

19 March, 2019

Our ref: JP/1245

Mpumalanga Department of Water and Sanitation: DWS

### **EIA APPLICATION FOR THE PROPOSED KANGALA EXTENSION PROJECT**

Universal Coal Development I (Pty) Ltd, hereafter referred to as UCD1, wishes to expand their current approved mining operations on their Kangala Colliery. The proposed Kangala Extension Project covers an extent of approximately 251 hectares (ha) over portions 14, 15, 16, 18, 19, 20, 22, 23, and 24 of the farm Strydpan 243 IR, and is located approximately 7.5km south-east of the town Delmas in Victor Khanye Local Municipality, within the Nkangala District Municipality, Mpumalanga Province. The proposed Kangala Extension Project is anticipated to use a standard truck and shovel mining method based on strip mining design and layout. The existing Coal Handling and Processing Plant at the adjacent Kangala Colliery will be utilised, and it is anticipated that no new surface infrastructure such as offices, dams, stores facility, workshops, or change house will be required for the project.

It is understood that an EIA report needs to be submitted as part of the Water Use License application (WULA). A full EIA report is still to be completed as part of the application for authorization. The accompanying Scoping Report is thought sufficient to satisfy the EIA report requirement at this stage. The scoping report contains a detailed impact assessment as well as proposed mitigation measures and recommendations from specialist studies.

Kind regards,

**John von Mayer**

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Kindly refer to accompanying document for Scoping report



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# **Environmental Management Programme for the Eloff Environmental Authorisations - Phase 1, Pit 1**

**Final Report**

**Version - Amended Final for Submission**

**April 2018**

**GCS Project Number: 16-0869**

**Client Reference: Eloff Phase 1**

**DMR Reference Number: MP30/5/1/2/2/10169MR**



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Phase 1, Pit 1**

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**DISCLAIMER**

Information contained in this report relating to the project description is based on information supplied by the client and other client appointed sources. It is assumed that the information provided to GCS is correct.

Environmental and social data, as well as environmental impact assessment provided in this report is based on information supplied by specialists in their respective fields, as well as existing information pertaining to the area in question (including previous site investigation data). It has been assumed that the information provided to GCS to perform the outcomes of this report is correct.

No responsibility is accepted by GCS for incomplete or inaccurate data supplied by others (the client and external sources). Where gaps have been identified these are listed for consideration by the responsible decision-makers.

GCS's opinions, conclusions and recommendations are based upon information that existed at the time of the start of the production of this Document.

## EXECUTIVE SUMMARY

GCS Water and Environment (Pty) Ltd (GCS) was appointed by Eloff Mining Company (Pty) Ltd (EMC) to undertake the Environmental Authorisations application process for the proposed mining of phase 1 Pit 1 of the Eloff Coal Resource, in support of the Mining Right Application. The Environmental Authorisation Process and associated reports, including the Environmental Impact Assessment (EIA) Report, the Environmental Management Programme (EMP) Report, and all Specialist Assessments fulfil the requirements of the following legislation:

- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA); and
- National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

The purpose of the EMPr for the proposed Eloff project Phase 1, Pit 1 is as follows:

- To describe how potential negative environmental impacts will be managed through appropriate mitigation measures;
- To describe actions that could be taken to rehabilitate the affected areas especially during the construction phase;
- To prescribe monitoring actions that will ensure that the environmental management programme is adhered to; and
- To describe how potential positive environmental impacts will be maximised.

The overall objective of the EMPr is to reduce or mitigate negative environmental consequences resulting from the construction and operational process and to limit negative impacts as far as possible. The EMPr also aims to enhance positive impacts.

This EMPr has been compiled for the open pit bench mining as the mining method for the Eloff resource. The activities associated with the mine can be divided into the following activities:

- Construction activities:
  - Removal of topsoil;
  - Wind exposure;
  - Vegetation removal;
  - Heavy machinery movement;
  - Poaching;
  - Illegal collection or harvesting;
  - Hydrocarbon fuel spillage; and
  - Influx of job seekers.
- Operational activities:

- Vehicle and machinery movement;
  - Hydrocarbon spills; and
  - Poor maintenance.
  - Opencast Mining
- Closure Phase:
  - Rehabilitation of disturbed areas
- Residual Impacts; and
- Cumulative Impacts.

