

February '13

VUNENE MINING (PTY) LTD

ENVIRONMENTAL MANAGEMENT PROGRAMME

Submitted to:
Vunene Mining (Pty) Ltd
Private Bag X 9001
Ermelo
Mpumalanga Province



REPORT





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ABBREVIATIONS

AIA - Archaeological Impact Assessment
AP - Action Plan
ASAPA - Association of South African Professional Archaeologists
CPA – Communal Property Association
CRM - Cultural Resource Management
BID - Background Information Document
DEA - Department of Environmental Affairs
DEAT - Department of Environmental Affairs and Tourism (currently known as DEA)
DOE – Department of Energy
DWA - Department of Water Affairs
EIA - Environmental Impact Assessment
EIR - Environmental Impact Report
EMPR - Environmental Management Programme
ENPAT - Environmental Potential Atlas
EP - Equator Principles
EPC – Engineering and Procurement Contract
EPFI - Equator Principles Financial Institutions
ESA - Early Stone Age
FGM - Focus Group Meeting
FSR - Final Scoping Report
GDP - Gross Domestic Product
GGP - Gross Geographic Product
GIS - Geographic Information System
GPS - Global Positioning System
HIA - Heritage Impact Assessment
I&APs - Interested and Affected Parties
IDP - Integrated Development Plan
IRP – Integrated Resource Plan
IUCN - International Union for the Conservation of Nature
KSW - Key Stakeholder Workshop
LSA - Late Stone Age
LIA - Late Iron Age
LTI – Latitude Tilt Irradiation
MSA - Middle Stone Age
MIA - Middle Iron Age
NEMA - National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA - National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NHRA - National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NSBA - National Spatial Biodiversity Assessment
NWA - National Water Act, 1998 (Act No. 36 of 1998)
O&M – Operations and Maintenance

PHRA - Provincial Heritage Resources Agency
PSSA - Paleontological Society of South Africa
PM - Public Meeting
PPP - Public Participation Process
SADC - Southern African Development Community
SAHRA - South African Heritage Resources Agency
SALA – Subdivision of Agricultural Land of 1970
SANBI - South African National Biodiversity Institute
SANDF - South African National Defence Force
SAWS - South African Weather Service
SDF - Spatial Development Framework
STEP - Subtropical Thicket Ecosystem Project
VT - Vegetation Type
VFR - Visiting Friends or Relatives
VAC - Visual Absorption Capacity

DEFINITIONS

Alien species: A plant or animal species introduced from elsewhere: neither endemic nor indigenous.

Anthropogenic: Change induced by human intervention.

Applicant: Any person who applies for an authorisation to undertake an activity or undertake an Environmental Process in terms of the Environmental Impact Assessment Regulations – National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as contemplated in the scheduled activities listed in Government Notice (GN) No R. 543, 544 and 545.

Arable potential: Land with soil, slope and climate components where the production of cultivated crops is economical and practical.

Archaeological resources: This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Alluvial: Resulting from the action of rivers, whereby sedimentary deposits are laid down in river channels, floodplains, lakes, depressions etc

Biodiversity: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

Cultural significance: This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Cumulative Impact: In relation to an activity, cumulative impact means the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

The "Equator Principles": A financial industry benchmark for determining, assessing and managing social & environmental risk in project financing

Ecology: The study of the interrelationships between organisms and their environments.

Environment: All physical, chemical and biological factors and conditions that influence an object.

Environmental impact assessment: In relation to an application, to which Scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application.

Environmental impact report: In-depth assessment of impacts associated with a proposed development. This forms the second phase of an Environmental Impact Assessment and follows on from the Scoping Report.

Environmental management programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures that must be implemented by several responsible parties throughout the duration of the proposed project.

Ephemeral: When referring to a stream or drainage line, it refers to the flow characteristics by which only periodic surface flows typically occur. Similarly when referring to a pan or depression, this would be characterised by only periods of time when surface water occurs within it, usually associated with the rainy season.

ESRI is a software development and services company providing Geographic Information System (GIS) software and geo-database management applications.

Heritage resources: This means any place or object of cultural significance. See also archaeological resources above

Hyrdomorphic / hydric soil: Soil that in its undrained condition is saturated or flooded long enough during the growing season to develop anaerobic conditions favouring growth and regeneration of hydrophytic vegetation. These soils are found in and associated with wetlands.

Local relief: The difference between the highest and lowest points in a landscape. For this study, it is based on 1:50 000 scale.

Macro-geomorphological: Related to / on the scale of geomorphic provinces. A geomorphic province is a spatial entity with common geomorphic attributes.

Precipitation: Any form of water, such as rain, snow, sleet, or hail that falls to the earth's surface.

Red data species: All those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.

Riparian: The area of land adjacent to a stream or river that is influenced by stream induced or related processes.

Scoping report: An “issues-based” report which forms the first phase of an Environmental Impact Assessment process.

Soil compaction: Soil becoming dense by blows, vehicle passage or other type of loading. Wet soils compact

easier than moist or dry soils.

REFERENCES

DEAT (1992) Integrated Environmental Management Guideline Series, Volumes 1-6, Department of Environmental Affairs, Pretoria.

DEAT (2004a) Environmental Management Plans, Integrated Environmental Management, Information Series 12, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

CITY OF CAPE TOWN: ENVIRONMENTAL MANAGEMENT PROGRAMME (2002) Specification EM – 02/07: ENVIRONMENTAL MANAGEMENT, Ver 5 (03/2002)

Lochner, P. 2005. Guideline for Environmental Management Plans. CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

National Environmental Management Act 107 of 1998 (NEMA)

ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED OPENCAST AND UNDERGROUND COAL MINING AT USUTU COAL MINE, NEAR CAMDEN POWER STATION

1. KEY PROJECT INFORMATION

DEA Reference number: 17/2/3 GS 11

Proposed opencast and surface mining of coal on Portions 3, 4, 6, 9, 14 and 15 of the Farm Jan Hendriksfontein 263 IT, Portions 2, 8, 9, 11, 17, 21 of the Farm Witpunt 267 IT, Portions 5, 6, 7, 8 of the Farm Vlakfontein 266 IT, Holbank 265 IT and Roodewal 270 IT, Twyflaar 298 IT, Vlakfontein 269 IT, Mooiplaats 290 IT, Msukaligwa Local Municipality, Mpumalanga Province.

Authors: Ilze Ueckermann

Sub-consultants:

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Johan Mare	MENCO	River Health (SASS 5)
Morne Burger	GPT	Geohydrologist
P.J. Gouws	PG Consulting	Floodline report
Vuyo April	ENVASS	Ecologist
Dutoit Wilken	ENVASS	Visual specialist
Tobias Coetzee	ENVASS	Heritage specialist
Francois Botha	ECOSiol	Soil specialist
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Report status: Final Environmental Management Programme (EMPr) for public review

Portions 3, 4, 6, 9, 14 and 15 of the Farm Jan Hendriksfontein 263 IT, Portions 2, 8, 9, 11, 17, 21 of the Farm Witpunt 267 IT, Portions 5, 6, 7, 8 of the Farm Vlakfontein 266 IT, Holbank 265 IT and Roodewal 270 IT, Twyflaar 298 IT; Vlakfontein 269 IT, Mooiplaats 290 IT

21 Digit Surveyor General Code:

FARM	SG CODE	SERVICE RIGHT OWNER
Jan Hendriksfontein 263 IT	T0IT00000000026300003	Johannes Vos
Jan Hendriksfontein 263 IT	T0IT00000000026300004	Pierre Theron Familie Trust
Jan Hendriksfontein 263 IT	T0IT00000000026300006	BHP BILLITON ENERGY COAL SOUTH AFRICA LTD
Jan Hendriksfontein 263 IT	T0IT00000000026300009	Sara Maria Steyn
Jan Hendriksfontein 263 IT	T0IT00000000026300014	BUENA VISTA TRADING 69 PTY LTD
Witpunt 267 IT	T0IT0000000002670002	INDAWO ESTATE PTY LTD

Witpunt 267 IT	T0IT0000000002670008	P.J. Randall Trust
Witpunt 267 IT	T0IT0000000002670009	ESKOM Holdings LTD
Witpunt 267 IT	T0IT0000000002670011	ESKOM Holdings LTD
Witpunt 267 IT	T0IT0000000002670017	ESKOM Holdings LTD
Witpunt 267 IT	T0IT0000000002670021	ESKOM Holdings LTD
Vlakfontein 266 IT	T0IT0000000002660005	P.J. Randall Trust
Vlakfontein 266 IT	T0IT0000000002660006	P.J. Randall Trust
Vlakfontein 266 IT	T0IT0000000002660007	Peter Johan Randall
Vlakfontein 266 IT	T0IT0000000002660008	Ferreira Family Trust
Holbank 265 IT	T0IT0000000002650000	
Roodewal 270 IT	T0IT0000000002700000	National Government of the Republic of South Africa
Twyfelaar 298 IT	T0IT0000000002980000	
Vlakfontein 269 IT	T0IT0000000002690000	Global Forest Products PTY LTD

Photograph of site:



Plate 1: General characteristics of the study area



Plate 2: General characteristics of the study area

Sensitive Visual receptors: Surrounding farming community
 Camden power station

Type of technology: Proposed opencast and surface mining of coal

Surface area to be covered: ± 200 hectare
Underground coal mining: ± 13 500 hectare

2. DETAILS OF ENVIRONMENTAL ASSESSMENT TEAM

2.1 Environmental Consulting team

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2.2 Project team

Emile van Druten:

Emile started Environmental Assurance (Pty) Ltd in 2004 after having spent 12 years as an Environmental manager at various corporate institutions. His career started in the conservation field as an anti-poaching team member at the Kwa Zulu Natal Parks Board.

He then joined the mining industry where he served companies such as Kudu Granite, Anglo American and BHP (Ingwe mining); his most recent corporate move was to Telkom South Africa where he headed up the Environmental and Health department.

Emile holds a BSc Hon degree from the University of Potchefstroom (University of the North West); he complimented this with an Environmental training diploma from the University of Rhodes. He is a qualified ISO 14001 auditor having been appointed through an European based certification authority (TGA Germany).

Ilze Ueckermann

Ilze is an experienced environmentalist who started her career as an environmental officer at Spoornet. Thereafter she moved to Strategic Environmental Focus (SEF) where she was an environmental consultant.

With more than 15 years working experience, she has a very good track record in conducting environmental impact assessments and drawing up environmental management programmes for large and small commercial, industrial, housing and mining developments. Ilze holds a M.A. (Geography and Environmental Management) from Rand Afrikaans University.

Ilze's main responsibility is the overall management of the Scoping and EIA process where her knowledge and experience adds value to the team. Furthermore, her knowledge and experience in waste license application processes as required by the National Environmental Management Waste Act (Act 59 of 2008) is supported by a very good knowledge of environmental legislative requirements.

3. INTRODUCTION

Environmental Assurance (Pty) Ltd (Envass), as an independent environmental consultant has been appointed by Vunene Mining (Pty) Ltd to undertake the Environmental Impact Assessment (EIA) for the proposed opencast and surface coal mining on Leeuwenburg 137 IT, Roodewal 270 IT, Holbank 265 IT, Vlakfontein 266 IT, Vlakfontein 269 IT, Mooiplaats 290 IT, Witpunt 267 IT, Transutu 257 IT and Jan Hendriksfontein 263 IT, in the Msukaligwa Local Municipality.

The Usutu Coal Colliery opencast mine is located 18 kilometres south east of Ermelo. This is an existing coal mine which was under care and maintenance for a period, subsequent to which mining operations were restarted. However, subsequent to the issuing of the mining right (dated 10 July 2009); a desktop study was undertaken which revealed that the mining area was mined before by Ingwe (Usutu Colliery). The area was mined by means of underground mining methods.

Environmental Assurance was appointed by Vunene Mining (Pty) Ltd to undertake the environmental authorisation process for the coal mining process. Issues which would specifically be addressed in this report are amongst others:

- Opencast mining methods which will be used to extract the coal;
- Underground mining methods which will be used to extract deeper coal;
- Existing infrastructure at the Usutu Colliery;
- Mining and blasting operations;
- Surrounding infrastructure and land uses; and
- In detail environmental impact assessment of activities undertaken on site.

Integrated Environmental Management (IEM) prescribes a methodology for ensuring that environmental management principles are fully integrated into all stages of the development process. It advocates the use of several environmental management tools that are appropriate for the various levels of decision-making. One such tool is an Environmental Management Plan (EMPr).

The IEM guidelines intend to encourage a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels. The basic principles underpinning IEM are that there be:

- informed decision-making;
- accountability for information on which decisions are taken;
- accountability for decisions taken;
- a broad meaning given to the term environment (i.e. one that includes physical, biological, social, economic, cultural, historical and political components);
- an open, participatory approach in the planning of proposals;
- consultation with interested and affected parties;
- due consideration of alternative options;
- an attempt to mitigate negative impacts and enhance positive aspects of proposals;
- an attempt to ensure that the 'social costs' of development proposals (those borne by society, rather than the developers) be outweighed by the 'social benefits' (benefits to society as a results of the actions of the developers);
- democratic regard for individual rights and obligations;

- compliance with these principles during all stages of the planning, implementation and decommissioning of the proposals (i.e. from 'cradle to grave'); and
- The opportunity for public and specialist input in the decision-making process.

These principles are in line with NEMA, which has repealed a number of the provisions of the Environment Conservation Act, 1989 [ECA] (Act No. 73 of 1989), and is focussed primarily on co-operative governance, public participation and sustainable development. The Environmental Impact Assessment Regulations that took effect in June 2010 regulate the procedures and criteria for the submission, processing, consideration and decision on applications for environmental authorisation of listed activities.

3.1 Objectives of this EMPr

The EMPr has been compiled to provide recommendations and guidelines according to which compliance monitoring can be undertaken during the opencast and underground mining of coal as well as to ensure that all relevant factors are considered to ensure for environmentally responsible development.

This EMPr informs all relevant parties (the project co-ordinator, the contractor, the environmental control officer and all other staff employed on site) as to their duties in the fulfilment of the legal requirements for the construction, operation and decommissioning of the infrastructure with particular relevance to the prevention and mitigation of anticipated potential environmental impacts.

All parties should note that obligations imposed by the EMPr are legally binding in terms of the environmental authorisation granted by the relevant environmental permitting authority.

The objectives of the EMPr are to:

- Ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and / or international;
- Ensure that there is sufficient allocation of resources on the project budget so that the scale of EMPr-related activities is consistent with the significance of project impacts;
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events;
- Provide feedback for continual improvement in environmental performance;
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant level;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Identify measures that could optimise beneficial impacts;
- Create management structures that addresses the concerns and complaints of the I&APs with regards to the development;
- Establish a method of monitoring and auditing environmental management practises during all phases of the activity;
- Ensure that safety recommendations are complied with; and
- Specific time periods within which the measures contemplated in the final environmental management programme must be implemented, where appropriate.

The point of departure for this EMPr is to ensure a pro-active rather than re-active approach to environmental performance by addressing potential problems before they occur. This will limit corrective measures needed during the decommissioning phase of the project. Therefore the purpose of an EMPr is to provide management measures that must be implemented by Developers, Engineers and Contractors alike to ensure that the potential impacts of a proposed development are minimised. It must also be ensured that the EMPr is maintained and upheld as a dynamic document in order for the project team to add or improve on issues that might be considered left out or not relevant to the project. In such instances the approving authority may authorise the ECO to make such changes.

3.2 Form and function of the EMPr

An EMPr is focussed on sound environmental management practices, which will be undertaken to minimise adverse impacts on the environment through the lifetime of a development. In addition, an EMPr identifies what measures will be implemented to manage any incidents and emergencies that may occur during the operational phase.

As such the EMPr provides specifications that must be adhered to, in order to minimise adverse environmental impacts associated with the opencast and underground mining of coal.

The content of the EMPr is consistent with the requirements as set out in Regulation 33 of the EIA regulations stated below, for the construction and operational phase.

