# SUSTAINABILITY CHAPTER

# FOR THE

# UNIVERSAL COAL KANGALA PROJECT

# IN THE

# MPUMALANGA PROVINCE

**UNIVERSAL COAL (PTY) LTD**

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## EXECUTIVE SUMMARY

Kangala Coal Mine is a proposed opencast coal mine project situated in a high agricultural potential area of the Delmas region in Mpumalanga. In order to obtain a Mining Right for the mining of coal on portions 1 and the remaining extent of portion 2 of Wolvenfontein 244 IR, Universal Coal must undertake an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP). As part of the environmental and social studies required for the EIA and EMP, a sustainability assessment was compiled. The sustainability chapter evaluates three aspects of sustainable development including environmental integrity, social justice and economic efficiency. The ultimate aim of sustainable development for the proposed Kangala Coal Mine is to promote the sustainable use of resources in the area.

For the purpose of the Kangala Coal Mine project, the agricultural industry in the Delmas area is considered to be sustainable due to its high agricultural potential and its ability to reap and sow on a continuous and long term basis. Sustainable agriculture refers to the ability to produce fertile soil for crops and livestock without causing severe or irreversible damage to ecosystem health. Existing agricultural production in the proposed project area can be classified as 'sustainable' and is confirmed by local farming initiatives such as Middelbult, Wolvenfontein and regional production by the Rossouw Group. Based on the finite and non-renewable nature of coal resources, coal mining is not considered 'sustainable'. Once the coal is removed and utilised it cannot be returned or reused. Based on its ability to contribute towards to the economy and socio-economic environment; however, it can lead to a more sustainable mining industry.

Although minerals are non renewable, the mining industry may find measures to support alternative and more sustainable industries such as agricultural. This could be achieved by using the "*High cost – Low impact*" approach, which means that the mine is willing to invest a percentage of its profits (*high cost*) towards environmental, social and economic management and monitoring to ensure a low impact on the environment (*low impact*). Many environmentalists consider non-sustainable mining developments a threat to the agricultural industry; however, through an integrated *high cost, low impact* approach may provide greater sustainability for the mining industry.

If the Mining Right Application is approved for the Kangala Coal Mine, a number of mitigation measures and management plans should be implemented to ensure long term success of the mining project in terms of the aims and objectives outlined in the EIA/EMP report. The "sustainability in coal mining"-concept embraced by Universal Coal is a key aspect of shared corporate philosophy.

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# 1. INTRODUCTION

## 1.1. Project Overview

The Witbank Coalfield is currently the most important source of coal in South Africa, supplying more than 50% of South Africa's coal trade. The Delmas coalfield is situated to the west of the Witbank coalfield and both the Witbank and Delmas coal fields are continuously being exploited due to increased demands for coal and electricity. The proposed Kangala Coal Mine mining site is located in the Delmas coalfield. Universal Coal intends to supply coal from the proposed project site directly to Eskom for the generation and distribution of electricity in Southern Africa, while the rest of the coal will be exported. Coal will be transported to the Leeuwpan siding, located 12km from the mine site. In order to obtain a Mining Right for the mining of coal on portions 1 and the remaining extent of portion 2 of Wolvenfontein 244 IR, Universal Coal must undertake an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP).

The mining activities proposed for the Kangala Coal Mine and its resultant impacts on the receiving environment are assessed and discussed in more detail in the main EIA/EMP Report. Each activity has been summarised (Table 1) into different phases of mining, namely construction-, operation-, decommissioning- and post-closure phases.

**Table 1: Proposed Project Activities for Kangala Mining**

| Activity | Description |
|---|---|
| **Construction Phase** | |
| **Error! Reference source not found.**: | Recruitment, procurement and employment |
| **Error! Reference source not found.**: | Transport of construction material |
| **Error! Reference source not found.**: | Storage of fuel, lubricant and explosives |
| **Error! Reference source not found.**: | Site clearing and topsoil removal |
| **Error! Reference source not found.**: | Construction of surface infrastructure |
| **Error! Reference source not found.**: | Establishment of initial boxcut and access ramps |

| Activity | Description |
|---|---|
| **Error! Reference source not found.**: | Temporary waste and sewage handling and treatment |
| Operational phase | |
| **Error! Reference source not found.**: | Employment |
| **Error! Reference source not found.**: | Storage of fuel, lubricant and explosives |
| **Error! Reference source not found.**: | Topsoil and overburden removal and stockpiling |
| **Error! Reference source not found.**: | Drilling and blasting of hard overburden |
| **Error! Reference source not found.**: | Coal removal |
| **Error! Reference source not found.**: | Vehicular activity on haul roads |
| **Error! Reference source not found.**: | Water use around site |
| **Error! Reference source not found.**: | Screening and washing |
| **Error! Reference source not found.**: | Discard dumps |
| **Error! Reference source not found.**: | Pollution control dams |
| **Error! Reference source not found.**: | Waste and sewage generation and disposal |
| **Error! Reference source not found.**: | Concurrent replacement of overburden and topsoil and revegetation |
| Decommissioning phase | |
| **Error! Reference source not found.**: | Retrenchment |
| **Error! Reference source not found.**: | Demolition of infrastructure no longer required |
| **Error! Reference source not found.**: | Final replacement of overburden and topsoil and revegetation |
| *Activity 23*: | Waste and sewage handling |
| Post-closure phase | |

| Activity | Description |
|---|---|
| **Error! Reference source not found.**: | Post-closure monitoring and rehabilitation |

## 1.2. Laws and Regulations

As part of the EIA and EMP phase, a sustainability chapter was compiled for the proposed Kangala Coal Mine. The sustainability chapter evaluates three aspects of sustainable development including environmental integrity, social justice and economic efficiency. The sustainability assessment was compiled in accordance with the requirements of the National Environmental Management Act (NEMA, no. 107 of 1998) and the Mineral and Petroleum Resource Development Act (MPRDA, no. 25 of 2002). In addition to NEMA and MPRDA, the following environmental and agricultural regulations are also relevant to the sustainable use of land resources in the proposed project area; owing to the fact that the two main economic activities in the Delmas district are mining and agriculture:

- Draft Sustainable Utilisation of Agricultural Resources Bill, (2003);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- National Veld and Forest Fire Act (no 101 of 1998);
- Environment Conservation Act, (Act No 73 of 1989); and
- Agricultural Research Act, 1990 (Act No. 86 of 1990).

## 1.3. Sustainability Overview

According to the Department of Minerals and Energy (Swart, 2007), the mining sector in South Africa aims to promote its vision of 'sustainable development' by enabling South Africans to make balanced and informed decisions regarding the extraction and utilisation of mineral resource, by measuring and assessing progress towards sustainable development objectives and by minimising negative impacts and optimising environmental management in the mining sector.