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## 1 CONTENT OF THE EMPR

ASPECT	REFERENCE
(1) An EMPr must comply with section 24N of the Act and include-	
(a) details of	
(i) the EAP who prepared the EMPr; and	Section 2.1
(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Appendix A
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 2.2
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;	Section 2
(d) a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	Section 6
(i) planning and design;	Section 6.2
(ii) pre-construction activities;	Section 6.2
(iii) construction activities;	Section 6.2
(iv) rehabilitation of the environment after construction and where applicable post closure; and	Section 6.2
(v) where relevant, operation activities;	Section 6.2
(e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 6.3
(f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to -	Section 6.2
(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Section 6.3
(ii) comply with any prescribed environmental management standards or practices;	Section 6.3
(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	N/A
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	N/A
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 7

ASPECT	REFERENCE
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 7
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 7
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 7
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 7
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 7
(m) an environmental awareness plan describing the manner in which-	Section 8
(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	Section 8
(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 9
(n) any specific information that may be required by the competent authority.	Section 8 Section 9
	N/A

## 2 INTRODUCTION

### 2.1 Details of the EAP

GCS Water and Environment (Pty) Ltd (GCS) have been appointed as the independent Environmental Assessment Practitioners (EAP) to undertake the environmental processes required to obtain approval for the proposed listed activities, as requested by the relevant competent authorities. The contact details of the EAP are provided in **Table 2.1**.

**Table 2.1: Name and Address of Environmental Assessment Practitioner.**

ITEM	COMPANY CONTACT DETAILS
Company Name:	GCS Water and Environment (Pty) Ltd
Company Representative:	Ms Riana Panaino
Telephone No.:	+27 (0)11 803 5726
Facsimile No.:	+27 (0)11 803 5745
E-mail Address:	rianap@gcs-sa.biz
Postal Address:	PO Box 2597, Rivonia, 2128

The curriculum vitae (CV) of Ms Riana Panaino is provided for in **Appendix A**.

### 2.2 Project Description

The mining method for the Eloff resource will be conventional open pit bench mining with the stripping operation removing topsoil and subsoil, exposing the hard overburden of the next cut. Initial topsoil and subsoil will be hauled to a designated area and used for rehabilitation at a later stage. Hard overburden will be drilled and blasted. Hard overburden material will also be hauled to a designated dumping area during the initial state. When steady state is reached, all waste material will be backfilled and rehabilitation adequately addressed by means of a backfilling process.

Once the overburden has been removed, Run of Mine (RoM) coal will be transferred to the crush and screen site by means of load haul trucks.

Eloff opencast areas are zoned into phases from Phase 1 to Phase 7. Each phase may comprise one or more pits depending on how the particular phase reserve is constrained by either environmentally sensitive courses or surface culture. Initial production will commence on Phase 1 Pit 1 estimated at a year after the Mining Right has been approved (**Figure 2.1**). Production from Phase 1 Pit 1 will ramp up to 1.0 million tons (Mt) RoM per year until Year 9 when the Phase 1 Pit 1 Reserve will start diminishing. At that stage Phase 2 Pit 1 will then be

commissioned with production being ramped up to  $\pm 3.0$  Mt RoM per year for the Life-of-Mine (LoM). Infrastructure built for Phase 1 Pit 1 will be used to support the exploitation of subsequent phases and pits.



Figure 2.1: Proposed Eloff Phase 1 and associated infrastructure.

**This application pertains only to Phase 1 Pit 1 and associated infrastructure.**

The Eloff Phase 1 Project will trigger listed activities in terms of environmental legislation and will therefore require an environmental authorisation for approval of the proposed activities before construction and mining can commence.