According to Regulation 33 of GN R 543, an environmental management programme must include:

Details of:

- The person who prepared the environmental management programme; and
- The expertise of that person to prepare an environmental management programme;
- Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of –
 - Planning and design;
 - Pre-operations and operational activities;
 - Operation of undertaking of the activity;
 - Rehabilitation of the environment; and
 - Closure where relevant.
- A detailed description of the aspects of the activity that are covered by the draft environmental management programme;
- An identification of persons who will be responsible for the implementation of the measures contemplated in paragraph (b);
- Proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon;
- As far as reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally acceptable principle of sustainable development, including, where appropriate, concurrent or progressive rehabilitation measures are used;

- A description of the manner in which it intends to –
 - Modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
 - Remedy the cause of pollution or degradation and mitigation of pollutants;
 - Comply with any prescribed environmental management standards or practices;
 - Comply with any applicable provisions of the Act in terms of closure where applicable;
 - Comply with any provisions of the Act regarding financial provisions or rehabilitation, where applicable;
 - Time frames within which the measures contemplated in the Draft environmental management programme must be implemented;
 - The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity;
 - An environmental awareness plan describing the manner in which: -
 - ✓ The applicant intends to inform his or her employees of any environmental risk which may result from their work; and
 - ✓ Risks must be dealt with in order to avoid pollution or the degradation of the environment.
 - ✓ Where appropriate, closure plans, including closure objectives.

4. LEGAL REQUIREMENTS

Construction must be according to the best industry practices, as identified in the project document. This EMP, which forms an integral part of the contract documents, informs the contractor as to his duties in the fulfilment of the project objectives, with particular relevance to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The Contractor should note that obligations imposed by the approved EMP are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

The Contractor shall identify and comply with all South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable to the design, construction and implementation phase of the project must be complied with. The list of applicable legislation provided below is intended to serve as a guideline only and is not exhaustive: -

- The Constitution of South Africa (Act 108 of 1996);
- Environment Conservation Act (Act 73 of 1989)[ECA];
- National Environmental Management Act (Act 107 of 1998)[NEMA];
- National Environmental Management: Protected Areas Act (Act 57 of 2003);
- National Environmental Management: Biodiversity Act (Act 10 of 2004)[NEMBA];
- National Forest Act (Act 43 of 1983);
- National Water Act (Act 36 of 1998);
- Conservation of Agricultural Resources Act (Act 43 of 1983)[CARA];
- National Veldt and Forest Fire Act (Act 101 of 1989);

- Hazardous Substances Act (Act 15 of 1973);
- National Heritage Resources Act (Act 25 of 1999);
- National Environmental Management: Air Quality Act (Act 39 of 2004)[NEMAQA];
- National Environmental Management: Waste Act (Act 58 of 2009)[NEMWA];
- Health Act (Act 63 of 1977);
- Occupational Health and Safety Act (Act 85 of 1993) [OSHAct];
- Mine Health and Safety Act (Act 29 of 1996);
- All relevant provincial legislation, municipal by-laws and ordinances.

4.1 Environmental Authorisation

In accordance with the requirements of the National Environmental Management Act (Act 107 of 1998) [NEMA], and relevant EIA regulations made in terms of this Act and promulgated in August 2010 (Government Notice R 543), and listed activities under (Government Notice R 544, 545 and 546). The opencast and underground mining of coal at Usutu (near Camden power station) project was subject to an Environmental Impact Assessment process.

NEMA (Act 107 of 1998) GNR 544 of 2010:

Item 9: The construction of facilities and infrastructure exceeding 1 000 meters in length for the bulk transportation of water, sewage or storm water –

- With an internal diameter of 0,36 meter or more; or
- With a peak throughput of 120 litre per second or more.

Excluding:

- Such facilities or infrastructure which are for the bulk transportation of water, sewage or storm water drainage inside a road reserve; or
- Where such facilities will occur within urban areas but further than 32 meters from a water course, measured from the edge of the water course.

Item 10: The construction of facilities or infrastructure for the transmission or distribution of electricity –

- Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;

Item 11: The construction of:

- canals;
- channels;
- bridges;
- dams;
- weirs;
- bulk storm water outlet structures;
- marinas;
- jetties exceeding 50 square metres in size;
- slipways exceeding 50 square metres in size;
- buildings exceeding 50 square metres in size; or

- xi) infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.

Item 13: Storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres;

Item 18: The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from

- i) a watercourse;
- ii) the sea;
- iii) the seashore;
- iv) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater-

but excluding where such infilling, depositing, dredging, excavation, removal or moving

- a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or
- b) occurs behind the development setback line.

Item 22: The construction of a road outside urban areas –

- i) With a road reserve wider than 13,5 meters; or
- ii) Where no reserve exists where the road is wider than 8 meters; or
- iii) For which an environmental authorization was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.

NEMA (Act 107 of 1998) GNR 545 of 2010:

Item 15: Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more.

NEMA (Act 107 of 1998) GNR 546 of 2010:

Item 13: The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.

Item 14: The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:

- i) Purposes of agriculture or afforestation inside areas identified in spatial instruments adopted by the competent authority for agriculture or afforestation purposes;
- ii) The undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the activity is regarded to be excluded from this list;
- iii) The undertaking of a linear activity falling below the thresholds in Notice 544 of 2010.

5. PROPOSED ACTIVITY

According to the regulation 33 of GN R543, an environmental management programme must include:

(c) A detailed description of the aspects of the activity that are covered by the Draft environmental management programme;

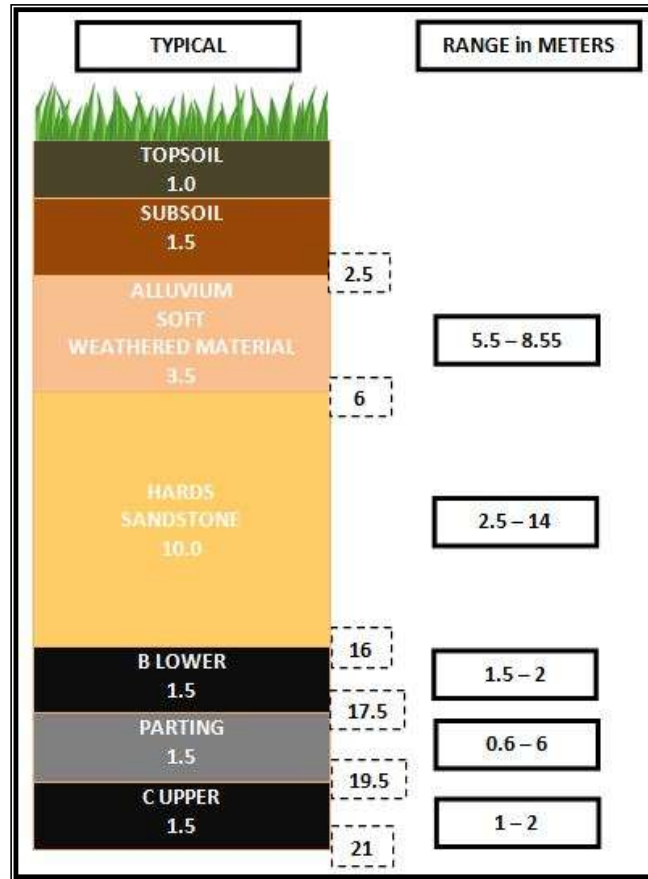
5.1 Description of proposed project

Usutu Colliery is a coal mine situated on certain portions of the farms Leeuwenburg 137 IT, Roodewal 270 IT, Holbank 265 IT, Vlakfontein 266 IT, Vlakfontein 269 IT, Mooiplaats 290 IT, Witpunt 267 IT, Transutu 257 IT and Jan Hendriksfontein 263 IT, approximately 18 kilometres southwest of the town of Ermelo. The area falls under the Msukaligwa Local Municipality and specifically in ward 11 of the local municipality.

The proposed roll-over open cast mining method entails the following:

The coal residues are at a depth of approximately 6 – 26 meters. A box cut of approximately 500 - 700 meters by 70 - 80 meters will be made, using heavy mining machinery, such as excavators and articulated dump trucks to extract the coal. The cover material (e.g. topsoil and sandstone), excavated during the initial box cut, will be stockpiled in separate stockpiles. Care will be taken to ensure that the topsoil, subsoils, softs, hards, B lower, Parting and C upper will not be mixed during this stockpiling procedure.

The coal will thereafter be mined and as soon as the total *in situ* coal volume has been extracted from the primary box; the method will roll-over to the second strip. The roll-over method assumes that the mining operator rehabilitates and restores the disturbed area as the mining process progresses. Thus, by the time the mine has been mined in totality, the rehabilitation of the disturbed area should at the end of the life of the mine be lagging by approximately three (3) strips.



Crushing screening and de-stoning plants will be erected at Usutu Colliery for the processing of the Run of Mine (ROM) coal. The ROM coal will be transported and then sold to Eskom once the contracts are concluded.

The NEMA application concerns the associated surface activities and coal mining activities to be undertaken by Vunene Mining (Pty) Ltd on certain portions of the above mentioned farms.

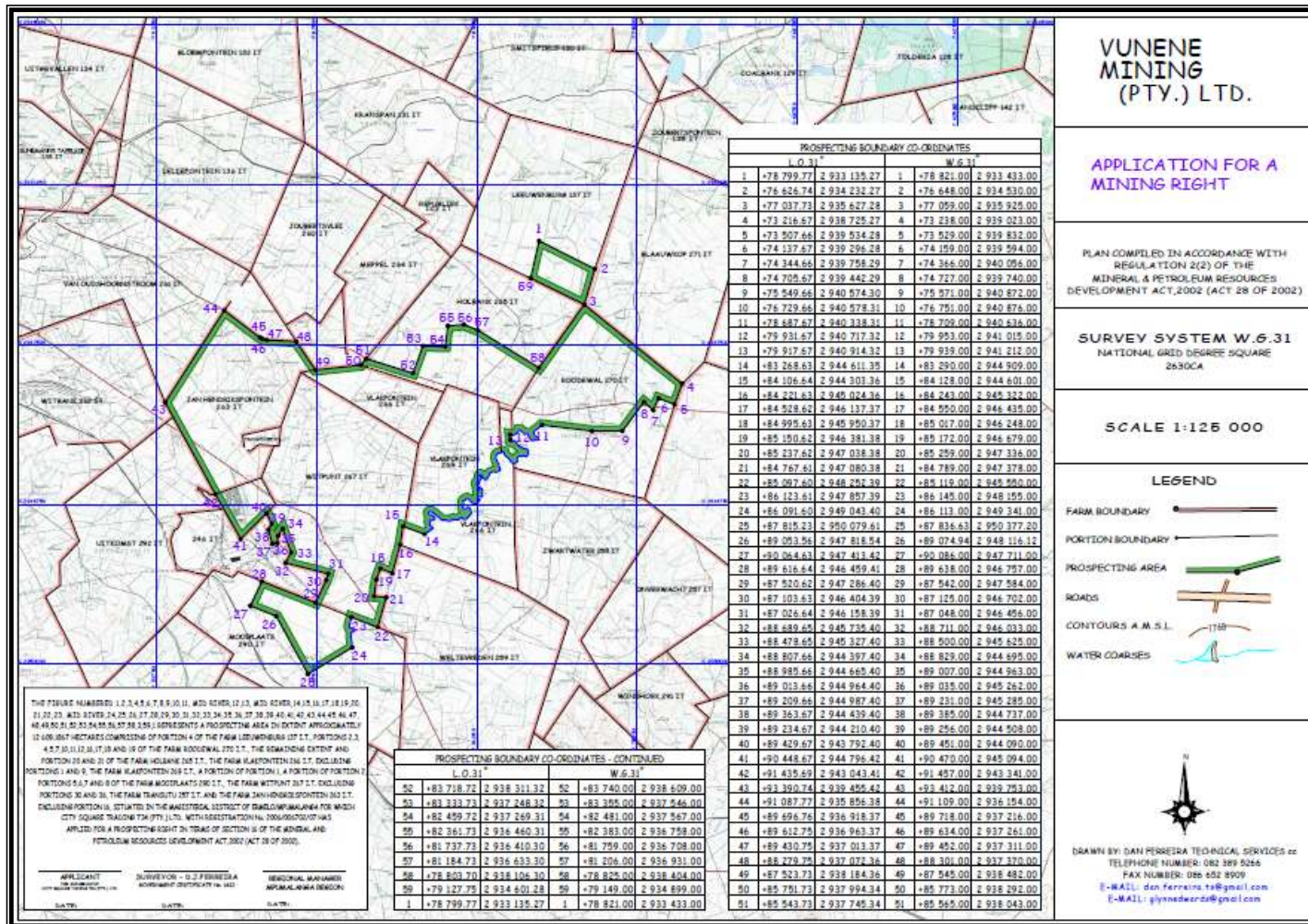


Figure 1: The Regulation 2(2) map of the Usutu Coal Colliery

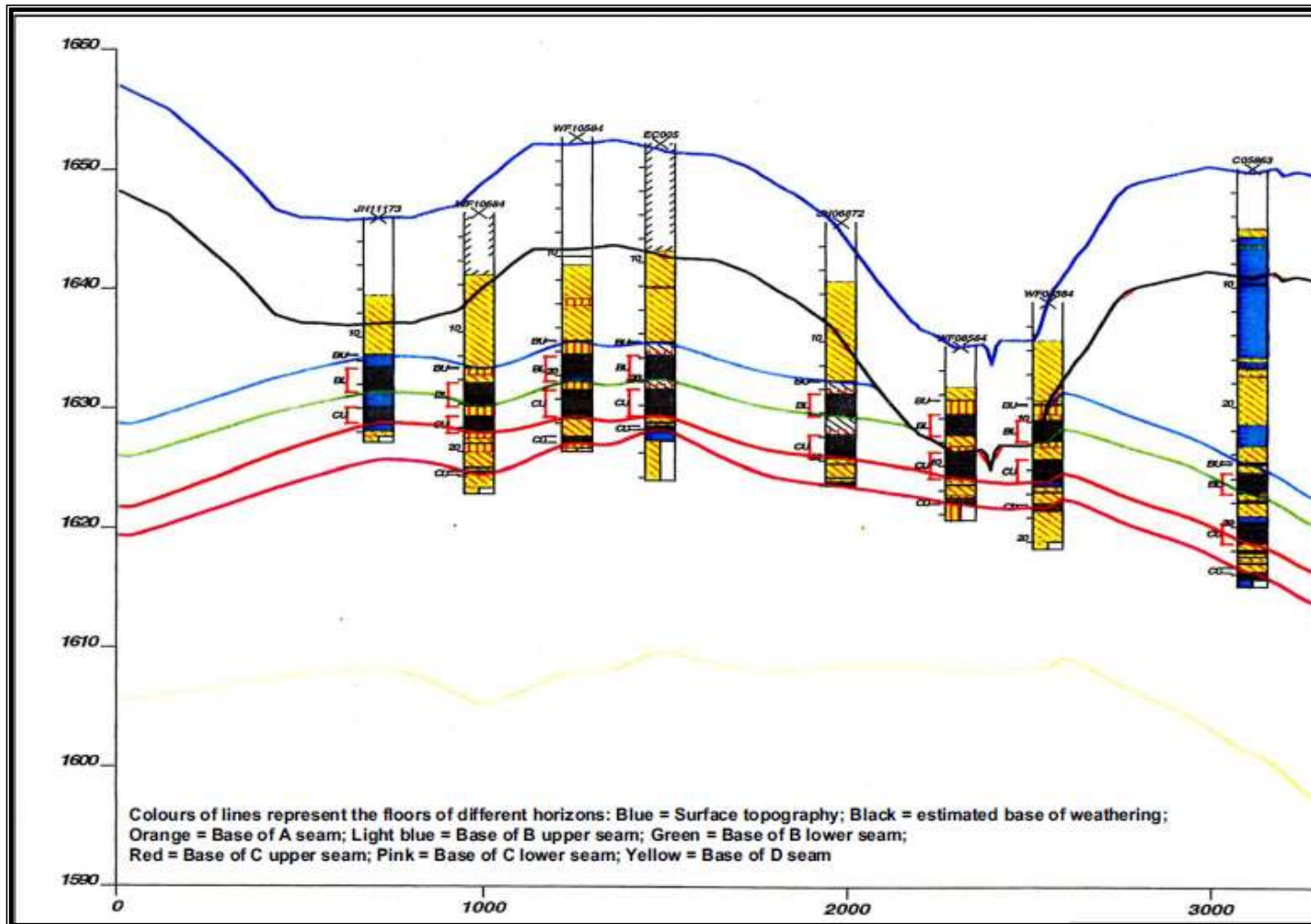


Figure 2: Cross section 1 from west to east looking north through the northern portion of the proposed mining area

