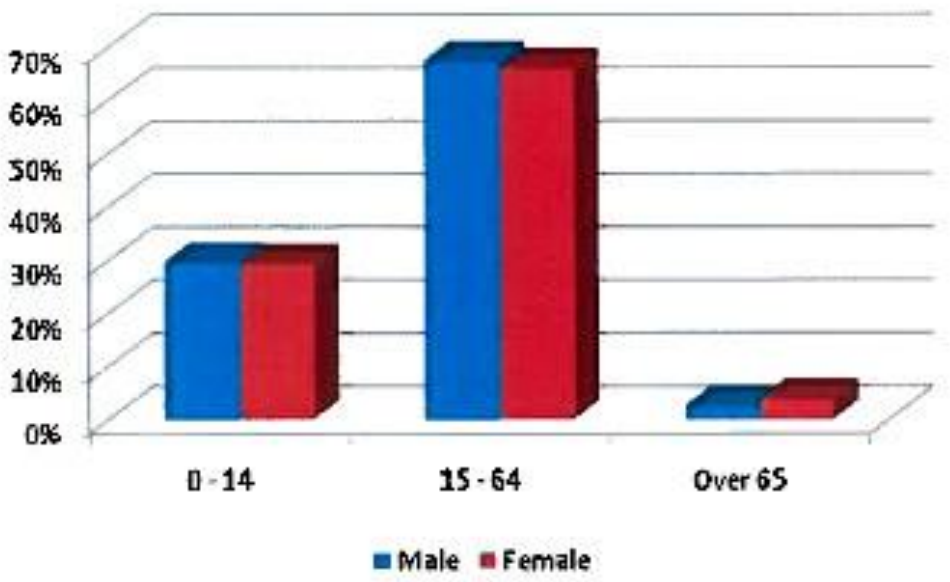


**Figure 12: Age group and gender distribution**

### *6.17.1 Education*

Only 9% of the population over 20 years had a tertiary or higher qualification and 18% had no formal schooling. Around 19% had some primary schooling or completed primary schooling while 55% of the population had some secondary and / or grade 12 qualifications.

### *6.17.2 Major economic activities and sources of employment*

Middelburg is an important agricultural and industrial centre in the region. The area is the seat of local government and hosts a number of industries including stainless steel, coal mining and electricity generation and agriculture.

### *6.17.3 Unemployment status*

The percentage of people with no income has increased from 1996 to 2001 and currently it is estimated that 51% of the employed population falls within the lower income bracket.

### *6.17.4 Households*

There approximately 37 116 households within the municipality with the majority being 1 to 4 occupants. 74% of the population lived in formal houses, 10% in traditional dwellings and 16% in informal dwellings.

### *6.17.5 Water*

About 87% of the population get water from regional or local water schemes and 6% from boreholes. 7% was sourced from springs, rivers, dams, tanks and water vendors.

Around 96% of the population have access to piped water and 77% have access to flush toilets. Around 19% had no access to formal toilet facilities.

### *6.17.6 Power supply*

Electricity is the most common energy source for cooking (53%), heating (53%) and lighting (75%). Candles still accounted for 23% of lighting needs. Coal and paraffin were also used for cooking and heating.

### *6.17.7 Municipal LED objectives*

Municipal LED (Local Economic Development) objectives and strategies for the Steve Tshwete Local Municipal Council (2006) involve:

- Rendering of affordable, accessible, efficient and quality services.
- Maximising infrastructural development through the utilisation of all available resources.
- Implementation of effective systems and procedures.
- 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:

- The project will further extend the duration of indirect employment through continued use of contractors and obtaining supplies. This is primarily sought locally.
- The project will extend the life of mine of Graspan Colliery and therefore ensure the continued employment of staff associated with the wash plant activities at the colliery for this period.
- The project will result in the implementation of social and local economic development plans through its S&LP.
- The project will provide for funds to S&LP initiatives.
- The proposed project will make a significant contribution to the inland coal market as well as the GDP.

## 7.2 No go alternative

The no-go option will result in the protection of the environment *in situ* and the continued use of the land for stock farming. It will, however 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 the above-mentioned benefits not being realised.

## 7.3 Project Site Alternatives

The project site is determined and delimited by the extent of the coal seam and no further site alternatives have been assessed. The site has been further delimited by the sensitive Elandspruit Pan in the south of the property, which has resulted in the location of mining being delimited to the northern parts of the property only.

Material stockpiles have been located in the most economic and environmentally advantageous locations. There is very limited space on site and therefore no alternatives are discussed regarding the location of material stockpiles.

The PCD location will be located at a natural low point so as to capture contaminated runoff from the active footprint, but will also need to be placed outside the wetland area. The site alternatives for the PCD will therefore be very limited to the south-western / western boundary (to be confirmed by the surface water specialist). Alternatives regarding the PCD location will therefore be unlikely but will be discussed in the EIA/EMP phase if alternatives exist.

It is most likely that the main access roads will be constructed along the northern boundary and a haul road through the centre of mining to prevent this development from impacting on the wetland buffer zones. The access roads and ramps to access active pits will be within the mining blocks and will not disturb additional surface area. Any access road alternatives which may arise through the EIA/EMP phase will be further assessed in the EIA/EMP report.

## 7.4 Project Activity Alternatives

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 option regarding the mining operation.

Other service-related infrastructure will not be constructed on site as the existing facilities at Graspan Colliery will be utilised. Portable toilets will be utilised and these can be relocated with mining as needed.

No alternatives have therefore been discussed regarding the proposed opencast mine and none will be discussed in the EIA/EMP phase of the project.

## 7.5 Land use alternatives

Table 20 lists the two 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 crop agriculture. Stock farming will have the least impact to the environment as that is the predominant current land use.

Mining 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 3 years for operation. Residual impact extent and severity will still need to be assessed, but in general, responsible mining, with rehabilitation plans and procedures in place 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 20: Comparative impact assessment for alternative land uses**

| Aspect | Agriculture - crops | Agriculture - Stock | Mining |
|---|---|---|---|
| Topography | The area appears to have been used in the past for agricultural purposes and therefore the land would have already been topographically impacted on. Should the area be utilised for crop production, then topographical impacts would be limited to very superficial changes as the area is contoured for preparation of seed. **Status: -ve; Duration: Long-term; Extent: Site specific; Probability: Definite; Severity: Slight; Significance: Low** | The area is currently utilised for stock farming (grazing) with the pan and associated wetlands having been marginally channelized and a dam located on these for watering of livestock. Impacts on topography would be limited to erosion and the potential for the formation of erosion gullies. This is, however, considered to have a very low likelihood due to the shallow nature of surrounding slopes. **Status: -ve; Duration: Long-term; Extent: Site specific; Probability: Highly unlikely; Severity: Slight; Significance: Low** | Mining will result in the complete alteration of the topographic nature of the area. For the brief construction and operational period the impact will be severe as soil and overburden stockpiles are created and boxcuts are excavated. During proper rehabilitation of the site, the area will be backfilled; however it is expected that the bulking factor will not be enough to attain similar elevations so a lowering of topography will be experienced which will result in altered flow dynamics. **Status: -ve; Duration: Permanent; Extent: Site specific; Probability: Definite; Severity: Moderate; Significance: Moderate** |
| Soil and Land Capability | Should the area be utilised for crop production, then soil characteristics may need to be improved to allow for economic crop production, including chemical amelioration through fertiliser application and physical amelioration through tillage. This will result in altered soil characteristics and altered land capability. The soils will also be stressed due to cyclic crop production and will require frequent fertilisation regimes to sustain the crop production on the land. This will further alter soil chemical characteristics. **Status: -ve; Duration: Long-term; Extent: Site specific; Probability: Definite; Severity: Moderate; Significance: Moderate** | The impacts on soil and land capability through continued use of the land for grazing will be negligible and limited to soil compaction, potential for increased erosion and the nutrient enrichment of soils. **Status: -ve; Duration: Long-term; Extent: Site specific; Probability: Possible; Severity: Slight; Significance: Low** | Mining will result in the complete alteration of the soil characteristics of the area and associated land capability. For the brief construction and operational period the impact will be severe as soil is stripped and stockpiled or stripped and placed onto preceding, recontoured mine cuts. During proper rehabilitation of the site, the area will be backfilled, contoured and soil types replaced, although the altered topography and associated flow dynamics will result in permanent changes to the soil characteristics. Soil analyses will be conducted by relevant specialists and the correct soil amelioration will be done on all soils over the rehabilitated area to ensure growth of local indigenous flora. **Status: -ve; Duration: Long-term; Extent: Site specific; Probability: Definite; Severity: Moderate; Significance: Moderate** |