Large scale developments such as coal mining in an area with high agricultural potential may create a complex relationship between industries; and although the mineral sector is actively attempting to achieve its sustainable development goals and objectives in the Mpumalanga Province, farmers in the Delmas region have already raised concerns regarding the potential impacts of mining on the local and regional agricultural industry. The impacts identified by

farmers include water availability and contamination, soil disturbances and ineffective rehabilitation, amongst others.

As a key aspect of their corporate philosophy, Universal Coal embraces the sustainable approach towards the development of the Kangala Coal Mine. Universal Coal strives to achieve the sustainable development objectives by minimising negative impacts and optimising environmental management. The biggest challenge for this sustainability approach is to create a balance between the main economic activities in this area, mining and agriculture.

# 2. AIMS AND OBJECTIVES

The overall objective of the sustainable baseline assessment for the proposed Kangala Coal Mine is to ultimately ensure that the local farming sector is not adversely affected by potential impacts caused by mining activities. The challenge is to determine how mining activities can continue without affecting the agricultural sustainability of the area by implementing the *high cost – low impact* approach. The aim of this assessment is to identify existing and potential sustainable land uses within the proposed project area and ultimately promote the sustainable use of social, economic and environmental resources in the area.

# 3. METHODOLOGY

Sustainable development refers to resource utilisation that meets present human socio-economic needs while preserving the environment in the long term so that these needs can also be met in the future (the Brundtland Commission, 1987). Sustainability assessments therefore take into account three significant elements: environmental integrity, social justice and economic efficiency. Although minerals are non renewable, the mining industry may find measures to support alternative and more sustainable industries such as agricultural. This could be achieved by using the "*High cost – Low impact*" approach, which means that the mine is willing to invest a percentage of its profits (*high cost*) towards environmental and socio-economic management and monitoring to ensure a low impact on the environment (*low impact*).

In context of the 'sustainability' approach, this section described the methodology used to evaluate and discuss the overall sustainability of the project area, as well as limitations and impact assessment criteria.

## 3.1. Study Approach

The sustainability chapter aims to address all aspects related the long-term economic, social and environmental development of the proposed project area. The following methodologies were utilised to assess the sustainable use of resources for the proposed Kangala Project.

### 3.1.1. Socio-Economic Assessment

- *Socio-Economic Assessment Phase 1*: Basic literature reviews were undertaken to gain knowledge of current socio-economic status of communities in the regional area. The review of the municipal Integrated Development Plan (IDP) was included in this phase.
- *Socio-Economic Assessment Phase 2:* A site visit was undertaken by DWA as part of the Public Participation Process (PPP) to obtain more information on the surrounding communities. The PPP report is part of the environmental impact assessment and management process and is described in more detail in the main EIA/EMP report.

### 3.1.2. Agricultural Assessment

- *Agricultural Assessment Phase 1:* Research and literature reviews were conducted for the better understanding of regional agricultural industries and production, as well as the baseline analysis of markets and industries.

- *Agricultural Assessment Phase 2:* Farmers and land owners were contacted to obtain primary baseline information regarding the agricultural-economic environment of the area and to gain understanding of the land use in the proposed project area.
- *Agricultural Assessment Phase 3:* Industry information and data were gathered from various sources (i.e. AgriSA, media records and industry specialists) to complete the baseline agricultural sections. Agricultural elements were analysed and integrated to compile the sustainability chapter and impact assessment and ratings were conducted in accordance with the relevant guidelines developed by DWA.

## 3.2. Limitations

The sustainability chapter only includes baseline information regarding the current status of the socio-economic and agricultural environments. The main elements of sustainability, Environmental integrity, Social justice and Economic efficiency, have therefore only been broadly described. Detailed assessments of social issues and economic analysis of markets and businesses have therefore not been included in this study. The local socio-economic conditions have been assessed through a number of key informant interviews with the nearby settlement and potentially affected farmers only. By reason of the fluctuation of markets and variation of input costs of individual farmers, the exact market values have not been financially calculated (ZAR) for this study. If more detailed studies are required for the analysis of the socio-economic or agricultural economic status of the proposed Kangala Project area, a Social Impact Assessment and or a comprehensive Agricultural Economic Impact Assessment study should be undertaken.

## 3.3. Impact Assessment Criteria

Records and data gathered for the socio-economic and agricultural sections were analysed, evaluated and integrated in accordance with the relevant guidelines and methodologies developed by DWA. The impact assessment methodology is described in detail in the main EIA/EMP report.

The impact rating process is designed to provide a numerical rating of the various environmental impacts identified by use of the Input-Output model. As stressed in the EIA/EMP report, the purpose of the EIA process is not to provide an incontrovertible rating of the significance of various aspects, but rather to provide a structured, traceable and defendable methodology of rating the relative significance of impacts in a specific context. Similarly to the EIA, the significance rating process for the sustainability assessment follows the established impact/risk assessment formula:

*Where*

Significance = Consequence x Probability

*And*

Consequence = Severity + Spatial Scale + Duration

Probability = Likelihood of an impact occurring

The matrix first calculates the rating out of 75, and then converts this into a percentage out of 100. The percentage is the figure quoted in the matrix. The weight assigned to the various parameters for positive and negative impacts in the formula. Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in the EMP. The significance of an impact is then determined and categorised into one of four categories, as indicated in Table 2. In accordance with Regulation 51 of the MPRDA, management actions will be assigned for all impacts, irrespective of significance

**Table 2: Significance threshold limits**

| **Category** | **Description** | Colour |
|---|---|---|
| High | 76%- 100% | |
| Medium – High | 51% – 75% | |
| Medium - Low | 26% – 50% | |
| Low | 0% - 25% | |