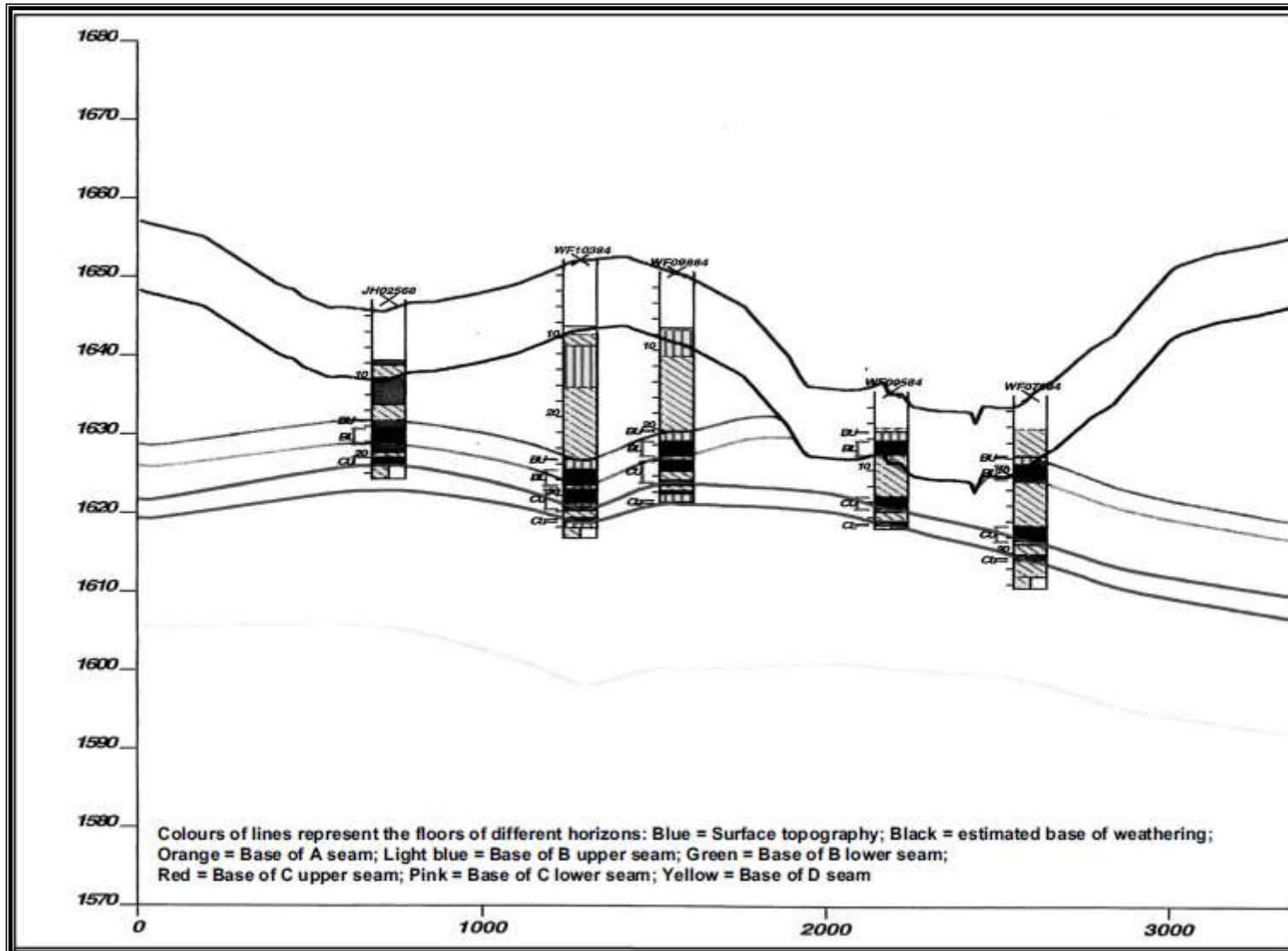


Figure 3: Cross section 2 from west to east through the main pit north of Camden Village

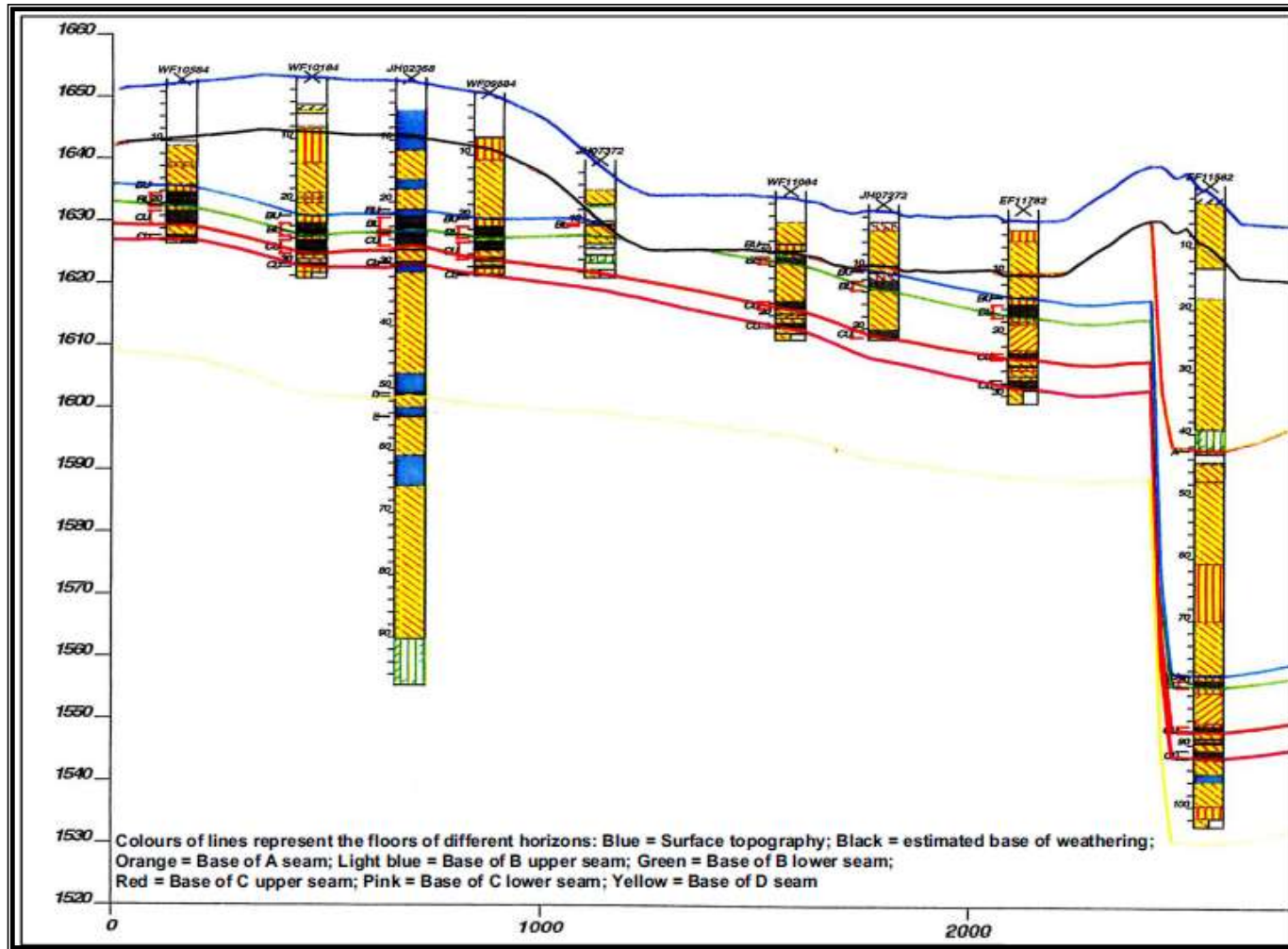


Figure 4: Cross section 3 from north to south looking east into the proposed mining area

There are increased demands for coal, as an energy source, both locally and internationally. Until alternative energy sources are dependable and financially viable, coal will remain in high demand. South Africa is in a position where the labour costs makes the mining of coal a cheaper financial option. In the current world economic situation, the proposed opencast and underground mine at Leeuwenburg 137 IT, Roodewal 270 IT, Holbank 265 IT, Vlaktefontein 266 IT, Vlaktefontein 269 IT, Mooiplaats 290 IT, Witpunt 267 IT, Transutu 257 IT and Jan Hendriksfontein 263 IT, in the Msukaligwa Local Municipality; will be mined at an ideal time as the Northern Hemisphere is experiencing economic downscaling and recessions.

The motivation for the project is based on the financial feasibility and Geological Assessment Report that was undertaken by the proponent, i.e. Vunene Mining (Pty) Ltd. Through geological assessments and a feasibility study it has been determined that the coal reserves on the above-mentioned farms (the proposed mining area) have an economic value and can be mined optimally via opencast and underground mining methods. Based on the proposed production rate of 3 000 000 tonnes per year (underground), the life of mine (LOM) is estimated to be approximately 30 years.

Furthermore, Vunene Mining (Pty) Ltd identified that with the proposed Usutu opencast mine the proponent will be supplying economic stimuli which will eventually result in an economic boost and financial stability and growth in the Mpumalanga Province.

The original delineation of the coal reserve in the area was identified during earlier exploration phases. It has however been established that the coal layer on Leeuwenburg 137 IT, Roodewal 270 IT, Holbank 265 IT, Vlaktefontein 266 IT, Vlaktefontein 269 IT, Mooiplaats 290 IT, Witpunt 267 IT, Transutu 257 IT and Jan Hendriksfontein 263 IT, in the Msukaligwa Local Municipality is located at a relatively shallow position (between 6 – 26 meters); which makes opencast mining a financially viable option. The coal reserves located deeper will be mined using the underground mining method.

Underground mining

The B and C coal seams reserve at the proposed mining area extends over an area of approximately 13 540 hectares. The seam thicknesses vary between 1.20 metres and less than 3 metres at the depth of 55 to 90 metres. It is estimated that the B and C coal Seam is 84 Million *In-Situ* Tonnes; as a result the mine is expected to remain in production for thirty years (30 years).

The seam thickness varies between 1.20 to 3.00 meters in thickness, which lends itself to bord and pillar mining using continuous miners. It is planned to take the maximum extraction allowed in primary mining to a safety factor of 1.6, which will give a 65% yield. There is no plan to extract any pillars at this stage. It is expected that there will be some dolerite intrusions, thus a dyke development section will be deployed for the purpose of mining through these and to prepare new mining sections.

The underground production is planned to commence on the West Underground Main high wall and will produce at a rate of 90,000 ROM tons per month from a single production section.

The underground mining equipment in each section will comprise the following, namely:

- Conventional mining (Continuous miners);
- 3 shuttle cars;
- Roof bolter;

- LHD (Underground Loaders);
- Feeder breaker;
- Section conveyor (extended as the section advances);
- Power supply and switches;
- Water supply and pumping arrangements;
- Tractor and trailer for materials transport; and
- Face drill.

The terms of reference for underground bord and pillar mining includes:

- No secondary extraction may be undertaken;
- A minimum safety factor of 3,0 must be maintained at all times; and
- A minimum pillar width to mining height ratio of 4,0 must be maintained at all times.

The main factors that influence pillar stability in underground coal mines are the pillar width to height (w:h) ratio and the pillar safety factor (SF). In order to better understand these concepts, the background relating to these aspects needs to be understood.

W:H Ratio

The width of the pillar to the height of the seam mined is given as the width to height ratio. This ratio can be read as the manner in which the pillar will fail. A ratio smaller than 3, indicates that the failure can be violent and sudden and a ratio above 3 indicates that the failure will be more gradual; meaning the signs of pillar failure will precede the actual failure.

To date no pillar has been known to have failed in South Africa with a width to height ratio of above 3,75.

The safety factor that is used to calculate a stable pillar geometry for underground bord and pillar mining is derived by dividing the pillar strength by pillar load. Because it is a safety factor, there will statistically be a certain probability that a given pillar with a certain safety factor will fail. The probability of failure is a function of the safety factor. The probability of failure for a safety factor of 2 is 0,0006%, indicating that less than 1 pillar in 1 000 000 (one million) would fail. The probability of pillar failure for different safety factors are illustrated below:

Table 1: Probability of pillar failure for a given safety factor

SAFETY FACTOR	PROBABILITY OF FAILURE (%)
2	0.0006
1.8	0.02
1.5	0.5
1.0	50
0.8	99.34
0.6	99.4

The Safety Factor formula is based on the assumption of the Tributary Area Theory (TAT) which assumes that:

- Each pillar carries the weight of overburden directly above it;
- The panel width exceeds the depth to the workings; and
- All pillars in the panel are uniform size.

The biggest concern undermining watercourses and wetlands is the subsidence or displacement that may occur. Subsidence can be described as a downward movement of the surface that overlies an underground excavation, or adjacent to the surface excavation.

The effect of subsidence or displacement can be divided into various types of subsidence namely:

Tilt:

During active subsidence tilting may for example cause buckling of the building. Windows can crack and doors can be stuck. After the area has stabilized the structure will return to the vertical position. In the case of watercourses and wetlands drainage or inlet course might be slightly affected.

Strain:

Two types of strain can be identified, tensile strain and compressive strain. Tensile strain can cause elongation of a piece of land whilst compressive strain can cause the surface to buckle.

Horisontal displacement:

This type of displacement can cause a section of land to move an x amount of meter. This type of displacement usually form cracks on the edges.

Sub-surface erosions (Potholes):

Potholes form where cracks formed in the upper rock layers are slowly filled with eroded soil. Eventually, a subterranean cavity forms in the soil, at the soil rock contact, due to the rock acting as a reservoir for this eroding soil. When this cavity reaches its critical size, it collapses and results in a pothole on surface.

Sinkhole formation:

This type of subsidence mainly occurs where intersections collapse, and is more common in areas where the depth of mining is less than 50 meters. In contrast to potholes, these sinkholes are usually wide and deep and approximately the same size as the intersection underground.

Opencast mining

Opencast mining, using the truck and shovel lateral rollover mining method, will be undertaken. Mining will commence from the initial box cut. Access to the opencast pit will be via a 17° pit ramp. A haul road that will be extended from the nearby existing road will be used to access the mining area.

The proposed Usutu Colliery opencast mining project will be undertaken over an area of approximately 200 ha at opencast areas, namely: portion 6A, 6B, 6C, 9 and 14. The mining will be outsourced to a suitably qualified mining contractor. Mining will be undertaken by diesel powered mining equipment in the form of front end loaders, excavators, haul and dump trucks, water carts and graders.

The soft overburden will be removed by mechanical methods. The hard overburden will be drilled and blasted and then removed by mechanical methods. The coal will be drilled and blasted prior to removal.

Replacement of overburden materials into the mining pit will be according to the following sequence:

- Placement of hard overburden at base of pit;
- Placement of soft overburden; and
- Final cover of topsoil (minimum 500 mm).

The B and C coal seams will be removed and sold to Eskom's Camden Power Station.

Strip ratio:

For the opencast mining of the coal seams at Usutu Colliery the following average strip ratio applies:

The B and C coal seams 4:1

The strip ratio is determined by the average thickness of the overburden in meters divided by the average seam thickness of the coal seam, multiplied by the relative density of the coal (taken as 1.5). This gives a ratio of cubic meters of overburden per ton of coal mined.

Run of Mine (ROM) coal will be processed through the crushing and screening plant at Usutu Colliery and then sold to Eskom's Camden Power Station for power generation purposes. All coal products from this Colliery will be sold to Camden Power Station, since coal from Usutu Colliery meets the Eskom's quality specification, and Eskom will only accept coal of such quality. Since Liketh Investments (Pty) Limited has operations that sells its product to Eskom, it was decided that the coal from Usutu Colliery would also be sold to Eskom. In view of the above, Usutu Colliery will entered into an agreement with Eskom for the sale of the ROM coal. Liketh Investments (Pty) Limited is a valued client of Eskom having concluded several agreements with Eskom.

Usutu Colliery is an existing operation which was placed under care and maintenance. Infrastructures that will be needed will be constructed at the opencast mining areas. The existing West shaft will be utilized to access the underground workings. Mining will consist of the removal of coal from the B and C coal seam and processing the ROM at the crushing and screening plant. The rehabilitation phase will include opencast voids backfilling, seeding, sealing of the shaft, the dismantling of the said plants and related buildings e.g., workshops, the substation, mine offices, etc.