| Aspect | Agriculture - crops | Agriculture - Stock | Mining |
|---|---|---|---|
| Surface water and surrounding wetlands | The excessive use of fertilisers, herbicides and insecticides will affected downstream water bodies as these are washed away through surface water runoff or through upper aquifer flow. Due to the proximity of the largely natural Elandspruit Pan and the high likelihood that these pesticides and inorganic nutrients are likely to end up in this pan, the impact would be severe. The pesticides would impact on natural flora and fauna of the pan and excessive fertiliser use will affect water quality and nutrient cycling in downstream locations. **Status: -ve; Duration: Long-term; Extent: Local; Probability: Highly probable; Severity: Moderate; Significance: Moderate** | The existing impacts are limited to the nutrient enrichment of soils, which could impact on the surrounding water quality through runoff from rainwater. **Status: -ve; Duration: Long-term; Extent: Site specific; Probability: Highly probable; Severity: Slight; Significance: Low** | Several mining aspects will create risks for downstream water bodies and associated wetlands. These include: soil stripping, mobilisation and stockpiling which will increase the risk for erosion and sedimentation; soil amelioration, spillage or leaks of any hydrocarbon contaminants or “dirty water” which could impair water quality through contaminated runoff; contamination of groundwater which will eventually daylight in nearby streams or possibly decant onto the surface and wash into nearby streams, springs and surface water bodies and impact on these; and the potential for establishment of alien invasive plant species, some of which are known to impact severely on water courses and wetlands. **Status: -ve; Duration: Long-term; Extent: Local; Probability: Highly probable; Severity: Moderate to high; Significance: Moderate** |
| Groundwater | The excessive use of fertilisers, herbicides and insecticides may leach into the upper aquifer and impair water quality within this aquifer. The likelihood is lower and with rainfall recharge, the aquifer could recover quickly if the sources of contamination were removed. **Status: -ve; Duration: Medium-term; Extent: Local; Probability: Probable; Severity: Slight to moderate; Significance: Moderate to low** | No impacts to groundwater expected. **Status: Neutral; Duration: -; Extent: -; Probability: -; Severity: -; Significance: -** | Several mining aspects will create risks to groundwater. These include: reduction of local groundwater levels as mine areas are dewatered and create a draw-down cone; alteration of the groundwater flow regime as earth strata are blasted and removed to excavate underlying coal; exposure of pyritic material to oxygen and water will result in the formation of AMD which will impair groundwater quality; the potential for groundwater plume migration as mining ceases and groundwater levels rebound; and spillage or leaks of any hydrocarbon contaminants or “dirty water” seeping into the |

| Aspect | Agriculture - crops | Agriculture - Stock | Mining |
|---|---|---|---|
| | | | groundwater table.<br>**Status: -ve; Duration: Long-term; Extent: Local; Probability: Highly probable; Severity: High; Significance: Moderate to high** |
| Air quality | Crop production and associated farming activities will create dust. This is generally seasonal though. Contributions to dust are largely related to the utilisation of dirt roads by farm vehicles and farming vehicles preparing or working in the field when weather is dry and particulate matter is easily distributed into the atmosphere.<br>**Status: -ve; Duration: Long-term; Extent: Local; Probability: Definite; Severity: Slight to moderate; Significance: Moderate to low** | No significant impacts to air quality expected.<br>**Status: Neutral; Duration: -; Extent: -; Probability: -; Severity: -; Significance: -** | Opencast mining results in the stripping and mobilisation of soil, the blasting and mobilisation of overburden, extraction and stockpiling of raw coal, haulage of coal along dirt roads and various surface rehabilitation activities, all of which contribute to elevated dust levels in the area. This must be mitigated, especially during the dry winter season which is also associated with windier conditions which will aggravate more dust and distribute dust particles further.<br>**Status: -ve; Duration: Medium-term; Extent: Local; Probability: Definite; Severity: Moderate; Significance: Moderate** |
| Noise | Crop production and associated farming activities will generate noise levels which will exceed ambient noise levels. Due to the fact that farming activities are largely conducted during daylight hours, the increased noise levels are unlikely to be a nuisance to surrounding residents, who are often likely to be workers on the farm. The surrounding land uses include agriculture, mining and brick making and within this landscape the impact of agricultural noise is considered low.<br>**Status: -ve; Duration: Long-term; Extent: Local; Probability: Definite; Severity: Slight; Significance: Low** | No significant impacts to noise levels expected.<br>**Status: Neutral; Duration: -; Extent: -; Probability: -; Severity: -; Significance: -** | Mining will contribute to elevated noise levels. Due to the fact that the area has several active mines in the area, the noise will largely be absorbed in to existing environment. Any noise generated during the night can be considered a significant impact on ambient noise as night time noise levels should be lower as fewer activities occur at night and nearby residents will be more aware of excessive noise. Any blasting activities are also considered extreme noise events even though these are brief and periodic.<br>**Status: -ve; Duration: Medium-term; Extent: Local; Probability: Definite; Severity: Slight to moderate; Significance: Low** |
| Flora and | Crop production will result in a complete | Grazing activities could have severe | Opencast mining will result in a complete |

| Aspect | Agriculture - crops | Agriculture - Stock | Mining |
|---|---|---|---|
| Fauna | alteration of the biodiversity of the area. The site already shows signs of past disturbance and is therefore not considered pristine. Impacts are therefore not considered highly significant. Any indirect impacts to flora and fauna associated with the wetland areas are however considered highly significant. **Status: -ve; Duration: Long-term; Extent: Site specific; Probability: Definite; Severity: Slight; Significance: Moderate to low** | impacts on floral composition if not well managed. **Status: -ve; Duration: Long-term; Extent: Site specific; Probability: Possible; Severity: Slight to moderate; Significance: Low** | alteration of the biodiversity of the area. The site already shows signs of past disturbance and is therefore not considered pristine. Impacts are therefore not considered highly significant. Any indirect impacts to flora and fauna associated with the wetland areas are however considered significant (see Surface water section above). Mitigation measures must be applied however to expedite rehabilitation. **Status: -ve; Duration: Medium-term; Extent: Site specific; Probability: Definite; Severity: Slight; Significance: Moderate to low** |
| Archaeology and heritage | No significant impacts to heritage sites expected, but loss of context of the area may occur if crops are planted over such areas. Ploughing could also damage subterranean sites should such sites exist on the property. **Status: -ve; Duration: Long-term; Extent: Site specific; Probability: Unlikely; Severity: Slight; Significance: Low** | No significant impacts to heritage sites expected. **Status: Neutral; Duration: -; Extent: -; Probability: -; Severity: -; Significance: -** | Three sites occur in the area targeted for mining and will be completely destroyed in terms of their local context should the mine plan remain unchanged. The two cemeteries will need to be relocated. The farmstead will be completely lost and a permit for destruction will be required from SAHRA. **Status: -ve; Duration: Permanent; Extent: Regional; Probability: Highly probable; Severity: High; Significance: High** |
| Visual aspect | An altered visual sense will be created where the lands will move from a more natural scene to one of agriculture. The change of visual aesthetics is considered low due to the surrounding mining activities and servitudes present in the area. **Status: -ve; Duration: Long-term; Extent: Local; Probability: Definite; Severity: Slight; Significance: Low** | No impacts to visual aesthetics expected. **Status: Neutral; Duration: -; Extent: -; Probability: -; Severity: -; Significance: -** | An altered visual sense will be created where the lands will move from a more natural scene to one of mining. After rehabilitation a natural scenic quality can largely be restored with proper rehabilitation of the site. The change of visual aesthetics is not considered highly significant due to the surrounding mining activities and servitudes present in the area. The presence of the pan and associated wetland vegetation and the rocky outcrops does give the immediate site some visual uniqueness. |

| Aspect | Agriculture - crops | Agriculture - Stock | Mining |
|---|---|---|---|
| | | | **Status: -ve; Duration: Medium-term; Extent: Local; Probability: Definite; Severity: Slight; Significance: Moderate to low** |
| Traffic and safety | Only impacts will be the periodic increase in traffic when products or services related to the farm are required. This is not considered a significant impact and has been rated as neutral.<br>**Status: Neutral; Duration: -; Extent: -; Probability: -; Severity: -; Significance: -** | No impacts to traffic and associated road safety expected.<br>**Status: Neutral; Duration: -; Extent: -; Probability: -; Severity: -; Significance: -** | Public roads and associated road safety will only be marginally impacted on with infrastructure and service delivery to site and again during decommissioning as infrastructure is removed. This will be minimal as minimal infrastructure will be erected on site. Coal will be trucked to the existing Graspan via new access/haul roads directly between the two operations and no additional haulage trucks are likely to occur on public roads.<br>**Status: -ve; Duration: Short-term; Extent: Local; Probability: Definite; Severity: Slight; Significance:** Low |
| Regional socio-economics | Crop farming will provide permanent employment for very few individuals considering the size of the proposed property. The impact is positive.<br>**Status: +ve; Duration: Long-term; Extent: Local; Probability: Definite; Severity: Slight; Significance: Moderate to low** | Stock farming will provide permanent employment for very few individuals considering the size of the proposed property. The impact is positive.<br>**Status: +ve; Duration: Long-term; Extent: Local; Probability: Definite; Severity: Slight; Significance: Low** | From a socio-economic perspective the mine will significantly improve livelihood of employees. The activities will be of short duration but will ensure the extended lifespan of the Graspan Colliery and therefore all the benefits associated with the colliery such as existing employment, S&LP funding for social development and general support of local businesses, including contribution to local tax and GDP.<br>**Status: +ve; Duration: Medium-term; Extent: Local; Probability: Definite; Severity: Slight; Significance: Moderate to high** |
| Cumulative assessment | The main cumulative effects of crop farming will be around the permanent alteration of the area to agriculture. Crop agriculture will alter chemical characteristics of soils and | The area is currently utilised for stock farming (grazing) with the pan and associated wetlands havening been marginally channelized and a dam located | The operation of a mine will contribute most significantly to cumulative impacts. The detailed cumulative assessment is detailed later, but the operations will significantly |

| Aspect | Agriculture - crops | Agriculture - Stock | Mining |
|---|---|---|---|
| | 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 low significance due to the small area affected even though the permanent nature of the impacts. | on these for watering of livestock. The area has already indicated signs of impacts caused by livestock activity and the continued use of the site for grazing will see the continuation of these impacts. These impacts are considered negative as they clearly are not adequately absorbed into the environment. The cumulative impact is, however, considered to be of low significance due to the small area affected. | contribute to drops in groundwater levels, reduced groundwater quality if poorly managed and elevate dust and particulate matter on the air quality priority area.<br>From a socio-economic perspective it will significantly improve livelihood of the several employees and have various economic benefits. |

# 8 PUBLIC PARTICIPATION PROCESS

Table 21 highlights the requirements for a public participation process as described under NEMA and associated regulations and guidelines.