### 3 LEGAL REQUIREMENTS

#### 3.1 Constitution of the Republic of South Africa, 1996

According to the Constitution of South Africa, 1996 (Act No. 108 of 1996) a bill of rights has been compiled to protect the citizens of our country. Section 24 of the constitution provides: Everyone has the right:

- a) to an environment that is not harmful to their health or well-being;

- b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:
- i. Prevent pollution and ecological degradation;
  - ii. Promote conservation; and
  - iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

### **3.2 The National Environmental Management Act**

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) provides the framework legislation and establishes an integrated environmental management system for South Africa. It aims to prevent pollution and degradation of South Africa's natural environments while at the same time promoting sustainable economic and social development.

In order to follow a sound environmental process in terms of the NEMA the application will be undertaken in terms of Government Notice 983 and 984 of the 2014 NEMA regulations. The activities and their triggers are provided in **Table 3.1**.

### **3.3 The National Environmental Management: Waste Act**

The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA), as amended, presents a more holistic regulatory approach to waste management. The main objectives of the Act are:

- To protect the environment and prevent ecological degradation; and
- To protect the health of people as well as the environment (flora, fauna, land, air, water etc.).
- To minimise the utilisation of natural resources;
- To prevent and minimise the generation of waste;
- To reduce, re-use, recycle and recovery of waste;
- To treat and safely dispose of waste as a last resort;
- To promote and ensure effective delivery of waste services; and
- To achieve integrated waste management reporting and planning.

These objectives are enforced by minimum requirements to comply with, for any person who undertakes an activity which produces waste, or handles waste, as taken up in the Act. These activities include: Storage of waste as well as transportation, processing, reusing and recycling of waste. Waste Management Licenses (WMLs) control these activities via conditions taken up in these licenses.

The potential listed activities (Error! Reference source not found.) which may be triggered by the proposed mining operation are contained in Category A, B and C (GN R921, as amended). Activities contained in Category A require a BA process to be followed, activities in Category B require a S&EIR process to be followed, and Category C require compliance to identified Norms and Standards.

The proposed Eloff Mine will require environmental authorisation in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) for the possible Category A, B and C activities detailed in Error! Reference source not found., however such an application will form part of a separate process and is therefore excluded from this authorisation process.

Table 3.1: Proposed Listed Activities in terms of GN 983 and 984 of NEMA, as amended.

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS DESCRIPTION	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION AS AMENDED IN APRIL 2017 (Bold = sections added; strikethrough = sections deleted)	COMMENT DESCRIPTION
NEMA GNR 983 Listing Notice 1, Activity No. 9	The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- i. with an internal diameter of 0,36 metres or more; or ii. with a peak throughput of 120 litres per second or more; excluding where- a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve; or b) where such development will occur within an urban area.	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— i. with an internal diameter of 0,36 metres or more; or ii. with a peak throughput of 120 litres per second or more; excluding where— a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or b) where such development will occur within an urban area.	There will be water pipelines and stormwater drains.
NEMA GNR 983 Listing Notice 1, Activity No. 10	The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process	There will be water pipelines and stormwater drains.



LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION AS AMENDED IN APRIL 2017 ( <b>Bold = sections added; strikethrough = sections deleted</b> )	COMMENT DESCRIPTION
	<p>water, waste water, return water, industrial discharge or slimes</p> <p>i. with an internal diameter of 0,36 metres or more; or</p> <p>ii. with a peak throughput of 120 litres per second or more; excluding where-</p> <p>a) such infrastructure is for bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve; or</p> <p>b) where such development will occur within an urban area.</p>	<p>water, waste water, return water, industrial discharge or slimes</p> <p>i. with an internal diameter of 0,36 metres or more; or</p> <p>ii. with a peak throughput of 120 litres per second or more; excluding where-</p> <p>a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or <b>railway line reserve</b>; or</p> <p>b) where such development will occur within an urban area.</p>	
<p><b>NEMA GNR 983</b> <b>Listing Notice 1,</b> <b>Activity No. 12</b></p>	<p>The development of-</p> <p>i. canals exceeding 100 square metres in size;</p> <p>ii. channels exceeding 100 square metres in size;</p>	<p>The development of-</p> <p>i. canals exceeding 100 square metres in size;</p> <p>ii. channels exceeding 100 square metres in size;</p> <p>iii. bridges exceeding 100 square metres in size;</p>	<p>PCD of 6.3 ha</p> <p>Surface infrastructure of 83ha</p>