6. SCOPE OF THE EMPr

In order to ensure a holistic approach to the management of environmental impacts during the opencast and underground mining of coal at Usutu Colliery, this EMPr set out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved.

The EMPr is a dynamic document subject to influence and changes as are wrought by variations to the provisions of the project specifications.

2

6.1 Layout of the EMPr

The EMPr is divided in three phases of development. Each phase has specific issues unique to that period of the opencast and underground mining of coal at Usutu Colliery and associated infrastructure development. The impacts were identified and brief description given. The three phases of the development were identified as below:



6.2 Construction Phase

The '**pre-construction**' section of this EMPr, refers to the period of time leading up to and prior to commencement of construction activities, and is included to ensure pro-active environmental management measures with the goal of identifying avoidable environmental damage at the outset and sustain optimal environmental performance throughout the construction phase. Most impacts will occur during the construction phase and must be mitigated through the contingency plans identified in the pre-construction phase.

The bulk of environmental impacts will have immediate effect during the '**construction**' phase (e.g. noise, dust, and water pollution). If the site is monitored on a continual basis during the construction phase, it is possible to identify these impacts as they occur. These impacts will then be mitigated through the measures outlined in this section, together with a commitment to sound environmental management from the project team.

The '**construction**' section refers to all construction and its operation-related activities that will occur within the approved area and access roads, until the project is completed. This "construction" section is divided into three functional areas, namely "materials"; "plant"; and "construction". Each of these functional areas within the EMPR contains specific mitigation requirements and requested contractor method statements stipulated where required.

6.3 Operational and Maintenance Phase

This section of the EMPr provides management principles for the operation and maintenance phase of the project. Environmental audits, procedures and responsibilities are required from Vunene Mining (Pty) Ltd during the operational and maintenance phase are specified.

6.4 Closure and decommissioning Phase

This section includes principles for the decommissioning and closure phase of the project. This section will be required to be re-evaluated and updated at the time of decommissioning.

7. ROLES AND RESPONSIBILITIES

According to the regulation 33 of GN R543, an environmental management programme must include:

(d) An identification of persons who will be responsible for the implementation of the measures contemplated in paragraph (b)

Overall responsibility for the implementation of the EMPr lies with Venene Colliery (Pty) Ltd, through the appointed site manager who will:

- Notify MDEDET of changes in the projects resulting in significant environmental impacts;
- Maintain a register of complaints and queries by members of the public; and
- Assistance with the implementation of the EMPr and the resolution of any problem areas will be the responsibility of the ESO, as will the design and review of the monitoring program.

The Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) will be responsible for approving the Environmental Impact Assessment Report and EMPr for this project.

7.1 Site manager and environmental site officer (ESO)

A site manager will be appointed by Vunene Mining (Pty) Ltd to assume the responsibility for implementing the management guidelines contained in this document.

It is also recommended that a suitably qualified person (environmental site officer (ESO) be appointed by the proponent to undertake site evaluation, monitoring and implementation of the EMPr. The environmental site officer (ESO) should conduct regular site visits (at every second week) during the construction phase and every three months for the first year of operation to audit the project and to ensure the success of the EMPr. The ESO should have the authority to stop any activity deemed to be in contravention of this EMPr.

The ESO will:

- Know the background of the project, and monitor the implementation of EMPr;
- Act as a guide and advisor to the construction team on environmental issues during preparation and operation;
- Conduct periodic auditing of the project for adherence to the EMPr, identification of problem areas and provision of action plans to avoid costly stoppages and/or further environmental damage;
- Ensure that open communication lines exists to the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) or other identified authorities for reporting of any significant environmental incidents and rapidly resolving any problems or complaints from the public;
- Ensure that any proposed changes are communicated in writing to the authorities for approval; and
- Ensure the protection and rehabilitation of the surrounding environment during the construction and operational phase as prescribed in the EMPr.

7.2 Environmental Control officer (ECO)

The ECO will:

- Conduct regular site visits (Monthly) to be able to report and respond to any environmental issues;
- Report compliance and non-compliance issues to the municipal representative and authorities as applicable;
- Advise the Contractor on environmental issues within the defined work areas;
- Review access and incidents records that may pertain to the environment and reconcile the entries with the observations made during site inspection, monitoring and audit;
- Recommend corrective actions when required for aspects of non-compliance with the EMPr;
- Take immediate action on site where clearly defined and agreed "No-Go" areas are violated or in danger of being violated and to inform the Venene Colliery (Pty) Ltd representative of the occurrence immediately and to take action;
- Be contactable by the public regarding matters of environmental concern as they relate to the operation of the works; and
- Take immediate action on site when prescriptive conditions are violated, or in danger of being violated and to inform Vunene Mining (Pty) Ltd representative of the occurrence and action taken.

7.3 Contractor

The contractor is responsible for the overall execution of the activities envisioned in the construction phase

including the implementation and compliance with recommendations and conditions of the EMPr. The Contractor must therefore ensure compliance with the EMPr at all times during the construction activities and maintain an environmental register which keeps a record of all environmental incidents which occur on site during all phases of the opencast and underground coal mining operations. The incidents may include:

- Public involvement / complaints;
- Health and Safety incidents;
- Incidents involving hazardous materials stored on site;
- Non compliance incidents.

The Contractor is also responsible for the implementation of corrective actions issued by the ECO and site manager within a reasonable agreed period of time.

8. ENVIRONMENTAL MANAGEMENT PROGRAMME

According to the regulation 33 of GN R543, an environmental management programme must include:

(b) Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by the Regulations, including environmental impacts or objectives in respect of –

Planning and design;
Pre-operations and operational activities;
Operation of undertaking of the activity;
Rehabilitation of the environment; and
Closure where relevant.

As far as reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally acceptable principle of sustainable development, including, where appropriate, concurrent or progressive rehabilitation measures;

A description of the manner in which it intends to –

Modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
Remedy the cause of pollution or degradation and mitigation of pollutants;
Comply with any prescribed environmental management standards or practices;
Comply with any applicable provisions of the Act in terms of closure where applicable;
Comply with any provisions of the Act regarding financial provisions or rehabilitation, where applicable;

8.1 EMPr: Planning and Design phase

Policy Compliance: The opencast and underground mining of coal at Usutu Colliery should be in line with relevant legislation and / or policy e.g. MPRDA, NEMBA, NEMA, SDF etc.

Placement of the opencast and underground coal mine:

- Ensure that as far as possible, infrastructure and mining layout should:
 - avoid sensitive environments;

- avoid high lying areas and ridgelines;
- avoid known bird migration routes;
- avoid areas of inappropriate geological or soil structure;
- avoid crossing wetlands, watercourses, pans and riparian areas;
- avoid placing infrastructure within 500m of drainage lines, within wetlands watercourses, pans and riparian areas;
- No vegetation beyond the infrastructure footprint should be damaged or removed;
- No vehicle tracks may be designed for slopes steeper than 1:6 where practicable;
- Appropriate and effective storm water management plans, especially for the access road associated with the opencast and underground coal mining at Usutu Colliery infrastructure must be included into the final engineering design;
- A Storm water management plan and or stormwater attenuation must be designed into the site such that the stormwater is not allowed to flow freely off the site and into the general area without storm attenuation measures in place;
- Appropriate storm water routing attenuation must be implemented to avoid onsite erosion and downstream sedimentation;
- The final layout of the opencast and underground coal mine should be provided to a paleontological specialist to indicate potential points of interest according to the geology;
- The outcome of the paleontological study must be received by SAHRA before construction starts for possible recommendations regarding the paleontological impact assessment;
- All graves identified should be protected and conserved:
 - A proper fence is to be built around any identified graves 5 meters away from the perimeter of the grave, including entry gates to allow visitors. No development will be allowed within 10 – 15 meters from the fence line surrounding the graves.
- An Vunene Mining (Pty) Ltd and community representative should walk through the finalised site layout and point or indicate any sensitive heritage artefacts (graves) that may not have been identified already and the outcome of the consultation should be send to SAHRA Burial Grounds and Graves Unit for final assessment (jkitto@shara.org.za);
- Planning of access routes must be undertaken in conjunction with the Contractor, Vunene Mining (Pty) Ltd and the Landowner. All agreements reached shall be documented in writing and no verbal agreements should be made. The condition of the existing access routes to be used shall be documented with photographs;
- Infrastructure must be chosen such that they provide the smallest footprint and visual impact;

8.2 EMP: Construction Phase

Site Establishment:

- The Contractor shall establish his construction camp, offices, workshops and other infrastructure as per the agreed site layout plan in a manner that does not adversely affect the environment;
- The Contractor shall submit a method statement for site clearance for approval by the Project Coordinator in consultation with the ECO. Site establishment shall take place in an orderly manner and all required amenities shall be installed at Camp site before the main workforce move onto site;

- The Construction camp shall have the necessary ablution facilities with chemical toilets at commencement of construction activities to the satisfaction of the Project Coordinator. The Contractor shall inform all site staff to make use of the supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities;
- Safe drinking water for human consumption shall be available at the site offices and other convenient locations on site. All water used on site must be taken from a legal source and comply with the recognised standards for potable and other uses;
- The Contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings;
- No fires will be allowed outside of the construction camp. Activities which may pose a risk of fire must be identified and suitable measures must be put in place to prevent any possible damage by fire. Contractors must inform the staff of the risk of fires and fire prevention and emergency procedures in the event of fire. Fire fighting equipment shall be supplied by the Contractor at suitable locations;
- The Contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes;
- The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at a municipal registered landfill. A certificate of disposal shall be obtained by the Contractor and kept on file. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management. The disposal of waste shall be in accordance with relevant legislation. Under no circumstances may solid waste be burnt or buried on site.

Site Clearing:

- Site clearing must take place in a phased matter, as and when required. Areas which are not to be affected by construction within two months of time, must, in order to reduce erosion risk, not be cleared. The area to be cleared must be clearly demarcated and this footprint strictly maintained;
- Spoil that is removed from the site must be removed to an approved spoil site or municipal registered landfill site;
- Silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. These include wetlands and steep areas;
- Topsoil from the Right of Way must be neatly stockpiled adjacent to the excavations ready for backfill when required;
- The Contractor shall ensure that all work is undertaken in a manner which minimises the impact on vegetation outside the immediate area of the Works. No tree or shrub outside the area of the Works shall be felled, topped, cut or pruned until it has been clearly marked for its purpose by the site manager. The method of marking will be specified by the site manager, and the Contractor will be informed in writing; and no tree outside the area of the Works shall be burned for any purpose.

For areas of specific importance as identified by the specialists, the Contractor shall:

- Identify and demarcate the extent of the site and associated Works Areas as indicated on the approved Environmental and Site plan using danger type with steel droppers;
- In sensitive environments, or where access to no-go areas are prevented a perimeter fence must be erected around the works area;
- Maintain site demarcations in positions until cessation of construction works;

- Maintain animal movement corridors as indicated in the specialist report and / or as specified on site by the ECO;
- Maintain the demarcation line, and ensure that no personnel or contraction material move outside the demarcated site;
- Do not establish any activities or operations that, in the opinion of the ECO are likely to adversely affect the aesthetic quality of the environment;
- In the event that such activities and operations are deemed to be necessary, then ameliorate actions to reduce the adverse effects must be taken. Actions will be specified by the ECO;
- Do not paint or mark any natural feature. Marking for surveying and other purposes must be undertaken using pegs, beacons or rope and droppers.

Environmental training:

- It is recommended that the proponent and its staff familiarise themselves with the content of this document and that the ESO ensures that the proponent and his staff understand the content of this document and its implications;
- Ensure that all site personnel have a basic level of environmental awareness training. Topics should include:
 - What is meant by the environment?;
 - Why the environment needs to be protected and conserved?;
 - How construction activities can impact on the environment;
 - Awareness of emergencies and spillages;
- It is the Contractor's responsibility to provide the Site foreman with environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff;
- Training should be provided to the staff members in the use of the appropriate fire-fighting equipment. Translators are to be used where necessary;
- The need for a clean site policy also needs to be explained to the workers;
- Staff operating heavy equipment (such as excavators, loaders etc) shall be adequately trained and sensitised to any potential hazards associated with their tasks;
- The Contractor must monitor the performance of construction workers that the points relayed during their introduction have been properly understood and are being followed. If necessary, the ECO and / or translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear;
- Toolbox talks (Green talks) are recommended.

Soil impacts:

1. Topsoil

- The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas;
- Care must be taken not to mix topsoil and subsoil during stripping;
- Polluted topsoil must be disposed of at a licensed landfill site.

2. Soil stripping

- No soil stripping must take place on areas within the site that the contractor does not require for construction work, or on areas of retained vegetation;

- Subsoils and overburden should, in all construction and lay down areas, be stockpiled separately to be returned for backfilling in the correct soil horizon order;
- Construction vehicles must only be allowed to utilise existing road or pre-planned access routes.

3. Stockpiles

- Stockpiles should not be positioned such that they obstruct natural water pathways and drainage channels;
- Stockpiles should not exceed 2m in height;
- If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth;
- Stockpiles may further be protected by the construction of berms or low brick walls around their bases;
- Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.

4. Fuel storage

- Topsoil and subsoil to be protected from contamination;
- Fuel and material storage must be away from stockpiles;
- Cement, concrete and chemicals must be mixed on an impermeable surface and provisions should be made to contain spillages or overflow into the soil;
- Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material;
- Contaminated soil must be contained and disposed of off site at an approved landfill site.

5. Concrete mixing

- No vehicles transporting concrete to the site may be washed on site;
- If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated run-off from the batch plant must not be allowed to get into the storm water system or any rivers, watercourses, wetlands, riparian areas or existing erosion channels.

6. Earthworks

- To take into consideration:
 - Soils compacted during the construction of the opencast and underground coal mine at Usutu Colliery and the associated infrastructure should be deeply ripped to loosen compacted layers and re-graded to even running levels. Topsoil should be spread over landscaped areas. According to specifications by a landscape architect the area should be re-vegetated upon completion of construction activities.

Erosion:

- Wind screening and stormwater control should be undertaken to prevent soil loss from the site;
- All erosion control mechanisms need to be regularly maintained;
- Retention of vegetation where possible to avoid soil erosion;
- Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time;
- Re-vegetation of disturbed areas and surfaces should occur immediately after the construction activities are completed;
- No impediment to the natural water flow other than approved erosion control works is permitted.

Air quality:

1. Dust control

- Damping down the un-surfaced and un-vegetated areas during dusty periods is required;
- Retention of vegetation where possible will reduce dust travel;
- Excavation and other clearing activities must only be undertaken during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas;
- The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the Landowner or neighbouring communities;
- A speed limit of 30km/h must not be exceeded on dirt roads (if any);
- Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor;

2. Emissions control:

- Regular servicing of vehicles in order to limit gaseous emissions (to be done off site);
- Regular servicing of on site toilets to avoid potential odours;
- Allocated cooking areas must be provided.

3. Fire prevention

- All cooking shall be done in demarcated areas that are safe in terms of runaway or uncontrolled fires;
- The Contractor shall have operational fire-fighting equipment available on site at all time. The level of fire-fighting equipment must be assessed and evaluated through a typical risk assessment process. It may be required to increase the level of protection, especially during the winter months.

Water quality:

1. Sanitation

- Adequate sanitary and ablution facilities must be provided for construction workers;
- The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.
- The contractor is responsible for providing all sanitary arrangements for his and the sub-contractors team. A minimum of one chemical toilet must be provided per 15 persons;
- Sanitary arrangements must be to the satisfaction of the ESO and the local authority. Toilets must be of the chemical type. The contractor must keep the toilets in a clean, neat and hygienic condition. The contractor must supply toilet paper at all toilets at all times. Toilet paper dispensers must be provided in all toilets;
- Toilets provided by the contractor must be easily accessible and a maximum of 50m from the works area to ensure they are utilised. All toilets will be located within the contractor's camp. Should toilets be needed elsewhere, their location must first be approved by the ESO. No toilets should be allowed within the 1:100 flood lines; wetland riparian and other sensitive water course areas; and
- The contractor (who must use reputable toilet-servicing company) must be responsible for the cleaning, maintenance and servicing of the toilets. The contractor (using reputable toilet-servicing company) must ensure that all toilets are cleaned and emptied before the builders' or other public holidays.
- Toilets out on site must be secured to the ground and have a sufficient locking mechanism operational at all times.