**Table 3: Weight assigned to various parameters for positive and negative impacts**

| Rating | Severity | | Spatial scale | Duration | Probability |
|---|---|---|---|---|---|
| | **Environmental** | **Social, cultural and heritage** | | | |
| **5** | Very significant impact/total destruction of a highly valued species, habitat or ecosystem or extremely positive impact over baseline environmental condition. | Irreparable damage to/destruction of highly valued items of great cultural significance or complete breakdown of social order or Extremely positive impact on social, economic and cultural environment. | National/ International | Permanent/ Irreversible (more than 50 years) | Certain/ Normally happens in cases of this nature (80-100% chance of happening) |
| **4** | Serious impairment of ecosystem function, or very positive impact over baseline environmental condition. | Serious social issues/Permanent damage to items of cultural significance or very positive impact on social, economic and cultural environment. | Provincial/ Regional | Long Term (25 to 49 years or beyond closure) | Will more than likely happen (60-79% chance) |
| **3** | Moderate negative alteration of ecosystem functioning or Moderately positive impact over baseline environmental condition. | Moderately important social issues and/or moderately significant damage to items of cultural significance or Moderately positive impact on social, economic and cultural environment. | Regional (substantially beyond site boundary) | Medium Term (5-24 years) | Could happen and has happened here or elsewhere (40-59% chance) |
| **2** | Minor effects not affecting ecosystem functioning or Slightly positive impact over baseline environmental condition. | Minor Impacts on the local population, repairable over time. Temporary impairment of the availability of items of cultural significance or Minor positive impact on social, economic and cultural environment | Local (beyond site boundary and affects neighbours) | Medium-Short Term (1-4 years) | Has not happened yet, but could (20-39% chance) |
| **1** | Insignificant effects on the biophysical environment or Insignificantly positive impact over baseline environmental condition. | Insignificant social issues / low-level repairable damage to commonplace structures. positive impact on social, economic and cultural environment or Insignificant positive impact on social, economic and cultural environment | Site (does not extend beyond site boundary) | Short term (Less than a year) | Conceivable, but only in a set of very specific and extreme circumstances (0-19% chance) |

# 4. REGIONAL DESCRIPTION OF STUDY AREA

The sustainable use of resources in an area may be influenced by various factors including the geographical location of the area, soil characteristics and socio-economic characteristics (Jordaan, 2006), as well as climate, topography and ecological state. In context of the proposed Kangala Project, the most significant aspects applicable to this study are briefly described in more detail in the following sections. An integrated map has been compiled to provide a holistic perspective on the sensitive areas in the study area in relation to the Kangala Coal Mine plan (Appendix A).

## 4.1. Geographical Location

The proposed project area is located in the Delmas Local Municipal area in the Delmas coal fields of the Mpumalanga Province, South Africa (topographical sheet 2628BA). It is situated 80km due east of the centre of Johannesburg close to the operating coal mines Leeuwpan and Stuart Coal. The proposed mine site is well situated close to good national road and railway infrastructure and within a radius of 30 km to 70 km from four coal-fired power stations. The nearest towns are Delmas, Devon and Leandra.

## 4.2. Regional Socio-Economics

Delmas local municipality has an estimated population of approximately 56,207 people in 2001 of which an estimated 41% are economically active i.e. employed or seeking employment. Of this percentage of economically active population, 23.5% are employed and 76.5% are unemployed, which implies that the dependency is high. The majority (69.5%) of the population falls into the no income bracket (earning less than R800/month), considered as living below the poverty line.

## 4.3. Existing Infrastructure and Safety

The R42 between Delmas and Nigel runs through the Wolvenfontein farm with the remainder of the farms being accessed via dirt roads that form boundaries between farms. There are farm vehicles which make use of the dirt roads, the traffic on which varies depending on the agricultural season. Harvesting and planting results in higher vehicle traffic. Traffic on the R42 is fairly constant and is made up of motor cars, trucks and occasional farming equipment. Farm attacks, stock- and crop theft have become general concerns on farms across South Africa. Granting a right of way over your farm to any person or company or government department may imply a security risk.

## 4.4. Climate and Air Quality

Climatic and other natural elements create the identity and nature of an area and influence the sustainability potential of the region. The project area falls within the Highveld climatic zone which is characterised by moderate summers, cold winters and summer rainfall. Precipitation occurs as showers and thunderstorms and falls mainly from October to March with the maximum falls occurring in November, December and January. Rainstorms are often violent (up to 242 mm can occur in one day) with severe lightning and strong winds, sometimes accompanied by hail. Margot Saner and Associates (MS&A) compiled a comprehensive Air Quality Impact Assessment for the Kangala Coal Mine. The aim of this report was to determine, through computational techniques, the potential impacts to the environment (in the form of dust deposition and ambient PM10 concentrations) that would result from activities performed on proposed project area. A more comprehensive description of the climatic factors and air quality are described in the EIA/EMP report.

## 4.5. Soil Characteristics

A soil survey of the potential opencast area for the proposed Kangala Coal mine was undertaken to determine the soil types, land capability (agricultural potential) and land use present on the property. The comprehensive soils report, including impact assessment and management plan, is included in the main EIA/EMP Report. During the soils survey, the dominant soils identified on the Wolvenfontein farm include Oakleaf and Tukulu soil forms. Shallow high clay content Katspruit soils were found in the pans and wetland areas; as well as shallow patches of Glenrosa and Mispah soil forms. 71% of the farm consists of cultivated high potential Oakleaf and Tukulu soil forms while 10% of the cultivated area consists of low potential Katspruit soil form. The remaining 18% of the farm consists of mainly wetland uncultivated areas.

The land capability of the farm Wolvenfontein is classified as mainly arable, high potential farm land. 71 % of the total area consists of arable high potential soil. 29 % of the farm is occupied by low potential agricultural soil due to mainly depth restrictions on the one hand and imperfect drainage on the other hand. The exceptions to arable farm land being the shallow soil in the pan and wetland areas. A small portion namely 10 % of the total area comprising of pan and wetland areas, is cultivated.

#### 4.5.1.Land Use

The predominant land use in the Delmas area is arable agriculture. The farm Wolvenfontein is no exception and land use is dominated by arable crop production due to the dominant high potential soil. Current land use is estimated at 81 % of the available land being used for arable farming. 19 % of the total available farmland is un-used due to shallow soils and wetland areas. Arable crop farming activities dominate at the farm Wolvenfontein. Only the wetland areas contain perennial vegetation potentially available for grazing. The wetland areas at Wolvenfontein are however not fenced off and are not used for grazing. The wetland areas were burnt during the winter thereby limiting potential grazing opportunities.

### 4.6. Sustainable use of Resources

South Africa covers an area of 121.9 million ha, of which over 80% (100 million ha) is used for agriculture (DEAT, 2005). This indicates that land resources in the country have immense social and economic value. The agricultural industry in South Africa ranges from intensive, large-scale commercial agricultural to low-intensity, small-scale, and subsistence farming. A large proportion (about 43%) of South Africa's more than 46 million people live in rural areas and depend on natural resources for their livelihood (DEAT, 2005). In combination with the increasing demands for arable land in South Africa, growing industrial and residential developments also put increasing pressure on the availability of land and its natural resources.