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.

**Table 21: 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 | Noted and has been conducted |
| (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: | Noted – 8.1 |
| a. Fixing a notice board at a places conspicuous to the public at the boundary or fence of | 8.1.2.2 & Appendix B |
| i. The site where the activity to which the application relates is or is to be undertaken | 8.1.2.2 Appendix B |
| ii. An alternative site mentioned | 8.1.2.2 & Appendix B |
| b. Giving written notice to | 8.1.2.1 & Appendix B |
| 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 & Appendix B |
| 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 & Appendix B |
| 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 | 8.1.2.1 & Appendix B |
| iv. The municipality which has jurisdiction in the area | 8.1.2.1 & Appendix B |
| v. The organ of state having jurisdiction in respect of any aspect of the activity | 8.1.2.1 & Appendix B |
| c. Placing an advertisement in | 8.1.2.3 & Appendix B |
| i. One local newspaper; or | 8.1.2.3 & Appendix B |
| 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 | 8.1.2.3 & Appendix B |

| Legal and Regulatory Requirement: | Cross Reference: |
|---|---|
| official Gazette referred to in subregulation (c) (ii) | |
| (3) A notice, notice board or advertisement referred to in subregulation (2) must – | 8.1.2.2 & Appendix B |
| 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 & Appendix B |
| ii. Whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation | 8.1.2.2 & Appendix B |
| iii. The nature and location of the activity to which the application relates | 8.1.2.2 & Appendix B |
| iv. Where further information on the application or activity can be obtained | 8.1.2.2 & Appendix B |
| v. The manner in which and the person to whom representations in respect of the application may be made | 8.1.2.2 & Appendix B |
| (4) A notice board referred to in subregulation (2) must - | 8.1.2.2 & Appendix B |
| a. be of a size at least 60cm by 42 cm | Appendix B |
| b. Display the required information in lettering and in a format as may be determined by the competent authority | Appendix B |
| (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 - | Noted – Section 8 & Appendix B |
| a. Information containing all the relevant facts in respect of the application is made available to potential interested and affected parties | Section 8 & Appendix B |
| 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. | Section 8 & Appendix B |



## 8.1 Scoping Phase

During the scoping phase for the NEMA application 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. DMR is the lead authority on mining. The authorities contacted with regards to this project include:

- The Department of Mineral Resources (DMR);
- The Department of Economic Development, Environment & Tourism (DEDET);

- The Department of Agriculture, Rural Development and Land Administration;
- The Department of Water Affairs (DWA);
- The Mpumalanga Parks Board (MPB);
- The South African Heritage Resources Agency (SAHRA);
- The Department of Public Works, Roads and Transport;
- Land Claims Commissioners Office;
- Steve Tshwete Local Municipality;
- Nkangala District Municipality; and
- Co-operative Governance of Traditional Affairs.

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

Copies of the draft NEMA Scoping Report will be circulated to the following authorities:

- The Department of Economic Development, Environment & Tourism (DEDET);
- The Department of Water Affairs (DWA);
- The South African Heritage Resources Agency (SAHRA);
- Steve Tshwete Local Municipality;
- Nkangala District Municipality; and
- The Mpumalanga Parks Board (MPB);



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

The public participation process for this project was initiated in April 2014 following instruction from the Department of Mineral Resources and the client.

An I&AP database was created using information from similar projects in the past, as well as from information and responses received from the press advertisements and the BID's sent out. The I&APs include a broad database of landowners, adjacent landowners, land users, communities, local authorities, ward councillors and other interest groups (Please refer to Annexure I).

A process of engagement was followed in order to ensure that all I&APs will be 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)*

A BID was compiled in English and 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 of the project via SMS or telephone and hand delivered documents where possible. Hard

Copies were hand delivered to all adjacent landowners and occupiers on the 07th April 2014.

The purpose of the Background Information Document is to:

- Invite members of the public to register as I&AP's;
- Identify I&AP's;
- Inform them of the current applications and the processes that need to be followed;
- Inform the public of the proposed project;
- Inform the public of the baseline environmental conditions at site as far as is possible;
- Inform the public of the preliminary impacts that will be considered during the EIA/EMP phase;
- Initiate a process of public consultation to record perceptions and issues; and
- Invite I&AP's to attend the initial Public Meeting.

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

#### *8.1.2.2 Notices*

A2 posters written in English, informing people of the proposed activities, inviting I&APs to the public meeting and requesting I&APs to register were placed at the Steve Tshwete Local Municipality, Nkangala District Municipality, Middelburg Library, Mhluzi Library, Shanduka Coal Central Office, Something out of Nothing Guesthouse in Mhluzi (Public Meeting Venue), at the R555 and D20 intersection and on the property boundary (Portion 31).

(Please refer to **Appendix B - Annexure IV** for a copy of the posters, **Annexure V** for proof of notification).

#### *8.1.2.3 Adverts*

An advertisement, informing people of the proposed activities, inviting I&APs to attend the public meeting and requesting readers to register as I&APs, was placed in two (2) newspapers. An English advertisement was placed in "The Star" and in the "Middelburg Observer" on 09th April and 11th April 2014 respectively.

(Please refer to **Appendix B - Annexure III** for a copy of the advertisements).

### *8.1.3 Introductory Public Meeting*

A Scoping Phase Public Meeting will be held on the 29th April 2014 at the Something out of Nothing Guesthouse in Mhluzi. All registered I&APs were notified of the meetings date through the BID's, posters and adverts. In addition, a reminder SMS will be sent to all registered I&APs prior to the meeting. Minutes will be taken at the meeting and these will be included in the Issues and Response table in the EIA / EMP.

The public meeting will also be video recorded, should the department require a copy of this video, please contact Cabanga and a copy will be made available.

#### *8.1.4 Document Review*

The draft NEMA Scoping Report will be made available for public review and comment for a period of forty (40) days. I&APs will be notified in writing via fax, e-mail, post as well as SMS of the reports availability for public review and comment. Copies will be made at the Middelburg Local Library, the Mhluzi Public Library and at the Shanduka Coal Central Office in Middelburg.

### 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 (phase II) public meeting will be held where the various specialist studies undertaken will be discussed, focusing on sensitive environmental issues. The meeting will also cover feedback on comments and queries received through the Public Participation Process. Personal invitations will be sent out to all registered I&APs via e-mail, fax and post. In addition two (2) advertisements, inviting I&APs to attend the meeting will be placed in two (2) newspapers. In addition, a reminder SMS will also be sent to all registered I&APs prior to the meeting. Minutes will be taken at the meeting and these will be included in the Issues and Response table.

The public meeting will also be video recorded, should the department require a copy of this video, please contact Cabanga and a copy will be made available.

#### *8.2.2 Micro-consultations*

Individual meetings will be scheduled with the relevant land owners/lawful occupiers or any I&AP should they be requested and minutes of these meetings will be forwarded to the Department as soon as they become available.

#### *8.2.3 Document Review*

The draft NEMA EIA / EMP Report will be made available for public review and comment for a period of forty (40) days. I&APs will be notified in writing via fax, e-mail, post as well as SMS of the reports availability for public review and comment. Copies will be made at the Middelburg Local Library, the Mhluzi Public Library and at the Shanduka Coal Central Office in Middelburg.

### 8.3 Issues and Response Summary

Table 22 below summarises the issues raised during the public participation process undertaken to date, as well as the relevant responses.