2. Water resources

- Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction related activities;
- Municipal water (or another source approved by the ECO) should be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting etc.;
- Compaction of backfilled material must attain low soil permeability;
- Site design and operation must that surface / storm water be diverted away from excavation trenches;
- Backfilling of trenches must be undertaken in such a way that water ponding and erosion of the backfilled trench be avoided.

3. Stormwater

- Impediments to or blockage of natural water flow must be avoided wherever possible;
- The ESO must assess whether regular water sampling of surface and or ground water resources within the immediate and surrounding environment are necessary. Should this be the case, baseline data from sampling must be obtained relevant to the activity and sensitivity of the area. Regular sampling must then be carried out to determine deviations from the baseline data;
- Increased run-off during construction must be managed using berms and other suitable structures as required to ensure flow velocities are reduced; this must be done in consultation with the Resident engineer (RE) as well as the ESO. Storm water, wherever possible, should be allowed to soak into the land in the area on which the water fell e.g. retention ponds;
- In the event of pollution caused as a result of construction activities, the contractor, according to section 20 of the National Water Act, 1998 (Act No. 36 of 1998) is be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas;
- The contractor must ensure that excessive quantities of sand, silt and silt-laden water do not enter the storm water system. Design of the storm water drainage system must ensure that the local and surrounding natural systems are not negatively impacted. Appropriate measures, e.g. erection of silt traps, or drainage retention areas to prevent silt and sand entering drainage or watercourses must be taken. These measures must be reviewed and audited by the ESO;
- No wastewater may run freely into any of the surrounding streets or naturally vegetated areas. Runoff containing high sediment loads must not be released into natural or municipal drainage systems or nearby watercourses. If this becomes a problem it is recommended that an attenuation pond be constructed to allow solids to settle prior to runoff leaving the site;
- Approval must be obtained from DWA for any activities that require authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998);
- A relevant specialist must be consulted prior to the demarcation of drainage lines and wetlands;
- No vehicular access is allowed in permanently wet areas;
- It must be ensured that all equipment to be used is not the cause irreparable damage to wet areas. The contractor must, where required, use alternative methods of construction in such areas;
- "NO ENTRY" signs must be strategically placed along rivers, streams and other natural or man-made drainage lines which are in close proximity to access routes; and
- No roads are to be cut through river and stream banks as this may lead to erosion causing siltation of streams and downstream dams. Existing drifts and bridges must be used if the landowner gives his consent. Such structures must then be thoroughly examined for strength and durability before they are used.

Noise:

- Although it is expected that some noise will be generated during the construction phase it is not expected that this will cause a nuisance to any of the neighbour due to the distances;
- Construction site yards, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the contractor(s), the sites must be evaluated in detail and specific mitigation measures designed into the system;
- Heavy vehicle traffic should be routed away from noise sensitive areas, where possible;
- Noise levels must be kept within acceptable limits. All noise and sounds generated must adhere to SABS 0103 specifications for maximum allowable noise levels for residential areas. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies;
- Blasting operations (if any) are to be strictly controlled with regard to the size of explosive charge in order to minimise noise and air blast, and timings of explosions. The number of blasts per day should be limited, blasting should be undertaken at the same times each day and no blasting may be allowed at night;
- With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the contractor and ECO should liaise with local residents and how best to minimise impact, and the local population should be kept informed of the nature and duration of intended activities;
- The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance;
- Noise generating activities should be restricted to between 06h00 and 18h00 Monday to Friday, and 06h00-13h00 on Saturdays unless otherwise approved by the appropriate competent person in consultation with adjacent landowners or potentially affected persons;
- Noise impacts should be minimised by restricting the hours during which the offending activities are carried out and, where possible, by insulating machinery and/or enclosing areas of activity; and
- Noise emanating from construction activities must not exceed the ambient noise level with more than 7dBA or more when measured at the nearest dwelling.

Biodiversity:

- Contractors and staff should be prohibited to chase, catch or kill any animals found or encountered during construction and operation phases; and
- Only vegetation falling directly in demarcated access routes or project sites could be removed where necessary;
- Any animals rescued or recovered will be relocated in suitable habitat away from the Usutu Colliery and associated infrastructure;
- Cleared vegetation can be used to form wood piles and logs and stumps. Dead or decaying wood piles should be created as these will provide valuable refuge areas especially due to the clearance of vegetation cover;
- Logs and stumps also provide important habitats for several reptile species as well as smaller mammals, amphibians etc. With time they will eventually be reduced to evaluable compost by several animal species. Dead trees and stumps will also be used for nesting purposes as well as perching or hunting platforms for birds species;
- Any lizards, snakes or monitors encountered should be allowed to escape to suitable habitat away from disturbance. No reptile should be intentionally killed, caught or collected during any phase of the project;
- General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area;
- Appropriate foot wear should be worn in field;

- During construction activities wherever possible work should be restricted to one area at a time. This will give smaller birds, mammals, reptiles and amphibians an opportunity to move into undisturbed areas close to their natural habitat. The Contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase;
- No further vegetation clearance except for the removal of alien invasive species. All remaining indigenous riparian vegetation must be conserved wherever possible;
- No roads shall be cut through river – and stream banks (riparian vegetation) as this may lead to erosion causing siltation of the rivers, streams, wetlands, and pans in the immediate area;
- Vehicle access to Usutu Colliery infrastructure must as far as possible be limited to existing roads.

Control over noxious, invasive and problem vegetation

- The disturbed areas must be monitored and maintained to contain and prevent noxious and invasive plants from spreading in the area. A three monthly inspection by the ESO should be executed in this regard.
- The following must be kept in mind:

The Conservation of Agricultural Resources Act 1983 (ACT No. 43 of 1983) abstracts from regulations 15A to 15F on combating category 1 plants.

15A

Category 1 plant may not occur on any land or inland water surface other than in biological control reserves.

A land user shall control any category 1 plant (s) that occur on any land or inland water surface in contravention of the provisions of sub-regulation (1) by means of the methods prescribed in regulation 15(E)

No person shall, except in or for purposes of a biological control reserve:

Establish, plant, maintain, multiply or propagate category 1 plants.

Import or sell propagated material of category 1 plants or category 1 plants.

Acquire propagating material of category 1 plants or any category 1 plants.

(4) The executive officer may, on good cause shown in writing by the land user, grant written exemption from compliance with the requirements of sub-regulation (1) on such conditions as the executive officer may determine in each case.

Summary of regulation 15(E)

The plants (category 1) must be removed from property by:

Uprooted, felling, cutting or burning.

Several options of biological control are available.

Any other method or treatment recognised by executive officer.

A combination of summarized methods above excepted by the executive officer.

The Conservation of Agricultural Resources Act 1983 (ACT No. 43 of 1983) abstracts from regulations 15B on combating category 2 plants.

15B

Category 2 plants may not occur on any land or inland water surface other than a demarcated area or a

biological control reserve.

(a) The executive officer may on application in writing demarcate an area as an area where category 2 plants may occur, be established and be maintained.

(b) An area in respect of which a water use license for stream flow reduction activities has been issued in terms of section 36 of the National Water Act, 1998 (Act no. 36 of 1998) shall be deemed to be a demarcated area.

3. The executive officer shall demarcate an area for the occurrence, establishment and maintenance of category 2 plants only if:

(a) the category 2 plants in the area are cultivated under controlled circumstances; and

(b) the land user concerned has been authorised to use water in terms of the National Water Act,(1998) (Act No. 36 of 1998).; and

(c) the category 2 plants or products of category 2 plants in the area are demonstrated to primarily serve a commercial purpose, use as a woodlot, shelter belt, building material, animal fodder, soil stabilisation, medicinal or other beneficial function that the executive officer may approve; and

(d) all reasonable steps are taken to curtail the spreading of propagating material of the category 2 plants outside the demarcated areas.

4. When an area is demarcated for the occurrence, establishment and maintenance of category 2 plants the executive officer may impose such additional conditions as may reasonably be deemed necessary to keep the category 2 plants in the area in check.

No person shall sell propagating material of category 2 plants or any category 2 plants to another person unless such other person is a land user of a demarcated area or of biological control reserve.

No person shall acquire propagating material of category 2 plants or any category 2 plants unless such material or plants are intended for use in a demarcated area or in a biological control reserve.

Propagating material of category 2 plants or category 2 plants shall only be imported or sold in accordance with the provisions of the Plant improvement Act, 1976 (Act no. 53 of 1976), the Agricultural Pest Act 1983 (Act No. 36 of 1983) and the environment conservation regulations.

A land user shall control any category 2 plants that occur on any land or inland water surface in contravention of the provisions of sub-regulation (1) by means of the methods described in regulation 15E.

Unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring or natural channel in which water flows regularly or intermittently, lake, dam or wetland.

The executive officer may, on good cause shown in writing by the land user, grant written exemption from compliance with one or more of the requirements of sub-regulations (1),(3),(5),(6),(8) and (9) on such conditions as the executive officer may determine in each case.

The Conservation of Agricultural Resources Act 1983 (ACT No. 43 of 1983) abstracts from regulations 15C on combating category 3 plants.

15 (C)

(1) Category 3 plants may not occur on any land or inland water surface other than in biological control reserves.

(3) (a) No land user shall allow category 3 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland.

(b) The executive officer may impose such additional conditions as may reasonably be deemed necessary with regard to category 3 plants already in existence at the time of the commencement of these regulations.

(c) A land user must take all reasonable steps to curtail the spreading of propagating material of category 3 plants.

(d) The executive officer may, after consultation with the land user, issue a direction in terms of section 7 of the Act that category 3 plants in existence at the time of the commencement of these regulations must be controlled by means of the measures prescribed in regulation 15F.

(4) No person shall, except in or for purposes of a biological control reserve-

(a) Plant, establish, maintain, multiply or propagate category 3 plants;

(b) Import sell propagating material of category 3 plants or any category 3 plants;

(c) Acquire propagating material of category 3 plants or any category 3 plants.

(5) The executive officer may, on good cause shown in writing by the land user, grant written exemption from compliance with one or more of the requirements of sub-regulations (1),(3) and (4) on such conditions as the executive officer may determine in each case.

Waste Management:

- The contractors must provide and maintain a method statement for “solid waste management”. The method statement must provide information on proposed licensed facility to be utilised and details of proposed record keeping for auditing purposes;
- Waste must be separated into recyclable and non-recyclable waste, and must be separated as follows:
 - Hazardous waste: including (but not limited to) old oil, paint, etc,
 - General waste: including (but not limited to) construction rubble,
 - Reusable construction material.
 - Recyclable waste must preferably be deposited in separate bins. The contractor is advised that “Collect-a-Can” collect tins, including paint tins, chemical tins, etc. and “Consol” collect glass for recycling.
- Any illegal dumping of waste must not be tolerated, this action will result in a fine and if required further legal action will be taken. This aspect must be closely monitored and reported on; proof of legal dumping must be able to be produced on request;
- Bins must be clearly marked for ease of management;
- All refuse bins must have a lid secured so that animals cannot gain access;
- Sufficient closed containers must be strategically located around the construction site to handle the amount of litter, wastes, rubbish, debris, and builder’s wastes generated on the site;
- Subcontractor(s) must contain a clause to the effect that the disposal of all construction-generated refuse / waste to an officially approved dumping site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMP. Proof of this undertaking must be issued to the ESO;
- All solid and chemical wastes that are generated must be removed and disposed of at a licensed waste disposal site. The contractor is to provide proof of such to the ESO;
- Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site; and

- A skip, with a cover, must be used to contain refuse from campsite bins, rubble and other construction material.

Health and Safety

- Excavations for whatever purpose will only remain open for a minimum period of time and during this time they must be clearly demarcated so as to prevent accidental ingress of people, animals or vehicles as well as to prevent soil erosion;

1. Worker safety

- Implementation of safety measures, work procedures and first aid must be implemented on site;
- A health and safety plan in terms of the Occupational Health and Safety Act (Act 85 of 1983) must be drawn up to ensure worker safety;
- Contractors must ensure that all equipment is maintained in a safe operating condition;
- A record of health and safety incidents must be kept on site;
- Any health and safety incidents must be reported to the Project Coordinator immediately;
- First aid facilities must be available on site at all times;
- Workers have the right to refuse work in unsafe conditions;
- Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers.

2. Worker facilities

- Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness;
- Fires are not to be allowed, unless in a demarcated area identified by the ECO;
- The contractors must provide and maintain a method statement for "fires", clearly indicating where and for what fires will be utilised plus details on the fuel to be utilised;
- Absolutely no burning of waste is permitted;
- Fires will only be allowed in facilities especially constructed for this purpose within fenced Contractor's camps. Wood, charcoal or anthracite are the only fuels permitted to be used for fires. The contractor must provide sufficient wood (fuel) for this purpose;
- Fires within the designated areas must be small in scale so as to prevent excessive smoke being released into the air;
- No wood is to be collected, chopped or felled for fires from private or public property as well as from no-go or sensitive areas within the site and any surrounding natural vegetation;
- Smoking should be prohibited in the vicinity of flammable substances;
- The proponent should ensure that fire-fighting equipment is available on site, in particular where flammable substances are being stored or used;
- All regulations contained in the Occupational Health & Safety Act apply;
- Any welding or other sources of heating of materials should be undertaken in a controlled environment wherever possible and under appropriate supervision, in such a manner as to minimise the risk of veldt fires and/or injury to staff;
- Open fires for heating and cooking shall only be permitted in protected areas designated by the ESO for this purpose.

- The construction campsite or staff facilities need to be placed where these will cause the least impact on the biophysical and social elements of the area; this site needs to be approved by the ESO and site manager;
- A registered supplier shall provide properly managed and maintained temporary chemical toilets or permanent toilets on site; and
- Skips or containers for refuse and litter will be provided, used and cleaned regularly by the contractor.

3. Protective gear

- Personnel Protective Equipment (PPE) must be made available to all construction staff and the wearing and use of PPE must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, ear plugs, hard hats, safety boots and overalls etc;
- No person is to enter the site without the necessary PPE;
- The construction camp must remain fenced for the construction period;
- Potentially hazardous areas such as trenches are to be demarcated and clearly marked;
- Adequate warning signs of hazardous working areas must be erected in suitable locations;
- Uncovered manholes and excavations must be clearly demarcated;
- Emergencies numbers of the local police, fire department and the municipality must be placed in prominent areas;
- Fire fighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank;
- A speed limit of 40 km/h must be adhered to by all vehicles and machinery.