Effective sustainable development initiatives should therefore be implemented to conserve certain areas for farming and encourage the responsible utilisation of land resources. This approach will ensure that agricultural production is not adversely affected by increased competition for land and resources. Sustainable development needs to be focussed on long term goals and objectives to ensure a viable balance is created between environmental integrity, social justice and economic efficiency. Effective sustainability assessments for project such as the proposed Kangala Coal Mine are evidently important elements in the planning and implementation phases of all projects and developments. The aims and objectives of sustainable development and sustainability assessments are discussed in more detail in the following chapter

# 5. LOCAL DESCRIPTION OF PROJECT AREA

## 5.1. Socio-Economic Results

The LM is characterised as an area dominated by farming activities, which occupy approximately 60% of the total municipal area (Delmas Local Municipality, 2009-2010). Similarly the project area, namely the Farm Wolvengontein 244IR portion1 and RE of portion 2, is currently used for agricultural purposes as are the surrounding farms, as shown in *Figure 1*. The farms immediately surrounding are Witklip, Middelbult, Leeupan and Stydpan.

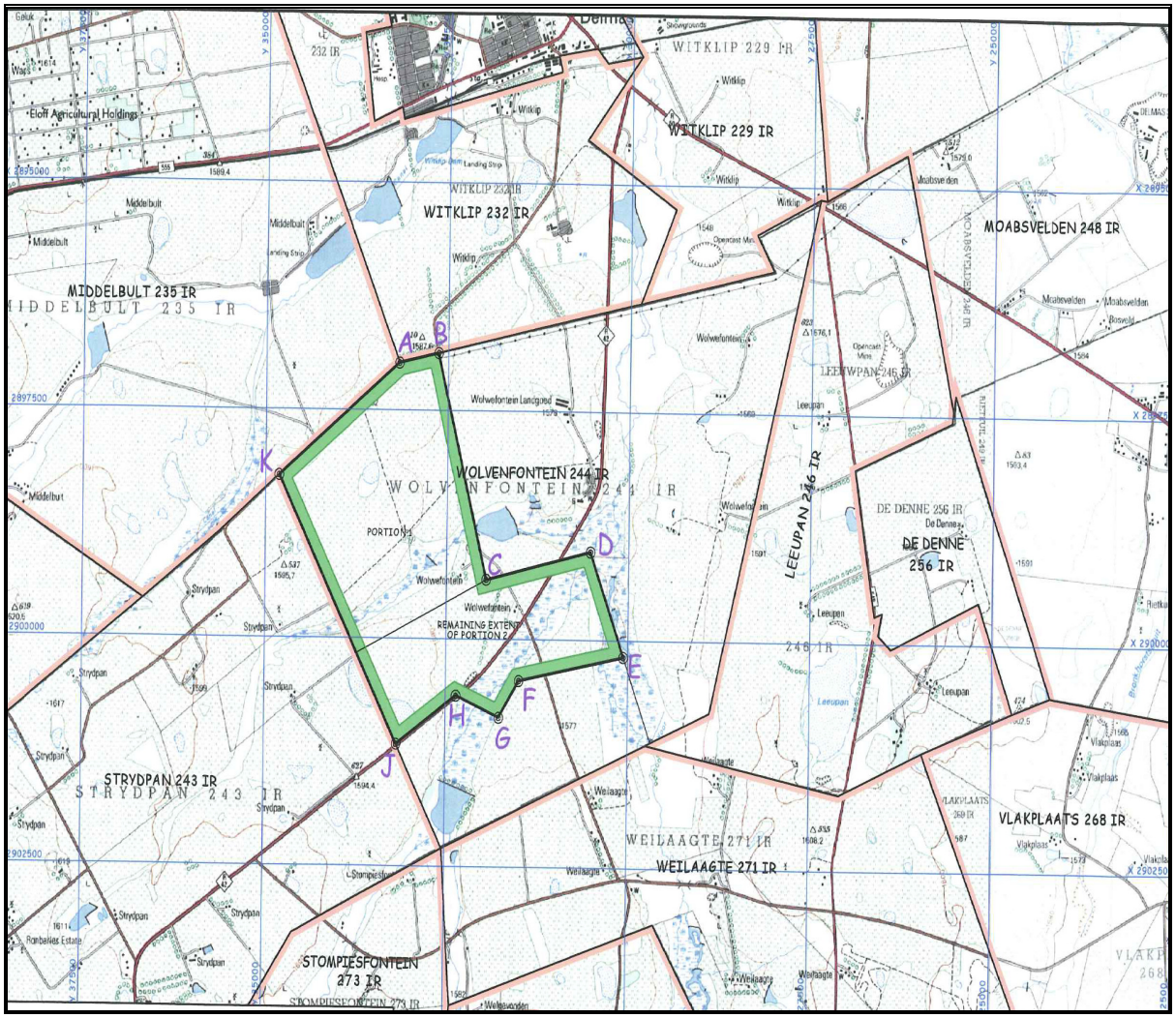


**Figure 1: Locality Map (Source: Injula Mining Operations (Pty) Ltd (2006))**

The owners of the surrounding farms are outlined in *Table 4*. These farms are either owned by individual land owners or mining companies as in the case of Strydpan Portions 16, 20 and 24.

**Table 4: Adjacent Landowners of the Kangala Coal Mine**

| Farm Name | Portion | Landowner |
|---|---|---|
| Wolvenfontein 244IR | RE | Kallie Madel Trust |
| Wolvenfontein 244IR | 5 | Willem Oosterhuis Boerdery |
| Wolvenfontein 244IR | 4 | Mariwija Boerdery |
| Wolvenfontein 244IR | 6 of Ptn 2 | Petrus Haefele |
| Strydpan 243IR | 16 | Eloff Mining Company |
| Strydpan 243IR | 20 | Eloff Mining Company |
| Strydpan 243IR | 24 | Eloff Mining Company |
| Strydpan 243IR | 33 | Hendrik Schoeman Weilaagte |
| Strydpan 243IR | 44 | Hendrik Schoeman Weilaagte |
| Middelbult 235IR | 39 | Elloff Landgoed |
| Middelbult 235IR | 40 | VV2 Eiendomme |
| Witklip 232IR | 2 | Hendrik Schoeman & Seuns |
| Witklip 232IR | 18 | Hendrik Schoeman & Seuns |

In general land use surrounding the Kangala Coal Mine project area is used for a variety of agricultural activities as shown in *Table 5*. The project area (Portions 1 and 2 of Wolvenfontein) are currently used for Maize and dry bean farming. Maize, beans and soya are common crops farmed in the surrounding area. Additionally agricultural activities include chickens, cattle, citrus, instant lawns and table grapes.