**Table 22: Issues and response table**

| I&AP: | Notified Via: | Issue Raised: | Responded Via: | Response: |
|---|---|---|---|---|
| Johannes Kruger Farm Elandspruit 291 JS Portion 40 | Hand Delivered | • Stated that Xstrata owns his farm and has a mining right over it.<br>• Has no comments or concerns with regards to the Shanduka Mining Right Application on Portion 31 at this stage. | Face-to-face meeting (07-04-2014) | • Noted. Stated that Wescoal have since purchased the rights from Xstrata, and will be mining his farm. Wescoal will be consulted as part of the PPP.<br>• Added that there will be a public meeting on the 29th April to discuss the application and would appreciate his attendance. |
| Celeste du Toit Farm Elandspruit 291 JS Portion 33 | Hand Delivered | • Explained that she is a tenant and the owner Mrs Potgieter lives in Welverdient. Added that she would give Mrs Potgieter the BID.<br>• Asked if Shanduka was the company that was buying all the farms in the area.<br>• Added that she did not know anything about who will be mining Mrs Potgieter farm. Added that they will not fix anything on the farm. | Face-to-face meeting (07-04-2014) | • Noted. Explained that this forms part of the public participation process, there will be a public meeting on the 29th April and would appreciate their attendance.<br>• No, Xstrata Coal bought a few of the properties including Mrs Potgieter farm as part of their MRA. However Wescoal have since purchased the rights from Xstrata. Shanduka's application is a separate application, and is unrelated to Wescoal or Xstrata.<br>• Noted. As mentioned above, this is not relevant to the Shanduka Portion 31 Application. It is advised that this be |

| I&AP: | Notified Via: | Issue Raised: | Responded Via: | Response: |
|---|---|---|---|---|
| | | • Has no comments or concerns with regards to the Shanduka Mining Right Application on Portion 31 at this stage. | | discussed with the landowner.<br>• Noted. As mentioned above there will be a public meeting on the 29th April to discuss the application and would appreciate her attendance. |
| Janie Prinsloo Farm Rietfontein 286 JS Portion 7 | Hand Delivered | • Asked if Shanduka were going to mine on Portion 31 now?<br>• Has no comments or concerns with regards to the Shanduka Mining Right Application on Portion 31 at this stage. | Face-to-face meeting (07-04-2014) | • Shanduka would like to mine the property and as such has submitted a mining right application. This is the first step of the public participation process. Shanduka will need to obtain the necessary licenses before mining can commence. This is generally a long process.<br>• Noted. Stated there will be a public meeting on the 29th April to discuss the application and would appreciate her attendance. |
| Nick de Wet Farm Rietfontein 286 JS Portion 10 | Hand Delivered | • Stated that the owner is away in America on holiday, when he returns the BID will be given to him. Added that he also owns a company called Jormid.<br>• Has no comments or concerns with regards to the Shanduka Mining Right Application on Portion 31. | Face-to-face meeting (07-04-2014) | • Noted. Explained that Jormid has already been identified as an I&AP and has been added to the database. A copy of the BID was also given to Nick for his information.<br>• Noted. Stated there will be a public meeting on the 29th April to discuss the application and would appreciate his |

| I&AP: | Notified Via: | Issue Raised: | Responded Via: | Response: |
|---|---|---|---|---|
| | | | | and the owners attendance. |
| Sam Mabizela Corobrik (Pty) Ltd | Hand Delivered | • How far is Shanduka with the Portion 31 Application?<br>• Will Shanduka do a section 102 application?<br>• Stated that Corobrik will attend the meeting on the 29th April. | Face-to-face meeting (07-04-2014) | • Explained that the application has been submitted and a reference number has been issued. This is the first step of the PPP. There will be a public meeting on the 29th April.<br>• No, Shanduka are doing a new mining right application for Portion 31 not a section 102 application. They may do a 102 application at a later stage.<br>• Noted. Gave thank. |
| Barrie Viviers Farm Elandspruit 291 JS Portions 34 and 38 | Hand Delivered | • Explained that both of his farms are under mining rights by Wescoal (this right was previously held by Xstrata).<br>• Has no concerns or comments with retards to the Shanduka Mining Right Application on Portion 31 at this stage. | Face-to-face meeting (07-04-2014) | • Noted. Wescoal will be consulted as part of the PPP. Stated there will be a public meeting on the 29th April to discuss the application and would appreciate his attendance.<br>• Noted. Gave thanks. |

# 9 ENVIRONMENTAL IMPACT ASSESSMENT

Table 23 lists the activities of relevance during the different phases of mining and the expected impacts pre-mitigation. This should be considered a preliminary impact assessment which will be refined as specialist and I&AP input is obtained through the EIA/EMP phase.

**Table 23: Preliminary impact assessment (without mitigation)**

| Impacted Aspect | Impact | Positive/ Neutral/ Negative Impact | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **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 |
| Air quality | Emissions | Neg | 1 | 1 | 1 | 1 | 4 | 5 | 20 | Y | Low |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Y | Low |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Y | Low |
| Soils | Potential hydrocarbon contamination to soils | Neg | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Y | Low |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 1 | 2 | 1 | 3 | 7 | 4 | 28 | Y | Low |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - |
| **ACTIVITY: Geohydrological Assessment** | | | | | | | | | | | |
| **SUB ACTIVITY: Drill rig delivery to site and set up for drilling in the area** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | Y | Low |
| Air quality | Emissions | Neg | 1 | 1 | 1 | 1 | 4 | 5 | 20 | Y | Low |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Y | Low |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 2 | 1 | 1 | 3 | 7 | 3 | 21 | Y | Low |
| Soils | Potential hydrocarbon contamination to soils | Neg | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Y | Low |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 1 | 2 | 1 | 3 | 7 | 4 | 28 | Y | Low |
| **SUB ACTIVITY: Drilling activities within the pan to determine groundwater connectivity to the pan** | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 5 | 25 | Y | - |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 2 | 3 | 10 | 3 | 30 | Y | Mod |
| Soils | Potential compaction of soils in the pan | Neg | 3 | 1 | 2 | 3 | 9 | 4 | 36 | Y | Low |
| Soils | Potential hydrocarbon contamination to soils | Neg | 3 | 1 | 2 | 3 | 9 | 2 | 18 | Y | Low |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 4 | 2 | 2 | 3 | 11 | 4 | 44 | Y | Mod |

| Impacted Aspect | Impact | Positive/ Neutral Impact Negative/ | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CONSTRUCTION PHASE** | | | | | | | | | | | |
| **ACTIVITY: Site Preparation (also applicable to new mine areas under roll-over opencast mining)** | | | | | | | | | | | |
| **SUB ACTIVITY: Truck and heavy machinery operation** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Low |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low |
| Archaeological & cultural sites | Loss of and disturbance to surface archaeological sites | Neg | 3 | 1 | 5 | 5 | 14 | 4 | 56 | Y | High |
| Archaeological & cultural sites | Potential disruption to grave sites | Neg | 5 | 2 | 5 | 5 | 17 | 4 | 68 | Y | High |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | Low |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 2 | 1 | 2 | 3 | 8 | 2 | 16 | Y | Low |
| Soils | Potential hydrocarbon contamination to soils | Neg | 2 | 1 | 2 | 3 | 8 | 2 | 16 | Y | Low |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod |
| **SUB ACTIVITY: Removal of herbaceous material with soil stripping** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 1 | 1 | 8 | 5 | 40 | Y | Mod |
| Fauna | Loss of habitat, refuge and food for animals | Neg | 3 | 2 | 1 | 3 | 9 | 4 | 36 | Y | Low |
| Flora | Loss of biodiversity | Neg | 2 | 1 | 2 | 3 | 8 | 5 | 40 | Y | Mod |
| Soils | Potential for loss of soil & damage to soil characteristics | Neg | 3 | 1 | 1 | 3 | 8 | 5 | 40 | Y | Mod |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | High |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | bodies (Elandspruit Pan) | | | | | | | | | | |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - |
| **SUB ACTIVITY: Topsoil Stockpiling or placement into soil berms** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 5 | 2 | 1 | 1 | 9 | 5 | 45 | Y | Mod |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling | Neg | 2 | 1 | 2 | 3 | 8 | 5 | 40 | Y | Mod |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | High |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - |
| **ACTIVITY: Construction of water management features and PCD [NEMA R.544 Listing 12; R.545 Listing 5 & Listing 10; R.546 Listing 14]** | | | | | | | | | | | |
| **SUB ACTIVITY: Berm and channel construction** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 1 | 1 | 8 | 5 | 40 | Y | Mod |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling | Neg | 2 | 1 | 2 | 3 | 8 | 5 | 40 | Y | Low |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | High |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - |
| **SUB ACTIVITY: PCD Construction** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 2 | 8 | 5 | 40 | Y | Mod |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation | Neg | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Y | Low |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 4 | 2 | 1 | 3 | 10 | 2 | 20 | Y | Mod |
| Surface water and Wetlands | Downstream water quantity of catchment reduced | Neg | 3 | 2 | 3 | 1 | 9 | 5 | 45 | N | Mod |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - |
| **ACTIVITY: Upgrade & construction of roads [NEMA R.544 Listing 22 & Listing 47; R.546 Listing 4, Listing 14 & Listing 19]** | | | | | | | | | | | |
| **SUB ACTIVITY: Levelling and compacting of roads** | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Soils | Potential for compaction of soil & soil degradation | Neg | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Y | Low |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 4 | 2 | 1 | 3 | 10 | 4 | 40 | Y | Mod |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - |
| **ACTIVITY: Preparation of material stockpile area [NEMA R.544 Listing 24; R.545 Listing 5 & Listing 17; R.546 Listing 14]** | | | | | | | | | | | |
| **SUB ACTIVITY: Levelling and compacting of areas for stockpiles** | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Soils | Potential for compaction of soil & soil degradation | Neg | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Y | Low |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 4 | 2 | 1 | 3 | 10 | 4 | 40 | Y | Mod |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - |
| **ACTIVITY: Construction and utilisation of portable toilets** | | | | | | | | | | | |
| **SUB ACTIVITY: Installation of portable toilets** | | | | | | | | | | | |
| Noise | Increased noise levels | Neg | 1 | 1 | 1 | 1 | 4 | 4 | 16 | Y | - |
| Visual aspect | Deterioration in visual aesthetics of the area | Neg | 1 | 1 | 3 | 3 | 8 | 1 | 8 | Y | Low |
| **SUB ACTIVITY: Utilisation of portable toilets** | | | | | | | | | | | |
| Groundwater | Potential harm through sewage leaks | Neg | 2 | 2 | 1 | 1 | 6 | 2 | 12 | Y | Low |
| Soils | Potential harm through sewage leaks | Neg | 2 | 1 | 1 | 3 | 7 | 2 | 14 | Y | Low |
| Surface water and Wetlands | Potential harm through sewage leaks | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low |
| **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 |
| Groundwater | Potential contamination through littering | Neg | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Y | Low |
| Soils | Potential contamination through littering | Neg | 2 | 1 | 3 | 3 | 9 | 2 | 18 | Y | Low |
| Surface water and Wetlands | Potential contamination through littering | Neg | 3 | 2 | 3 | 3 | 11 | 1 | 11 | Y | Low |
| Visual Aspect | Loss of aesthetics | Neg | 3 | 1 | 3 | 3 | 10 | 3 | 30 | Y | Low |
| **ACTIVITY: Overall construction and development of the site** | | | | | | | | | | | |
| **SUB ACTIVITY: Mobilisation of vehicles and contractors on site** | | | | | | | | | | | |