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION AS AMENDED IN APRIL 2017 ( <b>Bold = sections added; strikethrough = sections deleted</b> )	COMMENT DESCRIPTION
	iii. bridges exceeding 100 square metres in size; iv. dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; v. weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; vi. bulk storm water outlet structures exceeding 100 square metres in size; vii. marinas exceeding 100 square metres in size; viii. jetties exceeding 100 square metres in size; ix. slipways exceeding 100 square metres in size; x. buildings exceeding 100 square metres in size; xi. boardwalks exceeding 100 square metres in size; or	iv. dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; v. weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; vi. bulk storm water outlet structures exceeding 100 square metres in size; vii. marinas exceeding 100 square metres in size; ix. jetties exceeding 100 square metres in size; x. slipways exceeding 100 square metres in size; xi. buildings exceeding 100 square metres in size; xii. boardwalks exceeding 100 square metres in size; or xiii. infrastructure or structures with a physical footprint of 100 square metres or more;	Topsoil dump of 22ha Hards dump of 21.5ha Softs dump of 7ha

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS DESCRIPTION	2014 NEMA EIA REGULATIONS DESCRIPTION AS AMENDED IN APRIL 2017 ( <b>Bold = sections added; strikethrough = sections deleted</b> )	COMMENT DESCRIPTION
	<p>xii. infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs-</p> <ul style="list-style-type: none"> <li>a) within a watercourse;</li> <li>b) in front of a development setback; or</li> <li>c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; - excluding-</li> </ul> <p>aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p>	<p>The development of—</p> <ul style="list-style-type: none"> <li>i. <b>dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</b></li> <li>ii. <b>infrastructure or structures with a physical footprint of 100 square metres or more;</b></li> </ul> <p>Where such development occurs—</p> <ul style="list-style-type: none"> <li>a) within a watercourse;</li> <li>b) in front of a development setback; or</li> <li>c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; – excluding—</li> </ul> <p>aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>bb) where such development activities are related to the development of a port or</p>	-

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS DESCRIPTION	2014 NEMA EIA REGULATIONS DESCRIPTION AS AMENDED IN APRIL 2017 ( <b>Bold = sections added; strikethrough = sections deleted</b> )	COMMENT DESCRIPTION
	<p>cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>dd) where such development occurs within an urban area; or</p> <p>(ee) where such development occurs within existing roads or road reserves.</p>	<p>harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>dd) where such development occurs within an urban area; or</p> <p>ee) where such development occurs within existing roads, or road reserves or railway line reserves; or</p> <p>ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</p>	-

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS DESCRIPTION	2014 NEMA EIA REGULATIONS ACTIVITY	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION AS AMENDED IN APRIL 2017 (Bold = sections added; strikethrough = sections deleted)	COMMENT DESCRIPTION
NEMA GNR 983 Listing Notice 1, Activity No. 13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	Pollution Control Dam
NEMA GNR 983 Listing Notice 1, Activity No 14	The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	Above ground diesel storage will be required.
NEMA GNR 983 Listing Notice 1, Activity No19	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 of more than 5 cubic metres from- i. a watercourse; ii. the seashore; or	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 of more than 5 cubic metres from —(i) a watercourse; i. the seashore; or ii. the littoral active zone, an estuary or a distance of 100 metres inland of the high-	The infilling or depositing of any material of more than 5 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 10 cubic metres from —(i) a watercourse; i. the seashore; or ii. the littoral active zone, an estuary or a distance of 100 metres inland of the high-	Pit area and infrastructure within wetlands.