**Table 5: Land Use Surrounding the Project Area**

| Name | Farm name & Ptn | Farming activities | Additional economic activities | Ecological/ cultural sensitive sites |
|---|---|---|---|---|
| Jacobus Oosterhuis | Portion 6 Wolvenfontein 244IR | Chickens, cattle, maize, beans | No | Jackal, pheasants, porcupine, guinea fowl. In wetlands fishers, steenbok. On Koos Uys farm - Flamingos |
| Jozua du Plessis | Portions 39, 82 Middlebult 235IR | Cattle grain | No | Wetlands |
| Chris Rossouw | Portion 40, Middlebult 235IR | Chickens, cattle, eggs, soya beans, dry beans, mealies, instant lawn, citrus and table grapes | Soya bean extract plant | Serval, jackals, suricates, guinea fowl, duikers, wart hogs, porcupine |
| Petrus Haefele | Portion 6 Wolvenfontein 244IR | Mealies, beans, grazing. Property is rented to Schoeman boerdery | No | 32 different species of buck such as duikers, steenbok, there are ottos, flamingos, |
| Carel Schoeman | Portions 1, 2 Wolvenfontein 244IR | Maize, dry beans | No | Wetlands |

The site currently consists of agricultural fields, with three small streams which traverse the property. There are no houses where infrastructure is proposed, however there are some residential farm houses scattered around the property. There are power lines along the north western boundary of the farm and the property is traversed via a number of farm roads. There is no knowledge of the lodgement of land claims on the proposed project area.

#### 5.1.1. Local Attitudes to Mining

DWA underwent extensive consultations with local land owners during the public participation process in 2009. There were a wide range of attitudes and concerns expressed during consultation depending on the group consulted. In general agricultural land owners were not in favour of the Kangala Mine as it will be situated on prime agricultural land with is scarce in the municipal area. In addition land owners were concerned that once the mine was operational semi-skilled agricultural labour would leave the farms to find employment on the mine. In contrast the perceptions of farm workers and communities were that mining would bring greater employment opportunities.

### 5.2. Agricultural Results

The proposed Kangala Coal mine project area is primarily confined to Portions 1 and the Remaining Extent of Portion 2 of the farm Wolvenfontein 244 IR. The agricultural potential of the soil in the proposed project area on this farm is determined by the combination of soil depth and favourable (high rainfall) climatic conditions. Although the dominant agricultural potential of the farm Wolvenfontein is classified as high potential farm land, there are some areas of low agricultural potential present on the farm, as depicted in Figure 2. Due to the accessibility of information on the Rossouw Group, the farm Middelbult and associated agricultural initiates were included in this section as an example of the thriving agricultural industry in the Delmas area. The Rossouw Group is considered to be representative of the different types of farming practices found in the area, such as maize, cattle and soya. Other interested and affected farmers located in the geographical proximity of the proposed project area have been acknowledged and consulted as part of the Public Participation Process of this project.

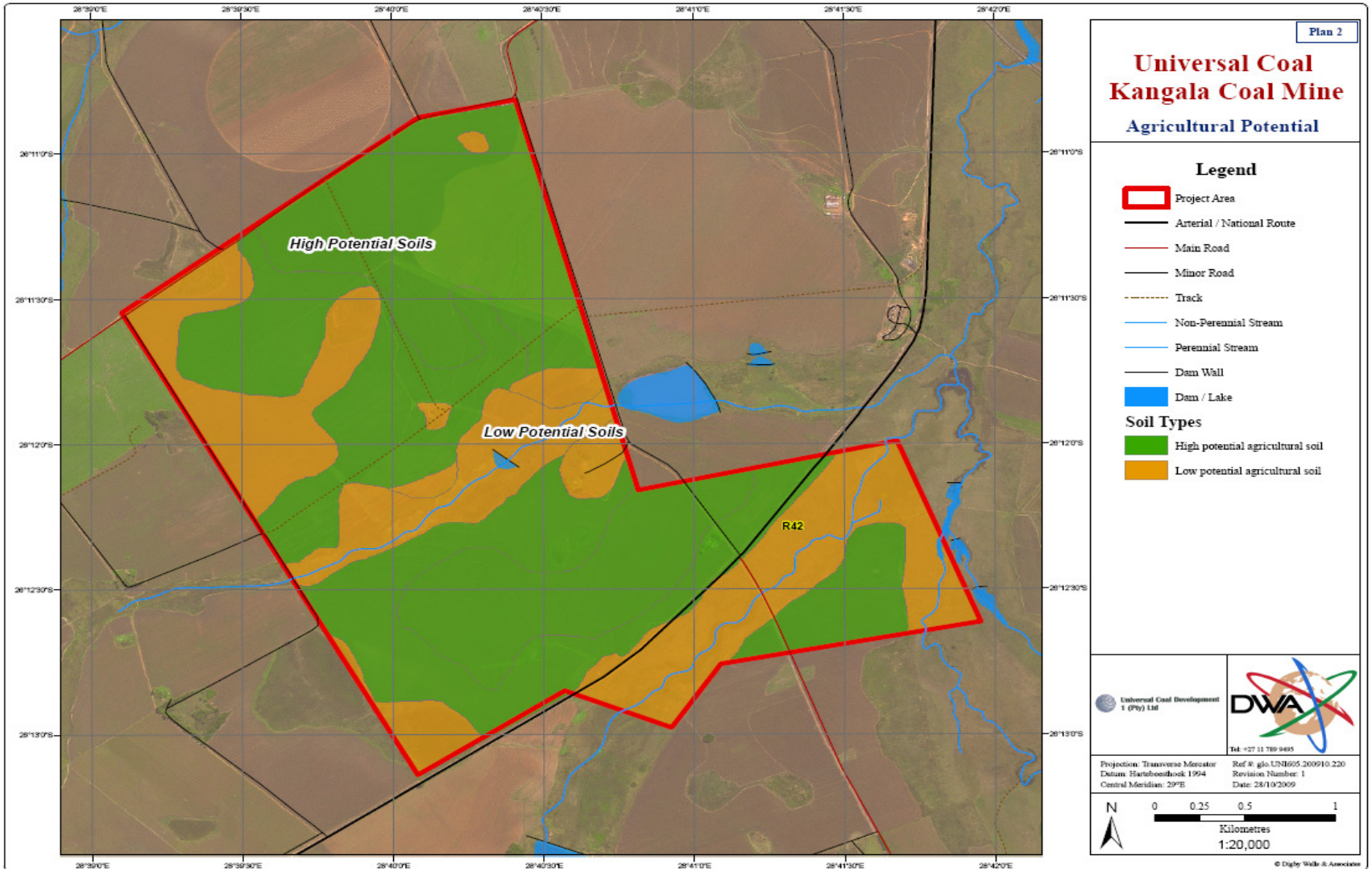


**Figure 2: Agricultural Potential (DWA, 2009)**

### 5.2.1. Wolvenfontein

The Kallie-Madel Trust currently owns the surface rights to Portion 1 and Remaining Extent of Portion 2 of Wolvenfontein 244. Arable crop farming activities are currently taking place on this farm. The wetland areas contain perennial vegetation potentially available for grazing. The wetland areas at Wolvenfontein are burnt during winter, limiting grazing opportunities. Pan areas on Wolvenfontein occupy the foot slope terrain units on the farm and only small areas of the pans are left uncultivated. The Oakleaf soil form is an example of a high potential arable agricultural soil (Soils Report, 2009). During the soils survey at Wolvenfontein, it was found that well managed soil conservation practises are being implemented. As depicted in Figure 3, contoured fields prevent soil erosion by decreasing water runoff at Wolvenfontein. Soil conservation is also evident in the form of a grassed water way, preventing runoff and erosion (Soils Report, 2009).