| Impacted Aspect | Impact | Negative/ Positive/ Neutral Impact | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fauna | Alienation of animals from the area, specifically the Bull Frog population and other protected species | Neg | 4 | 2 | 2 | 1 | 9 | 5 | 45 | Y | Mod |
| Flora | Alien invasive encroachment | Neg | 5 | 2 | 3 | 3 | 13 | 4 | 52 | Y | Mod |
| Social | Potential for more employment | Pos | 4 | 2 | 3 | 1 | 10 | 1 | 10 | Y | - |
| Social | Multiplier effect - maintained livelihoods | Pos | 4 | 2 | 3 | 1 | 10 | 5 | 50 | N | - |
| Social | Influx of unsuccessful job seekers which may informally settle in area | Neg | 4 | 3 | 3 | 3 | 13 | 2 | 26 | Y | - |
| Visual aspect | Deterioration in visual aesthetics of the area | Neg | 4 | 1 | 3 | 1 | 9 | 5 | 45 | Y | Mod |
| **OPERATION PHASE** | | | | | | | | | | | |
| **ACTIVITY: Operation water management facilities [NEMA R.544 Listing 12; R.545 Listing 5 & Listing 10; R.546 Listing 14]** | | | | | | | | | | | |
| **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 | 2 | 22 | Y | Low |
| Soils | Potential contamination of soils if dirty water escapes into environment | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | Low |
| Soils | Erosion | Neg | 3 | 2 | 3 | 3 | 11 | 2 | 22 | Y | Low |
| Surface water and Wetlands | Potential surface water contamination if leaks escape into the environment | Neg | 3 | 2 | 3 | 3 | 11 | 2 | 22 | Y | Mod |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 3 | 2 | 3 | 3 | 11 | 3 | 33 | Y | Mod |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface water and Wetlands | Downstream water quantity of catchment reduced | Neg | 3 | 2 | 3 | 1 | 9 | 5 | 45 | N | Mod |
| **SUB ACTIVITY: Operation of PCD** | | | | | | | | | | | |
| Groundwater | Potential infiltration of contaminated water into groundwater table if leaks occur | Neg | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | Mod |
| Soils | Potential contamination of soils if dirty water escapes into environment | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | Low |
| Soils | Containment of dirty water within dirty footprint area | Pos | 3 | 1 | 3 | 1 | 8 | 5 | 40 | N | - |
| Surface water and Wetlands | Containment of dirty water within dirty footprint area | Pos | 4 | 2 | 3 | 1 | 10 | 4 | 40 | N | - |
| Surface water and Wetlands | Potential surface water contamination if leaks escape into the environment | Neg | 3 | 2 | 3 | 3 | 11 | 2 | 22 | Y | Mod |
| Surface water and Wetlands | Downstream water quantity of catchment reduced | Neg | 4 | 2 | 3 | 1 | 10 | 5 | 50 | N | Mod |
| **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 |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | Low |
| Noise | Increased noise levels | Neg | 1 | 2 | 2 | 1 | 6 | 4 | 24 | Y | - |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 2 | 1 | 2 | 3 | 8 | 2 | 16 | Y | Low |
| Soils | Potential hydrocarbon contamination to soils | Neg | 2 | 1 | 2 | 3 | 8 | 2 | 16 | Y | Low |

| Impacted Aspect | Impact | Positive/ Neutral/ Negative Impact | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - |
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - |
| **SUB ACTIVITY: Coal Transportation** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 2 | 1 | 8 | 5 | 40 | Y | Mod |
| Groundwater | Potential contamination leeching into the water table if coal dust and spillage not cleared from road | Neg | 3 | 2 | 4 | 3 | 12 | 2 | 24 | Y | Low |
| Soils | Potential contamination of surrounding areas with coal dust | Neg | 3 | 1 | 3 | 3 | 10 | 4 | 40 | Y | Low |
| 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 | Mod |
| **ACTIVITY: Utilisation of portable toilets** | | | | | | | | | | | |
| **SUB ACTIVITY: Utilisation of portable toilets** | | | | | | | | | | | |
| Groundwater | Potential harm through sewage leaks | Neg | 2 | 2 | 3 | 1 | 8 | 2 | 16 | Y | Low |
| Soils | Potential harm through sewage leaks | Neg | 2 | 1 | 3 | 3 | 9 | 2 | 18 | Y | Low |
| Surface water and Wetlands | Potential harm through sewage leaks | Neg | 2 | 2 | 3 | 1 | 8 | 3 | 24 | Y | Low |
| **ACTIVITY: Opencast mining through roll-over mining [NEMA R.544 Listing 24; R.545 Listing 17; R.546 Listing 14]** | | | | | | | | | | | |
| **SUB ACTIVITY: Removal of subsoil and stockpiling (initial mine cuts) or mobilizing to mine cuts filled with hard and soft overburden** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 5 | 2 | 1 | 1 | 9 | 5 | 45 | Y | Mod |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling | Neg | 2 | 1 | 2 | 3 | 8 | 5 | 40 | Y | Mod |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 4 | 44 | Y | High |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - |
| **SUB ACTIVITY: Subsoil stockpiling** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 5 | 2 | 1 | 1 | 9 | 5 | 45 | Y | Mod |
| Soils | Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling | Neg | 2 | 1 | 2 | 3 | 8 | 5 | 40 | Y | Mod |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 4 | 2 | 1 | 3 | 11 | 4 | 40 | Y | High |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - |
| **SUB ACTIVITY: Removal of soft overburden and stockpiling (initial mine cuts) or mobilizing to previously mined cuts filled with hards** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 3 | 33 | Y | Mod |
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - |
| **SUB ACTIVITY: Soft overburden stockpiling** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 3 | 33 | Y | Mod |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - |
| **SUB ACTIVITY: Blasting** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 1 | 10 | 5 | 50 | Y | Mod |
| Archaeological & cultural sites | Loss of and disturbance to surface archaeological sites | Neg | 2 | 1 | 5 | 5 | 13 | 5 | 65 | Y | High |
| Geology | Disturbance of geological strata | Neg | 4 | 2 | 5 | 5 | 16 | 5 | 80 | N | High |
| Groundwater | Generation of poor quality leachate which may contaminate aquifers | Neg | 4 | 2 | 4 | 3 | 13 | 5 | 65 | N | High |
| Groundwater | Potential damage to groundwater aquifers and alteration of groundwater flow | Neg | 4 | 2 | 5 | 5 | 16 | 5 | 80 | N | Mod |
| Noise | Increased noise levels | Neg | 5 | 3 | 3 | 1 | 12 | 5 | 60 | Y | - |
| Social | Vibrations and air blast may damage structures in the area | Neg | 4 | 1 | 3 | 3 | 11 | 4 | 44 | Y | Mod |
| **SUB ACTIVITY: Removal of overburden and stockpiling (initial mine cuts) or mobilizing to previously mined cuts** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 2 | 1 | 8 | 5 | 40 | Y | Mod |
| Noise | Increased noise levels | Neg | 3 | 2 | 3 | 1 | 9 | 4 | 36 | Y | - |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 4 | 2 | 3 | 3 | 12 | 2 | 24 | Y | Mod |
| Topography | Alteration of topography | Neg | 4 | 1 | 2 | 1 | 8 | 5 | 40 | N | - |
| **SUB ACTIVITY: Hard overburden stockpiling** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Mod |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 1 | 3 | 11 | 3 | 33 | Y | Mod |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Topography | Alteration of topography | Neg | 2 | 1 | 1 | 1 | 5 | 5 | 25 | N | - |
| **SUB ACTIVITY: Successive removal of clay layers and stockpiling clay for Corobrik** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 1 | 12 | Y | Mod |
| Geology | Disturbance of geological strata | Neg | 2 | 1 | 5 | 5 | 13 | 5 | 65 | N | Mod |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 2 | 3 | 12 | 4 | 48 | Y | Mod |
| Topography | Alteration of topography | Neg | 4 | 1 | 2 | 1 | 8 | 5 | 40 | N | - |
| **SUB ACTIVITY: Mining and temporary in-pit stockpiling of coal** | | | | | | | | | | | |
| Geology | Removal of coal seam and alteration of geological strata | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | High |
| Groundwater | Potential damage to groundwater aquifers and alteration of groundwater flow | Neg | 5 | 2 | 5 | 5 | 17 | 5 | 85 | N | Mod |
| Groundwater | Potential contamination plume of groundwater | Neg | 5 | 2 | 4 | 5 | 16 | 5 | 80 | Y | High |
| **ACTIVITY: Construction of in-pit infrastructure [NEMA R.545 Listing 5 & Listing 10]** | | | | | | | | | | | |
| **SUB ACTIVITY: Construction and installation of sump and pump** | | | | | | | | | | | |
| Noise | Increased noise levels from pump | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| **SUB ACTIVITY: Pumping of in-pit water** | | | | | | | | | | | |
| Noise | Increased noise levels from operation of pumps | Neg | 3 | 2 | 2 | 1 | 8 | 5 | 40 | Y | - |
| Groundwater | Reduction of local groundwater | Neg | 4 | 2 | 5 | 5 | 16 | 5 | 80 | N | Mod |
| Groundwater | Alteration of groundwater flow | Neg | 4 | 2 | 5 | 5 | 16 | 4 | 64 | N | Mod |
| Groundwater | Limiting contact time with carbonaceous material and water | Pos | 3 | 2 | 3 | 3 | 11 | 4 | 44 | N | - |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | and preventing possible contamination | | | | | | | | | | |
| **ACTIVITY: Rehabilitation from roll-over mining** | | | | | | | | | | | |
| **SUB ACTIVITY: Truck activity and operation of machinery** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Low |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Low |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low |
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | Low |
| Noise | Increased noise levels | Neg | 1 | 2 | 2 | 1 | 6 | 4 | 24 | Y | - |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 2 | 1 | 2 | 3 | 8 | 2 | 16 | Y | Low |
| Soils | Potential hydrocarbon contamination to soils | Neg | 2 | 1 | 2 | 3 | 8 | 2 | 16 | Y | Low |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - |
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - |
| **SUB ACTIVITY: Backfilling and re-profiling of all disturbed areas** | | | | | | | | | | | |
| Topography | Re-contouring of area for free surface water drainage | Neg | 5 | 1 | 4 | 3 | 13 | 3 | 39 | Y | - |
| Surface water | Free drainage restored to area | Pos | 3 | 2 | 3 | 3 | 11 | 5 | 55 | Y | - |
| Surface water and Wetlands | Large areas of surface water runoff return to catchment | Pos | 4 | 2 | 3 | 3 | 12 | 5 | 60 | Y | - |
| Surface water and Wetlands | Reduced risk of contaminated water entering wetland areas | Pos | 4 | 2 | 3 | 3 | 12 | 4 | 48 | Y | - |