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION AS AMENDED IN APRIL 2017 ( <b>Bold = sections added; strikethrough = sections deleted</b> )	COMMENT DESCRIPTION
	iii. the littoral active zone, an estuary or a distance of 100 metres inland of the higher 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) will occur behind a development setback; b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or c) Falls within the ambit of activity 21 in this Notice, in which case that activity applies.	water mark of the sea or estuary, whichever distance is the greater but excluding where such infilling, depositing, dredging, excavation, removal or moving— a) will occur behind a development setback; b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	
NEMA GNR 983 Listing Notice 1,	The development of-	The development of a road—	If the haul roads are wider than 8

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION AS AMENDED IN APRIL 2017 (Bold = sections added; strikethrough = sections deleted)	COMMENT DESCRIPTION
Activity No 24	<p>i. a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or</p> <p>ii. a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding-</p> <p>a) roads which are identified and included in activity 27 in Listing Notice 2 of 2014; or</p> <p>b) roads where the entire road falls within an urban area.</p>	<p>i. a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or</p> <p>ii. a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road—</p> <p>a) roads which are identified and included in activity 27 in Listing Notice 2 of 2014;</p> <p>b) roads where the entire road falls within an urban area; or</p> <p>c) which is 1 kilometre or shorter.</p>	<p>metres activity will be triggered.</p> <p>this activity will be triggered.</p>
NEMA GNR 983 Listing Notice 1, Activity No 25	<p>The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2000 cubic metres but less than 15000 cubic metres.</p>	<p>The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2 000 cubic metres but less than 15 000 cubic metres.</p>	<p>There will be onsite sewage treatment.</p>

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS DESCRIPTION	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION AS AMENDED IN APRIL 2017 ( <b>Bold = sections added; strikethrough = sections deleted</b> )	COMMENT DESCRIPTION
NEMA GNR 983 Listing Notice 1, Activity No 27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- i. the undertaking of a linear activity; or ii. maintenance purposes undertaken in accordance with a maintenance management plan.	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— i. the undertaking of a linear activity; or ii. maintenance purposes undertaken in accordance with a maintenance management plan.	If more than 1 hectare of indigenous vegetation is cleared this activity will be triggered.
NEMA GNR 983 Listing Notice 1, Activity No 56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- i. where the existing reserve is wider than 13,5 meters; or ii. where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre— i. where the existing reserve is wider than 13,5 meters; or ii. where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.	There is the possibility that existing roads will be widened or lengthened.
NEMA GNR 984 Listing Notice 2, Activity Nr 6	The development of facilities or infrastructure for any process or activity which requires a permit or licence in terms of national or provincial legislation	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of	Section 21 g water uses within the IWULA.



LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS DESCRIPTION	2014 NEMA EIA REGULATIONS DESCRIPTION AS AMENDED IN APRIL 2017 ( <b>Bold = sections added; strikethrough = sections deleted</b> )	COMMENT DESCRIPTION
	<p>governing the generation or release of emissions, pollution or effluent, excluding-</p> <ul style="list-style-type: none"> <li>i. activities which are identified and included in Listing Notice 1 of 2014;</li> <li>ii. activities which are 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 National Environmental Management: Waste Act, 2008 applies; or</li> <li>iii. the development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2000 cubic metres or less.</li> </ul>	<p>national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding—</p> <ul style="list-style-type: none"> <li>i. activities which are identified and included in Listing Notice 1 of 2014;</li> <li>ii. activities which are 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 National Environmental Management: Waste Act, 2008 applies;</li> <li>iii. the development of facilities or infrastructure for the treatment of effluent, <b>polluted water</b>, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or</li> <li>iv. <b>where the development is directly related to aquaculture facilities or infrastructure</b></li> </ul>	-

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS DESCRIPTION	2014 NEMA EIA REGULATIONS ACTIVITY	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION AS AMENDED IN APRIL 2017 (Bold = sections added; strikethrough = sections deleted)	COMMENT DESCRIPTION
			where the wastewater discharge capacity will not exceed 50 cubic metres per day.	
NEMA GNR 984 Listing Notice 2, Activity No. 9	The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.	The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is – a) temporarily required to allow for maintenance of existing infrastructure; b) 2 kilometres or shorter in length; c) within an existing transmission line servitude; and d) will be removed within 18 months of the commencement of development.	Electricity to be sourced from Eskom. Powerline routes to be determined.	
NEMA GNR 984 Listing Notice 2, Activity No. 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-	Surface clearance for all activities: PCD of 6.3 ha	