**Figure 3: Cultivated fields of Oakleaf soil form (Soils Report, 2009)**

**Figure 4: Contoured fields at Wolvenfontein (Soils Report, 2009)**

### 5.2.2. Middelbult

The Middelbult farm is owned by the Rossouw Group, which is also operating in the Delmas region, consisting of two units namely Rossouw Farming and Roslè Farming (Rossgro Group Website, 2009). The Rossouw Group is a highly effective and sustainable farming operation that includes maize, dry beans, Beefmaster cattle, poultry, citrus and table grapes, amongst other.

Rossouw Farming is managed by Chris Rossouw (Senior) and Chris Rossouw (Junior), comprising of 2000 ha maize, 410 ha dry beans, 350 ha soybeans and 300 Beefmaster cattle (Landbouweekblad, 2008). The Roslè Farming is under management of Charles Rossouw, focuses on the production of table grapes and citrus, both mainly for the export market. It currently has about 112 ha of table grapes, 280 ha citrus and 175 ha maize under irrigation. Rossouw Group's poultry division (Rossouw Poultry) is managed by Dr. Adriaan Rossouw and Dr. Naudé Rossouw. Rossouw Poultry consists of the full chain of layer breeder farming, parent hens, production of ready-to-lay pullet hens, braai chickens and eggs for the consumer market. It currently has 34 chicken houses and the most recent houses were built completely environmentally controlled.

**Figure 5: Broilers/ Chicken houses (Rossgro Group Website, 2009)**

The Rossgro Abattoir is managed by Chris Rossouw (Junior) and approximately 20 000 braai chickens are slaughtered and processed per week (to be increased to 720 000 per week). As part of the Rossouw enterprise development, Africa Lawns grows and distributes instant lawns, concentrating mainly on Kikuyu, Cynodon and LM type of grasses. These types of grasses are the most common types that are being used in sport field construction, golf course developments and property developments. With an average production of 12 000 $m^2$ instant lawn per day, Africa Lawns part of the Rossouw group, is one of the biggest producers of instant lawn in South Africa.

**Figure 6: Golf Estate grass provided by African Lawns (African Lawns Website, 2009)**

The Rossouw Group employs 520 permanent workers in total on the various farms as well as 450 seasonal workers on the Rolsè Farm. There are also 70 employees together in the business on the various farms. Every division has its own separate managers. Skills development supported on all farms include Agri SETA Training, First Aid Training, Free Medical Services and Biosecurity (Landbouweekblad, 2008).

### 5.3. Mining Results

South Africa has seen significant levels of growth in electricity consumption and demand, as well as increased demands for quality coal. The Kangala Coal Mine has a gross in situ resource of 20.21 Mt (in situ before losses) that can be classified as multi-product coal that would yield a significant portion of export steam coal. The planned life-of-mine is 10 years. The life of mine may be extended, as more mineable reserves become available through a further drilling campaign of the adjacent resources.

Coal will be directly supplied to Eskom where it will be burnt to generate electricity which is distributed throughout Southern Africa. Due to increased development and demand for electricity, there is an ever increasing need for coal mines to continue to produce coal for supply to Eskom. As par of the Kangala Coal Mine development, 200 jobs will be created, multiplier effects will be established, training will be provided to employees resulting in an improvement of the local skills base and support will be given to the local and national economy by the purchase of goods and services. The mine will invest in social capital by undertaking a Social and Labour Plan, and promote sustainable local economic development in the surrounding areas. The export of coal will contribute towards South Africa's foreign revenue, the generation of export income and the expenditure by employees.

# 6. POTENTIAL IMPACTS

The mining activities proposed for the Kangala Coal Mine and its resultant impacts on the receiving environment are assessed and discussed in more detail in the main EIA/EMP Report. The assessment of environmental impacts resulting from alternative land use and development such as commercial agriculture, community agriculture, tourism and mining, is also described in the EIA/EMP report. The impact assessment and comparative analysis between various industries indicates that all human activities and developments ultimately have an impact on the social, economic and natural environment. As an intangible concept, the 'sustainability' of an industry can not easily be assessed in terms of impact assessment and ratings term; however, sustainability can be set as a goal to "do things right"; i.e. implementation of effective social, economic and environmental monitoring and management plans.

The overall sustainability of the Delmas area may be better understood in the context of existing agricultural production versus the potential developments of coal mines in an area with high agricultural potential. As described in the previous section, the existing agricultural industry is highly productive and in order to understand the potential impact on this industry the proposed activities for the Kangala Coal Mine needs to be understood, as well as its resultant impacts on the receiving environment. The aim of this section is therefore not to duplicate the assessment and rating of mining impacts on social, economic and environmental elements, but rather focuses on the identification of strategies to ensure the project can proceed with minimum impact on the agricultural industry. The focus is therefore not on impact identification or management, but rather the implementation of 'sustainability' principles.

In order to understand the nature of mining activities proposed for the Kangala Coal Mine, this section provides a preliminary description of the actions, activities and processes that are proposed for the operation. Each activity can be linked to the various mining, mineral processing, waste management and any other associated activities that constitute the various collieries' operations. These activities act as driving forces that exert pressure on the natural environment, ultimately resulting in impacts on the biophysical, social and cultural environments. The purpose of including these activities in the sustainability chapter is to better understand how mining may impact current activities, specifically those impacts which may be significant.

The proposed mining activities for the Kangala Coal Mine are described in the first chapter of this report. A summary of the most significant impacts that may result from proposed mining activities (Table 1) on the socio-economy and agricultural industry are outlined in Table 6.