4. Hazardous Material Storage

- Proper storage facilities should be provided for the storage of chemicals and any hazardous materials to be used during operation (if applicable);
- The contractor must provide method statements for the “handling & storage of oils and chemicals”, “fire”, and “emergency spills procedures”;
- Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. Spill kits must be made up of material/product that is in line with environmental best practice (SUNSORB is a recommended product that is environmentally friendly);
- These storage facilities (including any containers) should be stored on an impermeable surface, in order to ensure that accidental spillage does not pollute soil or water resources;
- An inventory of all chemicals and other substances must be kept on site, along with a description of possible ill effects and treatment of health-related afflictions resulting from accidents, should be kept in the storage area as well as by the appropriate site manager. Such areas should be securely locked;
- Workers should at all times be made aware of the health risks associated with the use of all chemicals (e.g. smoking near storage areas), and should be provided with appropriate protective clothing or equipment in case of spillages or accidents;
- Cement and other potential environmental pollutants should be stored and mixed on an impermeable substratum. There should be no opportunity for environmental contamination;
- All stockpiled material must be easily accessible without any environmental damage;
- All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised;

- The stockpiles may only be placed within the demarcated areas preferably the current feedlot area. No stockpiles should be placed within the 1:100 flood lines;
- The contractor must avoid vegetated areas that will not be cleared;
- Storm water runoff from the stockpile sites and other related areas must be directed into the storm water system with the necessary pollution prevention measures such as silt traps and may not run freely into the immediate and surrounding environments;
- Stockpiles are to be stabilised if signs of erosion are visible;
- Soils from different horizons must be stock piled such that topsoil stockpiles do not get contaminated by sub-soil material;
- Topsoil stockpiles must be monitored for invasive exotic vegetation growth. Contractors must remediate as and when required in consultation with the ESO;
- No plant, workforce or any construction related activities may be allowed onto the topsoil stockpiles;
- Topsoil stockpiles must be clearly demarcated as no-go areas;
- Stock piles must not be higher than 2m to avoid compaction thereby maintaining the soil integrity and chemical composition;
- Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas;
- Sufficient care must be taken when handling these materials to prevent pollution. Training on the handling of dangerous and toxic materials must be conducted for all staff prior to the commencement of construction;
- In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs (DWA) must be informed immediately;
- Storage areas must display the required safety signs depicting “no smoking”, “No Naked lights” and “Danger” containers must be clearly marked to indicate contents as well as safety requirements;
- The contractor must supply a method statement for the storage of hazardous materials at tender stage;
- Material Safety Data Sheets (MSDS) must be prepared for all hazardous substances on site and supplied by the supplier where relevant. MSDS’s must be updated as required’
- The contractors must provide and maintain a method statement for “Diesel tanks and refuelling procedures”;
- Bulk fuel storage tanks on the site must be on an impervious surface that is bunded and able to contain at least 110% of the volume of the tanks. The filler tap must be inside the bunded area where possible and the bund wall must not have a tap or valve;
- A Flammable Liquid License must be obtained for diesel volumes greater than 200 litres;
- Environmental Authorisation is required for volumes greater than 80 000 litres;
- Bulk fuel storage tanks must be located in a portion of the construction camp where they do not pose a high risk in terms of water pollution (i.e. they must be located away from water courses). No bulk fuel storage will be allowed within the 1:100 flood lines and the bulk tanks should preferably be placed in the currently disturbed feedlot area or alternatively just north of the railway line;
- Bulk fuel storage tanks must be placed so that they are out of the way of traffic, so that the risk of the tanks being ruptured or damaged by vehicles is minimised; and
- Bulk fuel storage areas should be covered during the rainy season.

Security

- Unsocial activities such as consumption or illegal selling of alcohol, drug use or selling on site are prohibited;

- Any persons found to be engaged in such activities shall have disciplinary and / or criminal action taken against them;
- No person shall enter the site unless unauthorised to do so by the contractor, Project Coordinator and ECO;
- If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed. The deviation of fences shall be negotiated and agreed upon with the landowner in writing by the ECO;
- Trespassing on private / commercial properties adjoining the site is forbidden;
- The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site.

Social environment:

- All contact with affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times;
- A complaints register shall be kept on site. Details of complaints should be incorporated into the audits as part of the monitoring process. The register is to be tabled during monthly site meetings;
- No interruptions other than those negotiated shall be allowed to any essential services;
- Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of all damage and remedial actions shall be kept on site;
- Road rehabilitation should take place during and once construction is completed;
- Construction traffic should only make use of approved routes;
- Where possible unskilled labour opportunities should be afforded to local community members;
- Equal opportunities for employment should be created to ensure that the local female population also have access to these opportunities. Females should be encouraged to apply for positions;
- Payment should comply with applicable Labour Law legislation in terms of minimum wages.

Cultural and Heritage artefacts

1. Removal of equipment

- All structure comprising the construction camp are to be removed from the site;
- The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint etc. And these shall be cleared up and contaminants disposed of appropriately;
- All hardened surfaces within the construction camp area should be top soiled and regressed using the guidelines as set out in the section on Flora and Fauna that forms part of this document.

2. Temporary services

- The Contractor must arrange the cancellation of all temporary services;
- Temporary roads must be closed and access across these blocked;
- All areas where the temporary services were installed are to be rehabilitated to the satisfaction of the ECO.

3. Associated infrastructure

- Surfaces are to be checked for waste products from activities such as concrete batching and cleared in a manner approved by the ECO;
- All surfaces hardened due to construction activities are to be ripped and imported material thereon removed;

- All rubble is to be removed from the site to an approved landfill site as approved by the ECO. Burying of rubble on site is prohibited;
- The site is to be cleared of all litter;
- The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials;
- Fences, barriers and demarcations associated with the construction phase are to be removed from the site;
- All residual stockpiles must be removed or spread on site as directed by the ECO;
- A.; leftover building materials must be removed from the site;
- The Contractor must be repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to damage caused by poor storm water management.

4. Rehabilitation

- Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately after the installation of the new infrastructure to prevent further soil erosion;
- Once the construction phase is completed, all redundant infrastructure, soil, waste and construction materials should be removed from site by the proponent and disposed of in an appropriate manner, i.e. at a registered site;
- Disturbed areas, which are to remain free of development, should be rehabilitated to a state comparable to the surrounding vegetation;
- Areas compacted by vehicles during the construction phase may have to be scarified (ripped) to allow penetration of plant roots and the re-growth of vegetation;
- Stockpiled topsoil (not higher than 2 meters) should be used as the final cover for all disturbed areas where re-vegetation is required;
- Due to the sensitivity of the drainage lines, re-vegetation of these areas should take place as soon as possible after the work is completed and erosion control measures must be employed both during and after operation;
- The disturbance of steep slopes, for example by the removal of vegetation, may result in slope instability and erosion by rain and surface runoff;
- To reduce the loss of material by erosion, the contractor must ensure that disturbance on site is kept to a minimum. The contractor is responsible for decommissioned all eroded areas in such a way that the erosion potential is minimised after construction has been completed;
- All disturbed areas will require decommissioning must be mulched to encourage vegetation re-growth. Mulch used must be free from alien seed;
- These areas must be cordoned off so that vehicles or construction personnel cannot gain access to these areas.

Ecology

- Disturbance of animals during construction period could take place. Construction staff should be prohibited to chase, catch or kill any animals found or encountered during construction. It is expected that animals will move away from activities but will return when things have settled down again;
- Ensure that construction activities are limited to the Usutu Colliery infrastructure;
- Construction activities must be geographically restricted; This must be achieved by demarcating the Usutu Colliery site. Vehicles may only move within demarcated areas;

- Construction camps and ablution facilities are to be placed in currently impacted areas, at least 50 meters away from any watercourses;
- An appropriate waste management programme must be implemented throughout the construction phase;
- Fires from cooking must be located within the enclosed, demarcated area. Fire-fighting equipment must be kept onsite in order to contain an accidental fire.

8.3 EMPr: Operational Phase

Maintenance

- Regular inspection of the Usutu Colliery must take place to monitor its operational status;
- The surrounding community should be encouraged to report any unexpected fault / failure to Vunene Mining (Pty) Ltd as soon as possible.

Vegetation

- The rehabilitation of the trenches and disturbed areas around the infrastructure must be undertaken with indigenous grasses local to the area and the require minimal horticulture maintenance;
- All weeds and invasive vegetation should be eradicated over a five year period;
- No faunal species must be harmed by maintenance staff during the routine checks of the Usutu Colliery infrastructure.

Avifaunal

- Mark certain sections of the plant area with anti collision marking devices on the earth wire to increase the visibility of the line and reduce likelihood of collisions;
- Structures should have minimum phase clearance of 2 000mm and the monopoles should be fitted with bird perch.

Visual

- The building textures and colours should blend in with the backdrop of colour and textures provided by the landscape. The natural setting and colours of buffs, olive greens, dark browns should be respected and where possible, these should be incorporated into the materials used in the exteriors of the building and landscape;
- Colours of new infrastructure should be matt and not glossy, so as to reduce reflection and glare from the surfaces. This is important when considering the night scene and reflected light;

9. ENVIRONMENTAL MONITORING

According to the regulation 33 of GN R543, an environmental management programme must include:

(e) proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereof

The Environmental Management Programme (EMPr) becomes a tool by which compliance on the proposed site can be measured against. In order to utilise the tool, environmental monitoring needs to take place with regular audits against the EMPr to ensure that all aspects are attended to.

Environmental monitoring establishes benchmarks to judge the natural and magnitude of potential environmental and social impacts.

Some of the key parameters for monitoring and auditing of the proposed project include the following *inter alia*:

- Soil erosion and siltation;
- Oil spillages;
- Dust and gaseous emissions;
- Water quality;
- Noise and Vibration;
- Change in biodiversity;
- Socio-economic change; and
- Land use changes.

The overall objective of environmental and social monitoring is to ensure that mitigation measures are implemented and that it is affective. Environmental and social monitoring will also enable responses to new and developing issues and concern. The activities and indicators that have been recommended for monitoring are presented in the EMPr.

Environmental monitoring will be carried out to ensure that all construction activities comply and adhere to environmental provisions and standard specifications, so that all mitigation measures are implemented. The contractor shall employ an officer responsible for implementation of social / environmental requirements. This person will maintain regular contact with the local / district Environmental Officer. The contractor and proponent will have a responsibility to ensure that the proposed mitigation measures are properly implemented during the construction phase.

The environmental monitoring program will operate through the preconstruction, construction and operational phase. It will consist of a number of activities, each with a specific purpose with key indicators and criteria for significance assessment. The following aspects will be subject to monitoring:

- Encroachment into sensitive areas;
- Maintenance of project footprint;
- Vegetation maintenance around project work sites, workshops and camps; and
- Health and Safety.

Monitoring should be undertaken at a number of levels. Firstly it should be undertaken by the contractor at work sites during construction, under the direction and guidance of the Supervision Consultant who is responsible for reporting the monitoring to the implementing agencies. It is not the Contractor's responsibility to monitor land acquisition and compensation issues. It is recommended that the Contractor employ local full time qualified environmental inspectors for the duration of the Contract. The Supervision Consultant should include the services of an international environmental and monitoring specialist on a part time basis as part of their team.

Environmental monitoring is also an essential component of project implementation. It facilitates and ensures the follow-up of the implementation of the proposed mitigation measures as they are required. It helps to anticipate possible environmental hazards and / or detect unpredicted impacts over time.

Periodic ongoing monitoring will be required during the life of the project and the level can be determined once the project is operational.

9.1 Closure goals and targets

“That all residual environmental impacts associated with the construction method employed, including possible infrastructure, stockpile, dumps or waste water containment structures, be neutralized or minimised such that the post-operational environment is able to function in a manner which conforms to the concept of sustainable development.”

Specifically, the rehabilitation and closure objective of the Vunene Mining (Pty) Ltd Usutu opencast and underground coal mine will be that the final (end) land use will as a minimum be comparable to the pre-operational land use of grazing, which could further be optimized for either a residential or a recreational development in years to come.

The predominant pre-operational land capability is that of grazing and the focus of the rehabilitation program will be that the post-operational environment be suitable for grazing again. The development of low yield graze land is viewed as the end land use. Within this strategic statement are the following objectives found. Note that these objectives have been spelled out to be specific, measurable, relevant and achievable:

Implement operational control measures as indicated and required by the EMPr:

- Initiate first stage rehabilitation with the aim of establishing low yield graze land, simultaneous acknowledgement of structural and service related factors for the later residential development objectives;
- Establish a close working relationship with adjacent operational institutions and facilitate a common long term closure objective;
- Address post operational objectives as stipulated in the section below; and
- Establish and conform to a frequent monitoring and reporting programme, such that liability assessments as well as legal compliance is tested and screened for improvements.

9.2 Socio-economic impacts

The Usutu Colliery is only a temporary use of land, so it is vital that rehabilitation of land takes place once these operations have stopped. In best practice a detailed rehabilitation or reclamation plan is designed and approved for each of the activities.

Reclamation activities are undertaken gradually;

- with the shaping and contouring of natural environment,
- removal of infrastructure,
- replacement of topsoil,
- seeding with grasses and planting of trees taking place, and
- Care is taken to relocate streams, wildlife, and other valuable resources.

The above is largely achieved through bulldozers and scrapers which are used to reshape the disturbed area. Drainage within and off the site should be designed to make the new land surface as stable and resistant to soil erosion as the local environment allows.

The above is however much dependent on the actual environmental conditions, historical activities as

- The objective for closure of the Usutu Colliery is to create a free draining post operational landscape that has been returned to a productive post operational land use. The land use is likely to be primarily wilderness with the potential for arable agriculture and livestock grazing;
- No new fixed infrastructure will be established on closure and all existing infrastructure will be removed; and
- The closure objective regarding groundwater is zero discharge of contaminated water to the environment.

9.3 Infrastructure area

The removal, decommissioning and disposal of all infrastructure, will comply with all conditions contained in the EMPR. To this end, decommissioning and rehabilitation of all infrastructure areas will follow the following principles:

- Dismantle project related infrastructure. Load and remove from site for re-sale or disposal at an approved waste site;
- Any item that has no salvage value to Vunene Mining (Pty) Ltd but could be of value to individuals will be treated as waste;
- Demolish and remove concrete foundations and slabs to an approved waste disposal facility;
- Inert ceramics such as bricks, concrete, gravel will be used as backfill or disposed of in a permitted waste disposal site;
- Inert waste, which is more than 500 mm underground, such as pipes will be left in place;
- Dismantle and remove redundant fence for salvage;
- Cover the fence line with topsoil;
- The company contracted to supply fuel will be requested to remove all fuel storage and reticulation facilities;
- All structures will be demolished and terracing and foundations removed to the lesser of 500 mm below the original ground level;
- Rip and grade the above areas for placement of topsoil;
- Rip and grade access roads for placement of topsoil;
- Maintenance of roads required for maintenance and monitoring;
- Load from stockpile, haul, place and spread a layer of topsoil on all areas on which vegetation will be established;
- Establish vegetation on topsoiled surfaces, including analysis of topsoil, application of fertilisers, application of seed and hand planting as necessary;
- Active maintenance of planted areas for a period of at least a year, including re-seeding and replanting, weed and alien vegetation control as required;
- Passive maintenance of planted areas, including re-seeding and re-planting, weed and alien vegetation control as required;
- Undertake complete groundwater quality and water level monitoring in order to establish long-term groundwater levels and quality trends;

- Access roads will have consolidated basement materials lifted and disposed in to pit. Footprint of access roads will be ripped to a depth of 1.0 meters. Topsoil will be spread over the ripped access road footprint to a depth of 300 mm and reseeded; and
- Piping and water treatment infrastructure will be maintained on site until water quality monitoring data proves that the water quality is acceptable for direct release to the receiving environment. The detailed closure plan that will be developed at end of operational life will address Long water monitoring and maintenance requirements.

9.4 Maintenance of Impacts Identified

- The necessary agreements and arrangement will be made by Vunene Mining (Pty) Ltd to ensure that all natural physical, chemical and biological processes for which a closure condition were specified are monitored until they reach a steady state or for three (3) years after closure or as long as deemed necessary at the time;
- Such processes include erosion of the rehabilitated surfaces, surface water drainage, ground water recharge, air quality, surface water quality, ground water quality, vegetative re-growth, weed encroachment; and
- The closure plan will be reviewed every one (1) years.

9.5 Topography: Surface Infrastructure

Management objectives

Return topography as close as possible to pre-operational topography.

Management principles and criteria

- Remove all concrete or steel structures that cannot be used by the community;
- Topsoil and rehabilitate open areas; and
- Rehabilitation includes planting and shaping to fit in with the natural topography.

9.6 Soil: Erosion

Management objectives

To prevent erosion.

Management principles and criteria

- It is not anticipated that surface subsidence will occur associated with the Usutu Colliery. Some minor settlement may occur, however it is unlikely to result in ponding of water;
- Vegetation establishment in disturbed areas will be undertaken during the rainy season;
- Vunene Mining (Pty) Ltd will observe the requirements of the Department of Agriculture in the design of effective erosion control measures on bare soils. These requirements are as follows:
 - Erosion control measures are required in all areas where slope gradients exceed 2%;
 - Engineered erosion control measures are required where slope gradients exceed 7° (15%);
 - The following activities will be included:
 - Ensure that all slopes are safe in the longterm;
 - Submission of closure report and application for closure to the authorities;
 - Environmental monitoring and maintenance for three (3) years after closure; and

- Rehabilitation of the land will be maintained until a closure certificate is granted or until the land use is regarded as sustainable.

9.7 Land Capability: Loss of Grazing Land

Management objectives

- Restore disturbed land to grazing potential (being 4ha per large stock unit or 10 small stock units); and
- After rehabilitation the site will be returned as close as possible to the pre-operational land capability.