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS DESCRIPTION	2014 NEMA EIA REGULATIONS DESCRIPTION AS AMENDED IN APRIL 2017 ( <b>Bold = sections added; strikethrough = sections deleted</b> )	COMMENT DESCRIPTION
	<p>i. the undertaking of a linear activity; or</p> <p>ii. maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>i. the undertaking of a linear activity; or</p> <p>ii. maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>Surface infrastructure of 83ha</p> <p>Topsoil dump of 22ha</p> <p>Hards dump of 21.5ha</p> <p>Softs dump of 7ha</p>
<p><b>NEMA GNR 984 Listing Notice 2, Activity No. 17</b></p>	<p>Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p>	<p>Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—</p> <p>a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or</p> <p>b) including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources</p>	<p>Mining Right Application required.</p>

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION AS AMENDED IN APRIL 2017 ( <b>Bold</b> = sections added; <del>strikethrough</del> = sections deleted)	COMMENT DESCRIPTION
		Development Act, 2002 (Act No. 28 of 2002)  the <b>primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;</b>  but <b>excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.</b>	
<b>NEMA GNR 984 Listing Notice 2, Activity No.21</b>	Any activity including the operation of that activity associated with the primary processing of a mineral resource including winning, reduction, extraction, classifying, concentrating, crushing, screening and washing but excluding the smelting, beneficiation, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.	Any activity including the operation of that activity associated with the primary processing of a mineral resource including winning, reduction, extraction, classifying, concentrating, crushing, screening and washing but excluding the smelting, beneficiation, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.  ...	Processing of Coal.

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION	2014 NEMA EIA REGULATIONS ACTIVITY DESCRIPTION AS AMENDED IN APRIL 2017 ( <b>Bold = sections added; strikethrough = sections deleted</b> )	COMMENT DESCRIPTION
NEMA GNR 984 Listing Notice 2, Activity Nr 27	<p>The development of -</p> <ul style="list-style-type: none"> <li>i. a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998);</li> <li>ii. a road administered by a provincial authority;</li> <li>iii. a road with a reserve wider than 30 metres; or</li> <li>iv. a road catering for more than one lane of traffic in both directions;</li> </ul> <p>but excluding the development and related operation of a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010, in which case activity 24 in Listing Notice 1 of 2014 applies.</p>	<p>The development of a road—</p> <ul style="list-style-type: none"> <li>i. a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998); ...</li> <li>ii. a road administered by a provincial authority; ...</li> <li>iii. a road with a reserve wider than 30 metres; or</li> <li>iv. a road catering for more than one lane of traffic in both directions;</li> </ul> <p>but excluding the development and related operation of a road—</p> <ul style="list-style-type: none"> <li>a) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010, in which case activity 24 in Listing Notice 1 of 2014 applies;</li> </ul>	<p>There will be haul roads constructed to and from the project area.</p> <p>A public road will be cut off by the mining infrastructure and will need to be realigned.</p>

LISTED ACTIVITY IN TERMS OF GNR 983 AND 984	2014 NEMA EIA DESCRIPTION	2014 NEMA EIA REGULATIONS DESCRIPTION AS AMENDED IN APRIL 2017 (Bold = sections added; strikethrough = sections deleted)	COMMENT DESCRIPTION
		b) which is 1 kilometre or shorter; or c) where the entire road falls within an urban area.	-

Table 3.2: Potential Listed Activities in terms of NEM:WA.

LISTED ACTIVITY IN TERMS OF CATEGORY A AND B OF NEM:WA	ACTIVITY DESCRIPTION	COMMENT - DESCRIPTION
NEM:WA Category A Activity 11	The disposal of domestic waste generated on premises in areas not serviced by the municipal service where the waste disposed exceeds 500 kg per month.	Domestic waste may be disposed of in waste skips
NEM:WA Category B Activity 1	The storage of hazardous waste in lagoons excluding storage of effluent, wastewater or sewage.	Hazardous waste may be stored until collected by a licenced waste collector
NEM:WA Category B Activity 7	The disposal of any quantity of hazardous waste to land.	Residue stockpiles, Waste rock dumps, overburden dumps, ROM Stockpiles (pending mine plan optimisation findings)
NEM:WA Category B Activity 10	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).	Residue stockpiles, Waste rock dumps, overburden dumps, ROM Stockpiles (pending mine plan optimisation findings)
NEM:WA Category B	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities	Residue stockpiles,