**Table 6: Potential primary impacts and anticipated secondary effects**

| *PRIMARY IMPACT* | *SECONDARY EFFECT* | *DESCRIPTION* | *PROBABILITY* | *SPATIAL SCALE / EXTENT* | *DURATION* | *SEVERITY* | *MITIGATION* |
|---|---|---|---|---|---|---|---|
| Impacts on hydrology due to mine effluent | Agricultural Industry and Food Security | Agriculture is dependent on good water quality for irrigation and for drinking water for livestock. The long-term use of acidic, heavy metal-laden mine water could result in acidification and accumulation of heavy metals in the soils, which in turn threaten human health through the food chain. Polluted pans or catchment areas in the proposed Kangala Project area may also affect the availability of clean borehole water. Water pollution will therefore have a negative impact on regional agricultural production, such as maize-, dry beans-, cattle-, and poultry- farming | 3 | 3 | 3 | 3 | Yes, required: Implemented according to Water Monitoring and Management Plan outlined in EIA/EMP Report. A hydro-census of the groundwater and surface water was undertaken. Water levels, volumes and quality were tested during the EIA phase according to Department of Water Affairs and Forestry (DWAF) guidelines. |
| Safety and Security | Local Communities and Farmers | Influx of foreign workforce, job seekers, business opportunists, entrepreneurs, beggars and criminals as result of mine employment may create social unrest or conflict amongst local community members. Mining operations may need to comply with certain protocol procedures with regards to access and right of way. | 3 | 2 | 3 | 3 | Yes, required: Implemented according to PPP requirements in EIA/EMP and Social and Labour Plan (SLP). No workers will be accommodated on site. |
| Air Pollution and Noise | Local Communities and Farmers | The predominant wind direction is east to east-south-east; subsequently farms and associated agricultural aspects located to the West to West-North-West may be more vulnerable to dust pollution and noise. | 3 | 2 | 3 | 2 | Yes, required. Implemented according to the Dust Monitoring Programme and Air Quality Management Plan outlined in EIA/EMP Report |
| Vibrations and Noise | Agricultural Industry and Farm Animals | Chickens and cattle in the surrounding area are sensitive to blasting, operational noise and vibrations. | 2 | 2 | 2 | 2 | Yes, required. Implemented according to Noise and Vibrations Monitoring and Management Plan. The mining company may be liable for damages caused by blasting/noise; complaints and damage will be documented and evaluated during mining phases. |
| Hydrology, Biophysical and Air Quality degradation | Agricultural Industry and Food Security | The Rossouw Group's future plans include dynamic expansions and they plan to continue with integrated sustainable agricultural development, such as an increase of 20% in egg production, an increase of pullet hens to 530 000, production of biodiesel from soybeans in the near future and other sustainable agricultural initiatives | 2 | 4 | 3 | 2 | Yes, required. Implemented according to Soil Management Plan and Rehabilitation Plan in EIA/EMP report, as well as international best practice guidelines and norms for post-closure and rehabilitation. |
| Cumulative Air Quality (Air Pollution) | Local Communities, Farmers and Fauna/Flora | In combination with Leeuwpan Coal Mine and Ikhwezi Colliery, located within 13 km of the proposed project site, the Kangala Mine may contribute to cumulative impacts on air quality in this region. | 2 | 4 | 3 | 2 | Yes, required. Implemented according to the Dust Monitoring Programme and Air Quality Management Plan outlined in EIA/EMP Report |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Hydrology, Biophysical and Air Quality | Cumulative Impacts on Agricultural Industry and Businesses | Wolvenfontein will be directly affected, leading to a decrease in regional maize production and the loss of commercial farm land and agricultural potential. Successful farming initiatives in the area, such as the Rossouw Group (Middelbult and surroundings), are important role player in the local economy, actively involved the maize, dry beans, cattle, and poultry industries, supporting various small-, medium- and large enterprises in and around the Delmas and employing and training numerous employees. | 3 | 4 | 3 | 2 | Yes, required. Implemented according to Soil Management Plan and Rehabilitation Plan in EIA/EMP report, as well as international best practice guidelines and norms for post-closure and rehabilitation. |
| Traffic and Infrastructure | Local Communities and Farmers | The proposed mining activities are currently planned for on the north western portion of the farm which is not likely to impact significantly on the R42 traffic; however, increased traffic may pose a safety risk to local communities due to the increased risk of accidents. | 2 | 2 | 2 | 4 | Yes, required. Traffic regulation will be followed and speed limits adhered to. Maintenance of municipal roads and road safety will be monitored and managed in collaboration with the local municipality. |
| Employment by the Mine | Positive Impact (job creation and training) | The total workforce will be approximately 200 people. There will be 34 permanent employees. The remainder of the workforce will be made up of contractors. | 5 | 2 | 3 | 4 | No, mitigation is not required. Positive impact will be implemented through mine employment and training and need to be managed. |
| Local Economic Development (LED) | Positive Impact (job creation and training) | The LED initiative to establish a small maize milling and distribution B.E.E business, purchasing from local small scale or subsistence farmers and selling processed maize products directly to communities or through a network of local agents. This initiative will employ approximately eight people with further opportunities for the employment of agents in outlying areas. | 3 | 3 | 2 | 4 | No, mitigation is not required. Positive impact will be implemented through LED initiative as part of Social and Labour Plan and local development and need to be managed. |
| Retrenchment at Mine Closure | Local Communities, Small Businesses, and Subcontractors | Retrenchment of employees, loss of income and depression of local economy: During the decommissioning phase of the project, the most significant socio-economic impact is loss of jobs. A number of jobs will be lost after Mine Closure which will have a multiplier effect on suppliers of goods and services to the mines and associated businesses. | 5 | 2 | 3 | 3 | Yes, required. Implemented according to the Social and Labour Plan recommendations and measures; such as alternative livelihood projects to avoid the effect of negative impacts and ensure long term community sustainability. |
| Change of current Land Use and impacts on Soil | Land Use, Agricultural Industry, Farmers and Communities | Land use will change during opencast mining operations and may affect the long term agricultural potential of the soil. Negative impact on soil fertility will occur from storage and erosion (compaction and pollution). Impact on soil quality from hydrocarbons storage and AMD. | 3 | 2 | 3 | 2 | Yes, required. During post-closure and rehabilitation phase, population growth, rate of urbanisation, the future need for resources (such as land and water) and the future need for services will be considered when considering future land uses for the Kangala Coal Mine |

# 7. DISCUSSION

The assessment of primary impacts on social, economic and environmental resources listed in Table 5 describes a number of potential impacts, both positive and negative, on the social, economic and environmental elements in the proposed project area and its surroundings. The impacts of proposed mining activities for the Kangala Coal Mine are assessed in more detail and rated in the context of each specialist study in the EIA/EMP report. According to specialist result outlined in the EIA/EMP report, mining activities evidently has various negative impacts on environmental resources such as soil, water and air, which are the bare essential resources that the agricultural industry dependents on. Increased impacts on these elements will therefore have a secondary negative impact on the agricultural industry.