| Impacted Aspect | Impact | Positive/ Neutral Negative/ Impact | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | and impairing ecological function. | | | | | | | | | | |
| **SUB ACTIVITY: Application of topsoil** | | | | | | | | | | | |
| Soils | Initial increased potential for loss of soil and soil erosion | Neg | 2 | 1 | 2 | 3 | 8 | 5 | 40 | Y | Low |
| Soils | Soils replaced and ameliorated | Pos | 3 | 1 | 3 | 3 | 10 | 5 | 50 | Y | - |
| Surface water and Wetlands | Potential for silt loading of surrounding surface water bodies | Neg | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Y | High |
| **SUB ACTIVITY: Amelioration of topsoil** | | | | | | | | | | | |
| Flora | Create adequate environment for flora to establish | Pos | 4 | 2 | 3 | 3 | 12 | 3 | 36 | N | - |
| Soils | Soils replaced and ameliorated | Pos | 3 | 1 | 3 | 3 | 10 | 5 | 50 | Y | - |
| **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 | - |
| 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 | - |
| **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 | - |
| Flora | Area re-vegetated with indigenous plants | Pos | 3 | 1 | 2 | 3 | 9 | 4 | 36 | Y | - |
| Flora | Alien invasive encroachment | Neg | 5 | 2 | 3 | 3 | 13 | 4 | 52 | Y | Mod |
| **ACTIVITY: Clay handling** | | | | | | | | | | | |
| **SUB ACTIVITY: Clay stockpiling and handling** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 3 | 2 | 3 | 12 | 4 | 48 | Y | Mod |

| Impacted Aspect | Impact | Positive/ Neutral Impact Negative/ | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Noise | Increased noise levels | Neg | 1 | 2 | 2 | 1 | 6 | 4 | 24 | Y | - |
| Surface water and Wetlands | Potential silt-loading of drainage lines and downstream water bodies | Neg | 5 | 2 | 2 | 3 | 12 | 4 | 48 | Y | Mod |
| Topography | Alteration of topography | Neg | 4 | 1 | 2 | 1 | 8 | 5 | 40 | N | - |
| **ACTIVITY: Raw coal handling** | | | | | | | | | | | |
| **SUB ACTIVITY: Coal stockpiling and handling** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 3 | 1 | 10 | 4 | 40 | Y | Mod |
| Groundwater | Ingression of poor quality, low pH leachate into water table | Neg | 5 | 2 | 4 | 5 | 16 | 3 | 48 | Y | High |
| Noise | Increased noise levels | Neg | 1 | 2 | 2 | 1 | 6 | 4 | 24 | Y | - |
| Topography | Alteration of topography | Neg | 3 | 1 | 3 | 1 | 8 | 5 | 40 | N | - |
| **ACTIVITY: Operation of floodlights** | | | | | | | | | | | |
| **SUB ACTIVITY: Operation of floodlights** | | | | | | | | | | | |
| Fauna | Hindrance to nocturnal animals | Neg | 3 | 2 | 2 | 3 | 10 | 4 | 40 | Y | Low |
| Traffic & safety | Potential distraction to road users | Neg | 3 | 2 | 3 | 1 | 9 | 2 | 18 | Y | - |
| Visual Aspect | Increased visibility of the site | Neg | 4 | 2 | 3 | 1 | 10 | 4 | 40 | Y | Low |
| **ACTIVITY: Waste generation** | | | | | | | | | | | |
| **SUB ACTIVITY: Waste generation** | | | | | | | | | | | |
| Fauna | Potential harm through littering | Neg | 4 | 2 | 3 | 3 | 12 | 3 | 36 | Y | Low |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Groundwater | Potential contamination through littering | Neg | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Y | Low |
| Soils | Potential contamination through littering | Neg | 2 | 1 | 3 | 3 | 9 | 2 | 18 | Y | Low |
| Surface water and Wetlands | Potential contamination through littering | Neg | 3 | 2 | 3 | 3 | 11 | 1 | 11 | Y | Low |
| Visual Aspect | Loss of aesthetics | Neg | 3 | 1 | 3 | 3 | 10 | 3 | 30 | Y | Low |
| **ACTIVITY: Overall mining activities at the site [NEMA R.544 Listing 24 & Listing 26; R.545 Listing 17; R.546 Listing 12, Listing 13 & Listing 14]** | | | | | | | | | | | |
| **SUB ACTIVITY: Mobilisation of vehicles and contractors to and from site** | | | | | | | | | | | |
| Fauna | Alienation of animals from the area, specifically the Bull Frog population and other protected species | Neg | 4 | 2 | 2 | 1 | 9 | 5 | 45 | Y | Mod |
| Flora | Alien invasive encroachment | Neg | 5 | 2 | 3 | 3 | 13 | 4 | 52 | Y | Mod |
| Social | Potential for more employment | Pos | 4 | 2 | 3 | 1 | 10 | 1 | 10 | Y | - |
| Social | Multiplier effect - maintained livelihoods | Pos | 4 | 2 | 3 | 1 | 10 | 5 | 50 | N | - |
| Social | Influx of unsuccessful job seekers which may informally settle in area | Neg | 4 | 3 | 3 | 3 | 13 | 2 | 26 | Y | - |
| Visual aspect | Deterioration in visual aesthetics of the area | Neg | 4 | 1 | 3 | 1 | 9 | 5 | 45 | Y | Mod |
| Flora | Indirect impact resulting in loss of biodiversity in the pan | Neg | 5 | 2 | 3 | 5 | 15 | 4 | 60 | Y | Mod |
| **DECOMMISSIONING PHASE** | | | | | | | | | | | |
| **ACTIVITY: Removal of portable toilets** | | | | | | | | | | | |
| **SUB ACTIVITY: Sewage removal** | | | | | | | | | | | |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Groundwater | Potential for sewage contamination removed | Pos | 2 | 2 | 1 | 3 | 8 | 4 | 32 | Y | - |
| Soils | Potential for sewage contamination removed | Pos | 2 | 1 | 1 | 3 | 7 | 4 | 28 | Y | - |
| Surface water and Wetlands | Potential for sewage contamination removed | Pos | 2 | 2 | 1 | 3 | 8 | 4 | 32 | N | - |
| **ACTIVITY: Filling the final opencast voids** | | | | | | | | | | | |
| **SUB ACTIVITY: Mobilisation of overburden and subsoil stockpiles** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 1 | 1 | 8 | 5 | 40 | Y | Mod |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Topography | Eradication of stockpiles | Pos | 3 | 1 | 3 | 3 | 10 | 4 | 40 | N | - |
| Visual Aspect | Improved aesthetics through removal of stockpiles | Pos | 3 | 1 | 1 | 1 | 6 | 5 | 30 | N | - |
| **SUB ACTIVITY: Backfilling and profiling of final void** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 1 | 1 | 8 | 5 | 40 | Y | Mod |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Topography | Eradication of voids | Pos | 3 | 1 | 3 | 3 | 10 | 4 | 40 | N | - |
| Visual Aspect | Improved aesthetics through rehabilitation | Pos | 3 | 1 | 1 | 1 | 6 | 5 | 30 | N | - |
| Groundwater | Potential contamination plume from mining areas | Neg | 5 | 2 | 5 | 5 | 17 | 4 | 68 | N | High |
| **ACTIVITY: Roads** | | | | | | | | | | | |
| **SUB ACTIVITY: Ripping/discing of all roads no longer required** | | | | | | | | | | | |
| Soils | Soils replaced and ameliorated | Pos | 3 | 1 | 2 | 3 | 9 | 4 | 36 | Y | - |
| Surface water and Wetlands | Revegetation of areas mined out reduces risk of silt loading | Pos | 2 | 2 | 2 | 3 | 9 | 2 | 18 | Y | - |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | on downstream water bodies | | | | | | | | | | |
| Topography | Re-contouring of area for free surface water drainage | Pos | 2 | 1 | 2 | 3 | 8 | 4 | 32 | Y | - |
| Visual Aspect | Improved aesthetics through rehabilitation | Pos | 2 | 1 | 2 | 3 | 8 | 4 | 32 | N | - |
| **ACTIVITY: Rehabilitation of unnecessary water management facilities** | | | | | | | | | | | |
| **SUB ACTIVITY: Final removal of all berms** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 2 | 1 | 9 | 4 | 36 | Y | Low |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Topography | Eradication of trenches and berms | Pos | 3 | 1 | 3 | 3 | 10 | 4 | 40 | N | - |
| Visual Aspect | Improved aesthetics through rehabilitation | Pos | 3 | 1 | 3 | 1 | 8 | 2 | 16 | N | - |
| **SUB ACTIVITY: Mobilisation of soils for infilling of PCD and trenches** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 2 | 1 | 9 | 4 | 36 | Y | Low |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Topography | Eradication of stockpiles | Pos | 3 | 1 | 3 | 3 | 10 | 4 | 40 | N | - |
| Visual Aspect | Improved aesthetics through removal of stockpiles | Pos | 3 | 1 | 1 | 1 | 6 | 5 | 30 | N | - |
| **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 | Low |
| Air quality | Dust generation | Neg | 3 | 2 | 1 | 1 | 7 | 5 | 35 | Y | Low |
| Air quality | Nuisance Emissions | Neg | 2 | 2 | 1 | 1 | 6 | 3 | 18 | Y | Low |