Management principles and criteria

- All other sites, will be landscaped so that the slope gradient is as gentle as possible and minimal erosion control measures are required;
- Spread available topsoil on all areas on which vegetation will be established;
- Before seeding and planting, topsoil should be sampled and analysed to establish fertility status and fertilised accordingly; and
- Maintain planted areas for a period of at least 3 years, including fertilization, re-seeding and replanting, weed and alien vegetation control as required.

9.8 Natural Vegetation: Loss of Biodiversity and Ecological Function

Management objectives

- Restore disturbed land to grazing potential (being 4ha per large stock unit or 10 small stock units) at all sites.

Management principles and criteria

- Rehabilitated areas of grazing capability will comprise a grass community dominated by grasses of pasture origin. These areas will be managed by a combination of grazing or mowing or veldt burning to effect defoliation. Vunene Mining (Pty) Ltd to monitor re-grassed areas as indicated in order to demonstrate the trend towards the areas becoming self maintaining in these rehabilitated systems.

9.9 Visual Aspects: Negative Visual Impact

Management objectives

- To limit the visual impact of the project on both the surrounding landowners and the Steve Tshwete Local Municipality.

Management principles and criteria

- All disturbed areas to be rehabilitated;
- Areas to be re-vegetated with endemic trees and grass species; and
- Remaining waste areas to be flattened, sloped, covered with topsoil and vegetated.

9.10 Regional Socio-Economic Impacts

Management objectives

- To mitigate the impacts of the termination of the project. Closure will result in cessation of employment, with a limited number of workers benefiting from closure and decommissioning activities.

Management measures

- Vunene Mining (Pty) Ltd will give advance warning of the closure of the Usutu Colliery as early as practically possible, so that employees have the maximum time to seek alternative employment;
- Vunene Mining (Pty) Ltd will offer professional employee counselling to deal with the effects of job loss to reduce the traumatic effect of dismissal. Where dismissal based on operational requirements becomes necessary the company will offer training in small business development and relevant skills to encourage job creation and financial independence;
- Vunene Mining (Pty) Ltd will provide severance payments and assist employees in obtaining social benefits. Vunene Mining (Pty) Ltd will take reasonable steps to notify employees, recently dismissed in terms of the Social and Labour Plan procedure, of vacancies, which have occurred subsequent to their dismissal, so that they may apply for re-employment. Application for such vacancies must be forwarded within the stipulated period and will be considered with due regard to the skills required;
- Local product and service providers will be most affected by the reduced economic activity in the area as a result of the mine's closure. Vunene Mining (Pty) Ltd will assist in the re-focussing and diversification of local service providers in accordance with sustainable development principles;
- Rehabilitated land and remaining infrastructure could be used for other purposes, which could include agriculture (grazing), tourism, training centres and other activities; and
- Rehabilitation should take account of sustainable development opportunities, formulated with the local community.

9.11 Dust and Air Quality

Passive sampling (Gravimetric Dust Bucket)

This method entails a dust stand and bucket at a minimum of eight locations on the peripheral area of the operation, these areas are selected by using the prevailing wind directions on the area.

Three (3) cycles of Dust fall out samples per quarter is taken (thus monthly), analysis includes gravimetric (mg . m³ / day) and one metals scan per quarter.

Gravimetric analysis of dust fall out is done according to SANS 1929 methodology at an independent registered laboratory

Active sampling (High volume dust sampler EVM 07 Quest)

Active sampling includes 8 suites of samples on the 8 sampling sites (main wind directions).

A suite includes SO₂, NO₂, HF, HCl, VOC, CO₂ en PM₁₀ and PM 2.5.

Analysis is done on site by the EVM 7 Environmental Monitor device.

Standards applied

Analysis of all samples (active and passive) are done by under the SANS 1929: 2004 methodology at a registered independent laboratory.

9.12 Surface water

- Sampling methodology applies predetermined points within the landscape with probability of influence by operational water flow and discard is sampled on a monthly basis.
- Analysis includes Chemical, Biological and Metal tests.
- DWEA guidelines, general standards and SANS 241:2006

9.13 Ground water

- Sampling methodology includes the testing of predetermined boreholes affected or used by operations are sampled on a quarterly basis or on a frequency requested by the owner or in compliance with the Environmental Management Plan of the organisation.
- All ground water tests according to SANS 241: 2006 methodologies at an independent and registered laboratory.

9.14 Fauna, Flora and rehabilitation

- Specialist monitoring on Faunal and Floral aspects include the monitoring of effects operational possesses have on vegetation and accompanied animal life within the immediate or surrounding areas of the operations.
 - Alien vegetation control and management;
 - Habitat and vegetation management;
 - Rehabilitation services include the rehabilitation of operational disturbed areas and hydrocarbon spill areas;
 - Re-vegetation and sloping of disturbed area to surrounding landscape; and
 - Remediation of soil at spill sites.

9.15 CLOSURE GOALS AND TARGETS

9.16 Hydrocarbon spills and Emergency procedure for Vunene Mining (Pty) Ltd

The guideline below is a pro-active effort to address the dimensions of a typical hazard and or risk on site. It must however be noted that the EMPr prescribes that no hydrocarbons will or are allowed to be stored on site.

9.17 Fire protection

Portable fire extinguishers suitable to each area conditions and hazards shall be provided and in a ready to use condition. They should be conspicuously located and mounted so as to be readily accessible. Fire extinguisher training to be provided to designated fire marshals.

9.18 Environmental inspection

Site inspection must include observations and reporting on site-specific environmental aspects and impacts.

9.19 General Emergency

Where an incident occurs, personnel at the scene shall render assistance to limit further damage and minimise the environmental impacts. There should be minimum delay in calling emergency services. The first responder shall judge how much information to obtain before emergency services are called and further provide information on an ongoing basis, as it becomes available.

9.20 Fire Emergency

In the case of fire, set off the alarm and notify emergency services immediately. Secure the scene and isolate the area allowing sufficient space for access by the emergency services and escape routes in the event of an escalation of the incident. Follow evacuation procedures. Identify major risks to minimise the environmental impacts e.g., air pollution contaminated effluent runoff.

9.21 Spill Emergency

Assess the risk by means of MSDS for the spilled substance before taking any action. Where necessary, call the emergency services immediately. Secure the scene and isolate the area to ensure the safety of people and the environment. Efforts to protect the environment should be weighed against the possibility of becoming part of the problem. The first responder shall remain in command of the scene of the incident until the arrival of emergency services at which time he passes on all relevant information to the person in command. Compile a brief written report as soon as possible thereafter while the facts are still fresh.

9.22 Evacuation during an Emergency

An evacuation may be ordered when any hazard (e.g. fire, gas leak, hazardous substance spill, toxic fumes or bomb threat) exists which may endanger the building, its occupants or the environment. Evacuation should be done according to a locally devised plan (site specific) which should take environmental hazards into account. Evacuation is to be initiated by an alarm and done in accordance with Occupational Health and safety guidelines.

9.23 Hazard Communication

Employees have a 'right to know' and be informed regarding the chemical and other hazards that they and the environment are exposed to under normal conditions of use or in a foreseeable emergency. This document is applicable to all employees, including those working at remote facilities and operations, who engage in the use of hazardous chemicals. Information and inventories of hazardous chemicals, including MSDS's should be available at all times where they are used. Employees using these products shall be trained in the specific handling precautions of substances used for their work. Induction programs for new employees must include relevant information described here. Ensure through the use of appropriate and visible signs that employees not normally assigned to the work area are aware of the hazards to which these areas are subjected. Report all working conditions, which may put the environment at risk.

9.24 Management of alien and invasive species

The aim of control is to reach a point where, ideally, the plants concerned do no longer occur in that particular area or, at least, where the plants can no longer grow, produce viable seeds or spores, coppice, sprout or produce root suckers, reproduce vegetatively, propagate themselves in any other way, or spread into other areas. If this is not possible, the plants have to be contained and their multiplication limited as far as possible.

When controlling weeds and invaders, damage to the environment has to be limited to the minimum. CARA does not specify the types of environmental damage that might be caused by control actions, but a few examples would be:

- the removal of or herbicidal damage to non-target plants;
- the chemical pollution of soil or water or any other threat to non-target organisms;
- the irresponsible use of fire;
- the creation of a fire hazard by allowing flammable material to accumulate in fire-sensitive areas;
- unnecessary or irresponsible disturbance of the soil, especially on riverbanks or slopes;
- failure to rehabilitate denuded areas so as to prevent soil erosion and invasion by other undesirable species; and
- any other action that might upset the ecological balance of the environment.

Biological control of weeds is subject to rigorous regulations, and will be recognised by CARA as a valid control method only if it is practised in accordance with all these regulations. Biological control involves the use of host-specific natural enemies of weeds or invaders from the plant's country of origin, to either kill or remove the invasive potential of these plants. It may only be initiated by and carried out under the supervision of an academic or research institute or organisation established by legislation, which practises and researches biological control of weeds and invader plants. In order to prevent the waste of bio control research effort, money and natural enemies, CARA also lays down certain rules for the protection of biological control agents. In areas where biological control is effective, no additional control methods should be used that would harm the bio control agents. Provision is made for certain areas to be set aside as biological control reserves, i.e. areas in which a number of invasive plants are maintained as host plants for the biological control agents, to ensure the continued presence of the agents in that area. Only the Executive Officer may designate a biological control reserve, on condition that it is used by a bio control expert to rear and redistribute bio control agents. In such a biological control reserve, no measures may be applied that would render the bio control agents ineffective.

Nothing contained in Regulation 15 may be used as a reason for ignoring or circumventing any other laws.

Category 1 plants, or declared weeds

Woody plants (trees or shrubs): several Australian *Acacia* species (*A. implexa*, *A. longifolia*, *A. paradoxa* and *A. pycnantha*); two lebeck trees (*Albizia lebeck* and *A. procera*); Mauritius thorn (*Caesalpinia decapetala*); four cestrum species (*Cestrum aurantiacum*, *C. elegans*, *C. laevigatum* and *C. parqui*); trifid weed (*Chromolaena odorata*); Montpellier and Scotch broom (*Cytisus monspessulanus* and *C. scoparius*); three hakeas (*Hakea drupacea*, *H. gibbosa* and *H. sericea*); all seed producing species or seed producing hybrids of *Lantana* that are non-indigenous to Africa (this excludes the creeping, purple-flowered *Lantana montevidensis*, which does not produce seeds in South Africa); Australian myrtle (*Leptospermum laevigatum*); Indian laurel (*Litsea glutinosa*); purple loosestrife (*Lythrum salicaria*); cat's claw creeper (*Macfadyena unguis-cati*); tree daisy (*Montanoa hibiscifolia*); the single-flowered varieties of oleander (*Nerium oleander*); wild tobacco (*Nicotiana glauca*); lesser broomrape (*Orobanche minor*); stinkbean (*Paraserianthes lophantha*); four ornamental granadilla-like species

(*Passiflora caerulea*, *P. mollissima*, *P. suberosa* and *P. subpeltata*, but not the edible *Passiflora edulis*); pereskia (*Pereskia aculeata*); Australian cheesewood (*Pittosporum undulatum*); the ornamental Durban guava (*Psidium x durbanensis*); wax tree (*Rhus succedanea*); bloodberry (*Rivina humilis*); eglantine (*Rosa rubiginosa*); American bramble (*Rubus cuneifolius*); red sesbania (*Sesbania punicea*); silverleaf bitter apple (*Solanum elaeagnifolium*); bugweed (*Solanum mauritianum*); Spanish broom (*Spartium junceum*); yellow bells (*Tecoma stans*); yellow oleander (*Thevetia peruviana*); Indian almond (*Triplaris americana*) and European gorse (*Ulex europaeus*).

Succulents: chandelier plant (*Bryophyllum delagoense*); queen of the night (*Cereus jamacaru*); torch cactus (*Echinopsis spachiana*); harrisia cactus (*Harrisia martinii*); jointed cactus (*Opuntia aurantiaca*); long spine cactus (*O. exaltata*); sweet prickly pear (*O. ficus-indica* - but excluding all spineless cactus pear cultivars and selections); creeping prickly pear (*O. humifusa*); imbricate cactus (*O. imbricata*); small round-leaved prickly pear (*O. lindheimeri*); drooping prickly pear (*O. monacantha*); rosea cactus (*O. rosea*); saucepan cactus (*O. spinulifer*) and pest pear of Australia (*O. stricta*).

Herbaceous plants: burweed (*Achyranthes aspera*); crofton weed and mistflower (*Ageratina adenophora* and *A. riparia*); two ageratums (*Ageratum conyzoides* and *A. houstonianum*); camel thorn bush (*Alhagi maurorum*); Madeira vine (*Anredera cordifolia*); moth catcher (*Araujia sericifera*); two Mexican poppy species (*Argemone mexicana* and *A. ochroleuca*); pom pom weed (*Campuloclinium macrocephalum*); the small-flowered Indian canna (*Canna indica* - but not the common ornamental species or cultivars); balloon vine (*Cardiospermum grandiflorum*); spear thistle (*Cirsium vulgare*); field bindweed (*Convolvulus arvensis*); two dodder species (*Cuscuta campestris* and *C. suaveolens*); three thorn apple species (*Datura ferox*, *D. innoxia* and *D. stramonium*); two echium species (*Echium plantagineum* and *E. vulgare*); four species of ginger lilies (*Hedychium coccineum*, *H. coronarium*, *H. flavescens* and *H. gardnerianum*); pepper-cress (*Lepidium draba*); parthenium weed (*Parthenium hysterophorus*); kudzu vine (*Pueraria lobata*); potato creeper (*Solanum seaforthianum*); wild tomato (*Solanum sisymbriifolium*); Mexican and red sunflower (*Tithonia diversifolia* and *T. rotundifolia*) and two cocklebur species (*Xanthium spinosum* and *X. strumarium*).

Grasses or reeds: Spanish reed (*Arundo donax*); pampas grass (*Cortaderia selloana* and *C. jubata*) - excluding sterile varieties of *C. cordata*; nassella tussock (*Nassella trichotoma*); white tussock (*Nassella tenuissima*); fountain grass (*Pennisetum setaceum* - excluding the sterile cultivar 'Rubrum') and feathertop (*P. villosum*).

Aquatic plants: red water fern (*Azolla filiculoides*); dense water weed (*Egeria densa*); water hyacinth (*Eichhornia crassipes*); Canadian water weed (*Elodea canadensis*); parrot's feather (*Myriophyllum aquaticum*); spiked water-milfoil (*Myriophyllum spicatum*); water lettuce (*Pistia stratiotes*) and Kariba weed (*Salvinia molesta*). Plants that are problematic only in certain areas, but are popular ornamental or utility plants elsewhere, were declared weeds (Category 1 plants) only in certain provinces. These include:

Silver wattle (*Acacia dealbata*), spider gum (*Eucalyptus lehmannii*) and leucaena (*Leucaena leucocephala*) - Category 1 in Western Cape, but Category 2 elsewhere.

Two tamarisk species (*Tamarix chinensis* and *T. ramosissima*) - Category 1 in Northern, Western and Eastern Cape, but Category 3 elsewhere.

Coral tree (*Ardisia crenata*) and camphor tree (*Cinnamomum camphora*)- Category 1 in only Northern Province, KwaZulu-Natal and Mpumalanga, but not subject to legislation elsewhere.

Pitanga (*Eugenia uniflora*), moonflower (*Ipomoea alba*) and morning glory (*Ipomoea indica*) -Category 1 in

Northern Province, KwaZulu-Natal and Mpumalanga, but Category 3 elsewhere.

Brazilian pepper tree (*Schinus terebinthifolia*) and Singapore daisy (*Telechitonina trilobata*) - Category 1 in KwaZulu-Natal, Category 3 elsewhere.

The dagga plant (*Cannabis sativa*), which used to be a declared weed, has been removed from the list because it is covered by the Narcotics Act.