Cumulative impacts of alternative industries such as mining and tourism on social, economic and environmental elements are also described in more detail in the EIA/EMP report. Besides mining, there are also other elements that may affect the sustainability of the agricultural industry such as political instability, fuel price escalations, electricity tariff increases, diseases, natural disasters and climate change.

The sustainability of the agricultural industry in the Delmas area is evidently vulnerable to a variety of external and internal impacts resulting from tangible and intangible changes to the environment such as industrial developments, mining projects, political changes and economic fluctuations, amongst others. It is therefore important to consider the cumulative impacts on broader scale and implement a *high cost low impact* approach in mining developments and identify strategies to contribute to the local agricultural industry, e.g. building roads, subsidising electricity or fuel costs.

As recommended in the EIA/EMP report, impacts resulting from the mining activities should still be managed and monitored according to the legislative requirements. These impacts can further be mitigated in the context of the *high cost low impact* approach to ensure overall sustainability of the agricultural industry. This implies that coal mines such as Kangala Coal Mine may add value to the Delmas area by operating more effectively and responsible and attain to achieve a sustainable balance between social justice, environmental integrity and economic efficiency. This balance can only be attained if the recommendations outlined in the EIA/EMP are effectively implemented through the integration of agricultural concerns and needs, and continuous monitoring of environmental resources.

Mines such as Kangala Coal Mine have the financial capacity to ensure the agricultural industry is not adversely affected by the impacts associated with mining activities. The *high cost low impact* approach is therefore not a once off solution to the sustainability debate, but a continuous process of environmental planning, management and monitoring.

# 8. MONITORING PROGRAMME

Monitoring is the "repeated observation, through time, of selected objects and values in the ecosystem to determine the state of the system" (Forest Service, 2009). Monitoring emerged as one of the primary management responses to the sustainability challenge and it helps us understand the condition of systems and what we value as sustainable. Monitoring has focused on developing the tools necessary to measure where the project is relative to where it wants to be. In essence, this means that the proposed Kangala Coal Mining development should be continuously monitored as it goes into construction phase, operational phase, decommissioning and post-closure phase to ensure its sustainable development goals are achieved. This implies asking questions such as: Is the Kangala Coal Mine considering and incorporating the concerns from local communities and I&APs? Is it avoiding or minimising negative impacts on the society, environment and economic industries? Is it implementing all monitoring and management programmes outlined in the EIA/EMP report, as required by NEMA, MPRDA and associated laws and regulations?

Consequently, monitoring is not independent from the holistic management process outlined in the EIA/EMP Report. "Good management requires good information," and a monitoring program can provide this when it is "structured into the process of management, well designed and executed" (Forest Service, 2009, Landres 1995). Monitoring becomes the core, the essential feedback loop, of managing for sustainability. The main focus of monitoring for sustainability is therefore based on the effective implementation of the EIA/EMP report for the proposed Kangala Coal Mine and the subsequent monitoring thereof. In addition to the monitoring and management plans outlined in the EIA/EMP, the following general guidelines may be considered to ensure the long term sustainability of the agricultural industry in the Delmas area. The Kangala Coal Mine should:

- Identify any existing regional plans, including regional development frameworks and plans;
- Conserve natural open space to maintain the efficient functioning of natural corridor systems;
- Protect high potential farmland where possible (i.e. maize fields and grazing land) against misuse or development that can damage or reduce its productivity;
- Formulate and implement erosion protection plans, as well as water, soil and air quality management plans and ensure effective post-closure and rehabilitation; and
- Take note of existing situations of surface or ground water pollution (e.g. illegal dumping, noxious effluent discharge, intensive use of agricultural fertilisers and pesticides) which pose a threat to human health or ecosystems and may contribute to the cumulative impact that mining may have on the boarder environment (DWAF, 2005)

# 9. CONCLUSION AND RECOMMENDATION

The three most important aspects of sustainable development, social justice, environmental integrity and economic efficiency were discussed in this chapter in the context of the proposed project area. Based on the finite and non-renewable nature of coal resources, coal mining is not considered sustainable. Once the coal resource is removed and utilised it cannot be returned or reused; however it provides electricity for generations and contribute towards the economy. Specialist result in the EIA/EMP report indicate that proposed mining activities will have various negative impacts on environmental resources such as soil, water and air, which are the bare essential resources that the agricultural industry dependents on.

Many environmentalists consider non-sustainable mining developments a threat to the agricultural industry and environment, but through an integrated *high cost, low impact* approach may provide greater sustainability for the mining industry. The mining industry may be able to provide support to the existing agricultural industry. Support from the mining industry may be provided though capital input (construction of roads and electricity infrastructure) through research and development (diseases and scientific awareness) and through effective environmental monitoring and management. In addition, surplus land not occupied by infrastructure or otherwise (especially after completion of construction) could be leased back to farmers for utilization of agricultural production.

The sustainability chapter was therefore compiled to promote the optimisation of project benefits associated with the Kangala Coal Mine and minimisations of negative impacts associated with proposed mining activities; and ultimately encourage the sustainable use of social, economic and environmental resources in the area. In essence, sustainable development is a shared responsibility and not an outcome that Universal Coal can deliver in isolation. Society, industry and government must all contribute and work together to ensure the responsible use of social, economic and environmental resources, as well as the long term conservation of agricultural sustainablilty.

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# APPENDIX A:

**Proposed Mine Plan and Sensitive Areas**

**(DWA, 2009)**

Plan 4

# Universal Coal Kangala Coal Mine

## Proposed Mine Plan and Sensitive Areas

28°39'0"E 28°39'30"E 28°40'0"E 28°40'30"E 28°41'0"E 28°41'30"E 28°42'0"E

26°11'0"S 26°11'30"S 26°12'0"S 26°12'30"S 26°13'0"S

Site 1
Site 2
Site 3
Site 4
R42

### Legend

- Project Area

**Archaeological Sites**

- Farmstead
- Cemetery
- 20m Fence for Site 1
- Arterial / National Route
- Main Road
- Minor Road
- Track
- Non-Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan
- Perennial Pan
- Wetland
- 100m Buffer of Wetland

**Mine Plan (29Oct09)**

- Boxcut
- Coal Opencast
- Coal Stockpile
- Discard Dump
- Explosives Magazine
- Offices
- Overburden Stockpile
- Pollution Control Dam
- Sub-Station
- Topsoil Berm
- Washing Plant
- Weigh Bridge
- Workshop/Stores

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Projection: Transverse Mercator
Datum: Hartebeesthoek 1994
Central Meridian: 29°E

Ref #: scc.UNI605.200910.218
Revision Number: 2
Date: 30/10/2009

N

0 0.25 0.5 1

Kilometres

1:20,000