| Impacted Aspect | Impact | Positive/ Negative/ Neutral Impact | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Groundwater | Potential hydrocarbon contamination leeching into the water table | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | Low |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Soils | Potential compaction of soils in neighbouring areas | Neg | 2 | 1 | 2 | 3 | 8 | 2 | 16 | Y | Low |
| Soils | Potential hydrocarbon contamination to soils | Neg | 2 | 1 | 2 | 3 | 8 | 2 | 16 | Y | Low |
| Surface water and Wetlands | Potential hydrocarbon contamination which may reach downstream surface water bodies | Neg | 3 | 2 | 1 | 3 | 9 | 3 | 27 | Y | Mod |
| Traffic & safety | Increased potential for road incidences | Neg | 3 | 1 | 1 | 5 | 10 | 2 | 20 | Y | - |
| Traffic & safety | Road degradation | Neg | 3 | 2 | 1 | 3 | 9 | 2 | 18 | Y | - |
| **SUB ACTIVITY: Removal of all carbonaceous material and cleaning all surface areas** | | | | | | | | | | | |
| Air quality | Dust generation | Neg | 4 | 2 | 2 | 1 | 9 | 4 | 36 | Y | Low |
| Noise | Increased noise levels | Neg | 1 | 2 | 1 | 1 | 5 | 4 | 20 | Y | - |
| Visual Aspect | Improved aesthetics through rehabilitation | Pos | 3 | 1 | 3 | 1 | 8 | 2 | 16 | N | - |
| **SUB ACTIVITY: Ripping/discing of all levelled or compacted areas where required** | | | | | | | | | | | |
| Soils | Soils replaced and ameliorated | Pos | 3 | 1 | 2 | 3 | 9 | 4 | 36 | Y | - |
| 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 | - |
| Topography | Re-contouring of area for free surface water drainage | Pos | 2 | 1 | 2 | 3 | 8 | 4 | 32 | Y | - |
| Visual Aspect | Improved aesthetics through rehabilitation | Pos | 2 | 1 | 2 | 3 | 8 | 4 | 32 | N | - |
| **SUB ACTIVITY: Reprofiling of all disturbed areas** | | | | | | | | | | | |
| Topography | Re-contouring of area for free surface water drainage | Pos | 2 | 1 | 3 | 3 | 9 | 4 | 36 | Y | - |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface water | Free drainage restored to area | Pos | 3 | 2 | 3 | 3 | 11 | 5 | 55 | Y | - |
| Surface water and Wetlands | Large areas of surface water runoff return to catchment | Pos | 4 | 2 | 3 | 3 | 12 | 5 | 60 | Y | - |
| 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 | - |
| **SUB ACTIVITY: Application of topsoil** | | | | | | | | | | | |
| Soils | Initial increased potential for loss of soil and soil erosion | Neg | 2 | 1 | 2 | 3 | 8 | 5 | 40 | Y | Low |
| Soils | Soils replaced and ameliorated | Pos | 3 | 1 | 3 | 3 | 10 | 5 | 50 | Y | - |
| Surface water and Wetlands | Potential for silt loading of surrounding surface water bodies | Neg | 2 | 2 | 3 | 3 | 10 | 2 | 20 | Y | High |
| **SUB ACTIVITY: Amelioration of topsoil** | | | | | | | | | | | |
| Flora | Create adequate environment for flora to establish | Pos | 4 | 2 | 3 | 3 | 12 | 3 | 36 | N | - |
| Soils | Soils replaced and ameliorated | Pos | 3 | 1 | 3 | 3 | 10 | 5 | 50 | Y | - |
| **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 | - |
| 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 | - |
| **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 | - |
| **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 | - |

| Impacted Aspect | Impact | Positive/ Neutral/ Negative Impact | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation | Irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Flora | Area re-vegetated with indigenous plants | Pos | 3 | 1 | 2 | 3 | 9 | 4 | 36 | Y | - |
| Flora | Alien invasive encroachment | Neg | 5 | 2 | 3 | 3 | 13 | 4 | 52 | Y | Mod |
| **ACTIVITY: Waste generation** | | | | | | | | | | | |
| **SUB ACTIVITY: Waste generation** | | | | | | | | | | | |
| Fauna | Potential harm through littering | Neg | 4 | 2 | 1 | 3 | 10 | 3 | 30 | Y | Low |
| Groundwater | Potential contamination through littering | Neg | 2 | 2 | 1 | 3 | 8 | 2 | 16 | Y | Low |
| Soils | Potential contamination through littering | Neg | 2 | 1 | 3 | 3 | 9 | 2 | 18 | Y | Low |
| Surface water and Wetlands | Potential contamination through littering | Neg | 3 | 2 | 1 | 3 | 9 | 1 | 9 | Y | Low |
| Visual Aspect | Loss of aesthetics | Neg | 3 | 1 | 1 | 3 | 8 | 3 | 24 | Y | Low |
| **ACTIVITY: Overall decommissioning of the site** | | | | | | | | | | | |
| **SUB ACTIVITY: Decommissioning and eventual closure of the site and mobilisation of vehicles and contractors on site** | | | | | | | | | | | |
| Flora | Alien invasive encroachment | Neg | 5 | 2 | 3 | 3 | 13 | 4 | 52 | Y | Mod |
| Fauna | Alienation of animals from the area | Neg | 2 | 2 | 1 | 3 | 8 | 5 | 40 | Y | Mod |
| Groundwater | Irresponsible use of water will impact on groundwater quantity | Neg | 3 | 2 | 2 | 1 | 8 | 2 | 16 | Y | Low |
| Groundwater | Rebound of water levels | Pos | 3 | 3 | 4 | 3 | 13 | 4 | 52 | N | - |
| Groundwater | Flow of contaminated groundwater away from mine into neighbouring areas and potential for decant | Neg | 5 | 2 | 4 | 5 | 16 | 4 | 64 | N | High |
| Social | Steady reduction in employment | Neg | 4 | 2 | 3 | 1 | 10 | 5 | 50 | Y | High |
| Flora | Indirect impact resulting in loss of biodiversity in the pan | Neg | 5 | 2 | 3 | 5 | 15 | 4 | 60 | Y | Mod |

| Impacted Aspect | Impact | Positive/ Neutral Impact / Negative | Magnitude | Extent | Duration | Reversibility | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | Mitigation - irreplaceable loss of resource |
|---|---|---|---|---|---|---|---|---|---|---|
| **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 | | | | | | | | | | |
| Fauna | | | | | | | | | | |
| Flora | Alien invasive encroachment | | | | | | | | | |
| Flora | | | | | | | | | | |
| Groundwater | | | | | | | | | | |
| Surface water | | | | | | | | | | |
| Topography | | | | | | | | | | |
| Wetlands | | | | | | | | | | |