Category 2 plants, or declared weeds

The following species are classified as Category 2 plants: rooikrans (*Acacia cyclops*); silver wattle (*A. dealbata*) - this species not allowed in the Western Cape; green wattle (*A. decurrens*); black wattle (*A. mearnsii*); Australian blackwood (*A. melanoxylon*); Port Jackson willow (*A. saligna*); sisal hemp (*Agave sisalana*); old man salt bush (*Atriplex nummularia*); beefwood and horsetail (*Casuarina cunninghamiana* and *C. equisetifolia*) - neither of which will be allowed for dune stabilisation; several species of gum trees (*Eucalyptus camaldulensis*, *E. cladocalyx*, *E. diversifolia*, *E. grandis*, *E. paniculata*, *E. sideroxylon* and *E. lehmannii*) - the latter species not allowed in the Western Province (because of their importance for beekeepers, legislation with regard to *Eucalyptus* species might still be changed; they might be exempted from the need of being controlled wherever they occur outside demarcated areas and, instead, control might only be mandatory in or near watercourses and wetlands); honey locust (*Gleditsia triacanthos*), St John's wort (*Hypericum perforatum*), which may only be grown under controlled conditions; leucaena (*Leucaena leucocephala*) - this species not allowed in the Western Cape; several pine species (*Pinus canariensis*, *P. elliotti*, *P. halepensis*, *P. patula*, *P. pinaster*, *P. radiata*, *P. roxburghii* and *P. taeda*); white and grey poplars (*Populus alba* and *P. x canescens*); honey and velvet mesquite (*Prosopis glandulosa* and *P. velutina*), as well as their hybrids; the commercial guava (*Psidium guajava*); castor oil plant (*Ricinus communis*); black locust (*Robinia pseudoacacia*), which may be propagated as a rootstock only, and then only with special authorisation; watercress (*Rorippa nasturtium-aquaticum*); European blackberry (*Rubus fruticosus*); the weeping and crack willows (*Salix babylonica* and *S. fragilis*) - not to be confused with the indigenous *Salix mucronata*, which should not be removed; and Johnson grass (*Sorghum halepense*).

Category 3 plants, or declared weeds

The following species are Category 3 plant invaders: pepper tree wattle (*Acacia elata*); pearl acacia (*Acacia podalyriifolia*); tree-of-heaven (*Ailanthus altissima*); sponge-fruit salt bush (*Atriplex lindleyi* subsp. *Inflata*); two species of orchid trees (*Bauhinia purpurea* and *B. variegata*); two species of cotoneasters (*Cotoneaster franchetii* and *C. pannosus*); loquat (*Eriobotrya japonica*); pitanga (*Eugenia uniflora*) - but not allowed in Northern Province, Mpumalanga or KwaZulu-Natal; Australian silky oak (*Grevillea robusta*); moonflower (*Ipomoea alba*) - but not allowed in Northern Province, Mpumalanga or KwaZulu-Natal; morning glory (*Ipomoea indica*) - but not allowed in Northern Province, Mpumalanga or KwaZulu-Natal; another species of morning glory (*Ipomoea purpurea*); jacaranda (*Jacaranda mimosifolia*); five species of privets (*Ligustrum japonicum*, *L. lucidum*, *L. ovalifolium*, *L. sinense* and *L. vulgare*) - *L. lucidum* may be propagated only as a rootstock if special permission has been obtained; St Joseph's lily (*Lilium formosanum*, also incorrectly called *Lilium longiflorum*); "syringa" (*Melia azedarach*); New Zealand christmas tree (*Metrosideros excelsa*); giant sensitive plant (*Mimosa pigra*); white mulberry (*Morus alba*) - excluding cultivar 'Pendula', - may be propagated only as a rootstock, if special permission has been obtained (note that the black mulberry, *Morus nigrum*, which is the better fruit tree of the two, is not subject to legislation); manatoka (*Myoporum tenuifolium* subsp. *montanum*, also sometimes called *M. acuminatum*); sword fern (*Nephrolepis exaltata*) - excluding its cultivars; belhambra (*Phytolacca dioica*);

'Abyssinian' coleus (*Plectranthus comosus*); pickerel weed (*Pontederia cordata*); strawberry and Durban guavas (*Psidium cattleianum* and *P. x durbanensis*); yellow and Himalayan firethorn (*Pyracantha angustifolia* and *P. crenulata*); Brazilian pepper tree (*Schinus terebinthifolius*) - but not allowed in KwaZulu-Natal; three senna species (formerly known as cassias) (*Senna bicapsularis*, *S. didymobotrya* and *S. pendula*); jambolan (*Syzygium cumini*); rose apple (*Syzygium jambos*); Chinese and pink tamarisk (*Tamarix chinensis* and *T. ramosissima*) - neither of which is allowed in the Northern, Western or Eastern Cape; the tipu tree (*Tipuana tipu*) and the toon tree (*Toona ciliata*).

9.25 Storm water control measures

Preventive measures include non-structural practices that help prevent the generation of runoff and the contamination of runoff by pollutants. Preventive measures are considered the "first line of defence" in an integrated storm water management system. These measures are usually very cost effective compared to structural control measures, which can have significant capital and operation and maintenance costs. Many of these measures involve changing the behaviour of individuals and/or procedures used in carrying out various activities.

Vunene Mining (Pty) Ltd will be subjected to the following inter alia, management practices:

- Assess the site's soils, current and native vegetation cover, wetland areas, streams, ponds and other critical areas; and establish buffers and delineate protected areas;
- Maximize retention of native vegetation cover to intercept, evaporate and transpire precipitation;
- Preserve permeable, native soils and restore disturbed soils with compost and other amendments to infiltrate and store storm water;
- Retain and incorporate topographic site features that promote infiltration and storage of storm water;
- Direct the location of buildings and roads away from critical areas and soils that can effectively infiltrate storm water;
- Minimize building footprints, and road widths and lengths to reduce impervious surfaces; and eliminate effective impervious surfaces;
- Utilize pervious surfaces (e.g. pervious pavement, pavers and gravel systems) where possible to promote storm water infiltration;
- Utilize small, decentralized bio-retention areas with appropriate vegetation to infiltrate, store and transpire precipitation;
- Reduce the reliance on traditional conveyance and pond technologies to manage storm water quality and quantity;
- Manage storm water as close to its origin as possible; and
- Risk should be identified where large amounts of storm water could enter the property.

10. ENVIRONMENTAL AWARENESS

According to the regulation 33 of GN R543, an environmental management programme must include:

An environmental awareness plan describing the manner in which: -

The applicant intends to inform his or her employees of any environmental risk which may result from their work; and

Risks must be dealt with in order to avoid pollution or the degradation of the environment.

Contractors shall ensure that their employees and any third party who carries out all or part of the Contractor's obligations are adequately trained with regard to the implementation of the EMPr, as well as regarding environmental legal requirements and obligations. Training shall be conducted by the ECO where necessary.

Environment and Health awareness training should be targeted at three distinct levels of employment i.e. the executive, middle management and labour. Environmental awareness training programme shall contain the following information:

- The names, positions and responsibilities of personnel to be trained;
- The framework for appropriate training plans;
- The summarized content of each training course; and
- A schedule for presentation of the training courses.

The ECO shall ensure that all records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMPr. The training records shall verify each of the targeted personnel training experience.

The developer shall ensure that adequate environmental training takes place. All employees shall have been given induction presentation on environmental awareness and the content of the EMPr. The presentation needs to be conducted in the language of the employees to ensure it is understood. The environmental training shall as a minimum include the following:

- The importance of conformance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personnel performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the Agency's environmental management systems, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities;
- Environmental legal requirements and obligations;
- Details regarding flora / fauna species of special concern and protected species, and the procedures to be followed should these be encountered during the construction of the Usutu Colliery;
- The importance of not littering;
- The importance of using supplied toilet facilities;
- The need to use water sparingly;
- Details of and encouragement to minimize the production of waste and re-use, recover and recycle waste where possible;
- Details regarding archaeological and or historical sites that may be unearthed during construction and the procedures to be followed should these be encountered.

11. COMPLIANCE WITH THE EMPr

According to the regulation 33 of GN R543, an environmental management programme must include:

(e) Proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon;

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

11.1 Non Compliance

The contractors shall act immediately when notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. The ECO should be made aware of any complaints.

Any non-compliance with the agreed procedure of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as it deems fit.

The Contractor is deemed not to have complied with the EMPr if, *inter alia*:

- There is evidence of contravention of the EMPr specifications within the boundaries of the construction site, site extensions and roads;
- There is contravention of the EMPr specifications which relate to activities outside the boundaries of the construction site;
- Environmental damage ensues due to negligence;
- Construction activities take place outside the defined boundaries of the site; and /or
- The contractor fails to comply with corrective or other instructions issued by the Engineer with a specific time period.

It is recommended that the Engineers / Contractors institute penalties for the following less serious violations and any other determined during the course of work as detailed below:

- Littering on site;
- Lighting illegal fires on site;
- Persistent or un-repaired fuel and oil leaks;
- Any persons, vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas;
- Excess dust or excess noise emanating from the site;
- Possession or use of intoxicating substances on site;
- Any vehicles being driven in excess of designated speed limits;
- Removal and / or damage to fauna, flora or cultural or heritage objects on site;
- Urination and defecation anywhere except at designated facilities.

11.2 Emergency preparedness

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will cause environmental impacts, throughout the construction period. Such activities may include *inter alia*:

- Accidental discharge to water and land;
- Accidental exposure of employees to hazardous substances;
- Accidental fires;

- Accidental spillages of hazardous substances;
- Accidental toxic emissions into the air;
- Specific environmental and ecosystem effects from accidental releases or incidents.
-
- These plans shall include:
 - Emergency organisation (manpower) and responsibilities, accountability and liability;
 - A list of key personnel and contact details;
 - Details of emergency services available (e.g. the fire department, spill clean up services, etc);
 - Internal and external communication plans, including prescribed reporting procedures where required by legislation;
 - Actions to be taken in the event of different types of emergencies;
 - Incident recording, progress reporting and remediation measures required to be implemented;
 - Information on hazardous materials, including the potential impacts associated with each;
 - Training plans testing exercises and schedules for effectiveness.

The Contractor shall comply with the emergency preparedness and incidents and accident reporting requirements, as required by the Occupational Health and Safety Act (Act 85 of 1993), the NEMA (Act 107 of 1998), The national Water Act (Act 36 of 1998) and the National Veldt and Forest Fire Act (Act 101 of 1998) as amended and or any other relevant legislation.

11.3 Incident reporting and remedy

If a leakage or spillage of hazardous substances occurs on site, the local emergency services must be immediately notified of the incident. The following information must be provided:

- The location;
- The nature of the load;
- The extent of the impact; and
- The status at the site of the accident itself (i.e. whether further leakage is still taking place, whether the vehicle or the load is on fire).

Written records must be kept on the corrective and remedial measures decided upon and the progress achieved therewith over time. Such progress reporting is important for monitoring and auditing purposes. The written reports may be used for training purposes in an effort to prevent similar future occurrences.

11.4 Penalties

Where environmental damage is caused or a pollution incident, and / or failure to comply with any of the environmental specifications contained in the EMP, the developer and / or contractor shall be liable.

The following violations, and any others determined during the course of work, should be penalised:

- Hazardous chemicals / oil spillages and / or dumping in non approved sites;
- Damage to sensitive environments;
- Damage to cultural and historical sites;
- Unauthorised removal / damage to indigenous trees and other vegetation, particularly in identified sensitive areas;

- Uncontrolled unmanaged erosion;
- Unauthorised blasting activities (if applicable);
- Pollution of water sources;
- Unnecessary removal or damage of trees.

12. CLOSURE PLANNING

According to the regulation 33 of GN R543, an environmental management programme must include:

(k) Where appropriate, closure plans, including closure objectives.

Final site cleaning – the contractor shall clear and clean the site and ensure that everything not forming part of the permanent works is removed from the site before issuing the completion certificate or as otherwise agreed.

Rehabilitation – the contractor shall not be responsible for rehabilitating and re-vegetation at all areas disturbed / areas earmarked for conservation during construction to the satisfaction of the engineer and ECO.

12.1 Post construction environmental audit

A post construction environmental audit must be carried out and submitted to DEA at the expense of the developer so as to fulfil conditions of the Environmental Authorisation granted. Objectives should be to audit compliance and the key components of the EMPr, to identify main areas requiring attention and recommend priority actions. The audit should be undertaken annually and should cover a cross section of issues, including implementation of environmental controls, environmental management and environmental monitoring.

Results of the audits should inform changes required to the specifications of the EMPr or additional specifications to deal with any environmental issues which arise on site and have not been dealt with in the current document.

12.2 Management review and revision of the EMPr

The EMPr is to be reviewed annually for the first three years and then once every five years thereafter by an independent environmental consultant, unless otherwise specified by the authorities. The auditor is to highlight issues to be addressed in the EMPr or charges required during the annual audit. These points are to be included as an annexure to the EMPr and to be considered during the review process. Recommended changes to the EMPr must be forwarded to DEA for the approval and comment, before subsequently being incorporated into the EMPr.

12.3 General review of the EMPr

The EMPr will be reviewed by the ECO on an on-going basis. Based on observations during site inspections and issues raised at the site meetings, the ECO will determine whether any procedures require modification to improve the efficiency and applicability of the EMPr on site.

Any such changes or updates will be registered in the Eco's record, as well as being included as an annexure to this document. Annexure of this nature must be distributed to all relevant parties.

13. REPORTING

13.1 Administration

Before the contractor begins each construction activity, the Contractor shall give to the ECO and engineer a written method statement setting out the following:

- The type of construction activity;
- Locality where the activity will take place;
- Identification of impacts that may result from the activity;
- Identification of activities or aspects that may cause an impact;
- Methodology and / or specification for impact prevention for each activity or aspect;
- Methodology and / or specification for impact containment for each activity or aspect;
- Emergency / disaster incident and reaction procedure;
- Treatment and continued maintenance of impacted environment.

The contractor may provide such information in advance of any or all construction activities provided that new submissions shall be given to the ECO and / or engineer whenever there is a change or variation to the original.

The ECO and/or engineer may provide comment on the methodology and or procedures proposed by the Contractor but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency / disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

13.2 Good housekeeping

The Contractor shall undertake "good housekeeping" practises during construction. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in the safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

13.3 Record keeping

The engineer and the ECO will continuously monitor the contractor's adherence to the approved impact prevention procedures and the engineer shall issue to the contractor a notice of non compliance when ever transgressions are observed. The ECO should document that nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the engineer in a monthly report. These reports shall be made available to DEA when requested/

The Contractor shall ensure that an electronic filing system identifying all documentation related to the EMP is established.

A list of reports will be generated during all phases of the Vunene Mining Usutu Colliery is provided below, and all applicable documentation must be included in the environmental filing system catalogue or document retrieval index.

- Final Environmental Impact Assessment Report;
- Environmental Management Plan;
- Final design documents and diagrams issued to and by the Contractor;
- All communications detailing changes of design / scope that may have environmental implications;
- Daily, weekly and monthly site monitoring reports;
- Complaints register;
- Medical reports;
- Training manual;
- Training attendance register;
- Incident and accident reports;
- Emergency preparedness and response plans;
- Copies of all relevant environmental legislation;
- Permits and legal documents, including letters authorising specific personnel of their duties as part of emergency preparedness teams e.g. fire teams etc;
- Crisis communication manual;
- Disciplinary procedures;
- Monthly site meeting minutes during construction;
- All relevant permits;
- Environmental Authorisation on the EIA from DEA; and
- All method statements from the Contractor for all phases of the project.

13.4 Document Control

The Contractor and Resident Engineer shall be responsible for establishing a procedure for electronic document control. The document control procedure should comply with the following requirements:

- Documents must be identifiable by organisation, division, function, activity and contact person;
- Every document should identify the personnel and their positions, who drafted and compiled the document, who reviewed and recommended approval, and who finally approved the document for distribution;
- All documents should be dated, provided with a revision number and reference number, filed systematically, and retained for a five year period.

The Contractor shall ensure that documents are periodically reviewed and revised, where necessary, and that current versions are available at all locations where operations essential to the functioning of the EMPr are performed. All documents shall be made available to the independent external auditor.

14. CONCLUSIONS

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMPr should be seen as a day to day management document. This EMPr thus sets out the environmental and social standards, which would be required to minimise the negative impacts and maximise the positive benefits of the Vunene Mining Usutu Colliery as detailed in Scoping EIA Report and specialists' studies. The EMPr could thus change daily, and if managed correctly lead to a successful construction and operational phases.

Further guidance should also be taken for any conditions contained in the Environmental Authorisation, if the project is granted approval, and that these DEA conditions must be incorporated into the final EMPr.

All attempts should be made to have this EMPr available, as part of any tender documentation, so that the engineers and contractors are made aware of the potential cost and timing implications needed to fulfil the implementation of the EMPr, thus adequately costing for these.