# 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 will be minimal and is of low significance. The main reasons are that the larger area is already affected, the proposed site is small in relation to this and the fact that the stockpiles and the opencast mining voids will be temporary in nature. The bulking factor of in-fill material will however not be sufficient and the topography will be lower after mining. The impact is negative, site specific, definite, permanent and of moderate significance.

## 10.2 Geology

The removal of the coal results in a reduction of the overall coal resources. Coal reserves in South Africa are diminishing and are non-renewable. The cumulative effect 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 have impacted on the soil in the area. In the immediate area the soils have supported agricultural uses and have been disturbed. The cumulative impact on soils in the area is therefore moderate to low. The impact is negative, site specific, definite, of long-term duration and of moderate 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 and even crop farming. 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 for dust suppression and mining needs. 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 small area proposed for development and the very localized and limited immediate catchment around the site the

cumulative effect is of low significance. The impact is negative, regional, highly probable, of medium term duration and of 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.

Should containment of dirty water on site not be realised and dirty water escapes into the environment then the impact will be of high significance, especially due to the nature of coal-mining impacted waters and due to the proximity of the Elandspruit Pan which will be indirectly impacted by dirty water runoff. This will result in highly significant impacts to a wetland of biodiversity importance. On a very localized scale the cumulative impact is highly significant. The overall impact is negative, local, highly probable, of long- term duration and of moderate significance.

## 10.5 Groundwater

### *10.5.1 Groundwater quantity*

The proposed mining operation will utilise minimal groundwater. 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. It is expected that, due to the topography of the immediate area, and the neighbouring mine workings, that the impact will be very localised and no private boreholes will be affected (to be confirmed with the geohydrological assessment). The impact on users is expected to be negligible but can be considered significant in terms of cumulative impacts if other mines establish in the immediate area. The cumulative impact is negative, local, highly probable, of medium term duration and of moderate to low significance.

It must be stressed that if dewatering changes the hydrological characteristics of the Elandspruit Pan, that cumulative impacts will be of moderate to high significance.

### *10.5.2 Groundwater quality*

After mining water levels will rebound and a contamination plume will develop, and possible mine decant. This plume is expected to be largely restricted due to the topographical nature of the proposed mine. However, there is a possibility that the Elandspruit Pan and surrounding springs may be impacted by the plume and potential decant. The impact on its own is highly significant regarding the immediate area, due to the fact that the Elandspruit Pan is of importance to National biodiversity. The impact is negative, local to regional, highly probable, of long term duration and of moderate to high significance, and of high significance if the Elandspruit Pan is affected

## 10.6 Air Quality

The air quality report completed for Graspan and Townlands Collieries which surround the site on the east and south, indicates that without mitigation, PM10 and dust levels will affect

surrounding areas, but large populated areas identified in the north east of the area should remain largely unaffected and levels should remain within set standards. The fact that the area is a Priority Area regarding air quality and the proposed activities will contribute to a moderate deterioration in air quality, the activities on site must be targeted specifically for dust management. With mitigation the impacts will stay localised with PM10 and dust only exceeding stipulated standard very locally along roads and at the mine pits. Overall impact significance on air quality is moderate.

## 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.

## 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. Currently, much of the vegetation targeted directly for opencast mining appears to be of medium to low sensitivity but the vegetation associated with the Elandspruit Pan and its buffer zone is expected to be of high sensitivity. In general, if indiscriminate mining proceeds and the sensitive vegetation associated with this area are destroyed, the cumulative impact will be highly significant, as it will result in impacts to the pan. Indiscriminate mining will also result in the destruction of protected plant species associated with the pan and their habitat, which is also a cumulative impact of high significance. Proper mining within the confines of the northern area will result in impact to disturbed vegetation. If no direct impacts are experienced in the pan then the cumulative impact can be considered negative, of medium-term duration, site specific, definite and of moderate to low significance.

From a faunal perspective the condition of the vegetation on the study site appears to be moderate to very low at places and there appears to be no loss of any particular sensitive faunal species, if the site is developed. Protected species seem to move through the area rather than actually reside there so the pan and rocky outcrop do provide habitat to some extent for protected species. In general the cumulative impact is negative, local, definite, of long term duration and of low significance. Impacts to the wetland and rocky outcrop area will result in cumulative impacts of moderate to high significance.

## 10.9 Sensitive Landscapes

The pan is listed as a Rank 2 FEPA wetland, and as such is important from a National biodiversity perspective. The wetland harbours protected floral species and the protected African Bullfrog and may also potentially be utilised by various bird species and other protected animals. Any impacts can be considered to be of moderate to high significance.

Cumulative impacts are negative, regional to national, definite and of moderate to high significance.

## 10.10 Site of Archaeological and Cultural Interest

A historical farm yard consisting of an old farm house, a kraal, a silo, a dam and some outbuildings, of low cultural significance was identified. The site will be destroyed (once permits are obtained). The cumulative impact is considered moderate to low. Historical content and context in the larger area becomes lost as more and more areas are disturbed.

The heritage assessment also identified two cemeteries that will need to be relocated. The sites have high cultural significance and cumulative impacts are highly significant if graves are relocated due to the sensitivity around such a process.

## 10.11 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 moderate to low significance.

## 10.12 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 not result in increased traffic only a change in route as the same fleets currently utilized will be moved to the proposed operation. The cumulative impact on traffic and safety is negative, site specific, definite, of short term duration and of low significance.

## 10.13 Regional Socio- Economic structure

The high unemployment and the high multiplier effect in the region means that the financial input of the mining activities has a huge, positive impact on the socio-economic aspect of the area. This will be through continued employment of staff and contractors and indirectly through the continued use of suppliers. This will feed through to other sectors and other people in the area through the multiplier effect. With the additional funding and extended funding 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 always exists 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:

- Soils, land capability and land use studies have been completed to date;
- Surface water studies;
- Groundwater assessment and geohydrological modelling;
- Atmospheric studies;
- Baseline noise assessments have been completed to date;
- Flora and fauna assessments;
- Aquatic assessments;
- Visual characterisation;
- Wetland assessment and delineation; and
- Heritage Study (Phase I assessment) has been completed to date.

## 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. PPP to follow for I&APs and authorities will include:

- Review of scoping report;
- EIA/EMP phase meeting;
- Review of the EIA/EMP report; and
- Notification of ROD (I&APs only).

## 11.2 Impact assessment and Management of Impacts

The impact assessment for the EIA report will be conducted as indicated below. This methodology was also used for the scoping phase. 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.

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 status 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 duration 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 extent 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 reversibility 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 magnitude (severe or beneficial) of the impact** | | |
|---|---|---|
| **Score** | **Magnitude** | **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 probability 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 Consequence** | | **= Magnitude + 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)?

## 11.3 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 by considering the mitigation of each negative impact and consolidating these mitigation measures into a management plan which will also highlight inspection and monitoring, frequency of inspections and proposed action plans to any potential issues observed. This will be detailed in the EIA/EMP report.

# 12 CONCLUSION

Studies will be conducted to determine the full baseline status of the current environment. This scoping report provides a desktop environmental assessment and broadly assesses potential impacts which the proposed mining operation may have on the surrounding environment. The most significant feature on site is the Elandspruit Pan. This will be fully assessed during the EIA/EMP phase. At this stage it can be stated that direct impacts to the pan can easily be mitigated by carefully planning mining and cordoning off the wetland and its buffer zone. Secondary or indirect impacts through groundwater dewatering or through surface runoff will need to be fully quantified before a full understanding of the impacts is attained. At this stage it is envisaged that management measures will need to be implemented for these potential impacts.

Additional feedback obtained through the PPP process and the specialist investigations will provided 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.

# 13 REFERENCES


Archaetnos, 2013: *A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR A PROPOSED OPENCAST MINING OPERATION AT ELANDSPRUIT PORTION 31, CLOSE TO MIDDELBURG, MPUMALANGA PROVINCE.* Report No.: AE01363V. Archaetnos Culture & Cultural Resource Consultants. October 2013.

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**Appendix A: Cabanga Concepts Company Profile and EAP CV**

**Appendix B: Public Participation Process Report and Related Documents**