LISTED ACTIVITY IN TERMS OF CATEGORY A AND B OF NEM:WA	ACTIVITY DESCRIPTION	COMMENT - DESCRIPTION
Activity 11	which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	Waste rock dumps, overburden dumps (pending mine plan optimisation findings)
NEM:WA Category C Activity 2	"The storage of hazardous waste at a facility that has the capacity to store in excess of 80m <sup>3</sup> of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste."	Hazardous waste may be stored until collected by a licenced waste collector

### 3.4 Environmental Process Objectives

In order to mitigate potentially negative impacts and to identify any potential fatal flaws that may render the project environmentally unacceptable, GCS have adopted an integrated, step-by-step process to identify issues of concern and to thoroughly investigate these issues. The environmental investigations undertaken addressed all phases related to the proposed Eloff Project, Phase 1, Pit 1. These phases included the:

- Pre-construction and Construction phase;
- Operational phase; and
- Closure phase.

To ensure that the negative impacts are identified and mitigated in the early stages of the project, and that the positive impacts are maximised, the environmental study is to meet the following aims:

- Follow the guideline process as outlined by the NEMA;
- Ensure that impacts are identified early through investigations to minimise environmental damage and maximise benefits;
- Conduct thorough special investigations that will allow the project team to develop an adequate understanding of the issues to be dealt with;
- Compile a Scoping and Environmental Impact Report (SEIR) that will identify, evaluate and address the potential impacts;



- Provide ongoing environmental input into the project planning and development;
- Compile an Environmental Management Plan Report (EMPr) that will limit the significance of the negative impacts and maximise the positive aspects; and
- Ensure that all relevant Interested and Affected Parties (I&APs) and Stakeholders are consulted and involved throughout the Project.

#### **4 PURPOSE OF THE EMPr**

EMC is applying for the Environmental Authorisations for the proposed Eloff Phase 1 Pit 1 mining operation. EMC will be responsible for implementing the EMPr during all phases of the operation.

The purpose of the EMPr for the proposed Eloff Phase 1, Pit 1 is as follows:

- To describe how potential negative environmental impacts will be managed through appropriate mitigation measures;
- To describe actions that could be taken to rehabilitate the affected areas especially during the construction phase;
- To prescribe monitoring actions that will ensure that the environmental management programme is adhered to; and
- To describe how potential positive environmental impacts will be maximised.

During an environmental evaluation and assessment process, various impacts were identified and mitigation measures developed for these impacts. These mitigation measures have been organised and co-ordinated into the EMPr, which will guide the construction, operation and decommissioning and closure of the mine. The EMPr will remain in force for the whole duration of the project and will be subject to various audits. The EMPr is a living document which may be subject to necessary updates in the interest of best practices.

##### **4.1 General Objectives of the EMPr**

Through the development of this EMPr, EMC wants to achieve the following objectives:

- Identify all possible impacts that may arise from the development;
- Have detailed mitigating measures in place that the contractors and sub-contractors have to adhere to in order to avoid or minimise identified impacts;
- Define corrective measures that need to be implemented should non-conformances occur;
- Propose measures to eliminate possible negative long term impacts that may result from the construction phase;

- Propose the best practice rehabilitation measures;
- Ensure the health and safety of all relevant role players; and
- Ensure the successful handover of the EMPr to the responsible party during operation.

The overall objective of the EMPr is to reduce or mitigate negative environmental consequences resulting from the construction and operational process and to limit negative impacts as far as possible. The EMPr also aims to enhance positive impacts. The environmental objectives of the EMPr are to ensure that all necessary steps will be taken to ensure the following with regard to the above identified impacts:

- That appropriate pollution control and other environmental protection measures are taken by the applicant, in accordance with all applicable laws and regulations;
- That the applicant will not degrade the degree of environmental impact beyond existing environmental conditions; and
- That, socio-economic and bio-physical conditions will be addressed in order to ensure that minimal negative impacts are caused by the mine.

#### **4.2 Approval and Implementation of the EMPr**

The Department of Mineral Resources (DMR) must approve the EMPr before it can be used as a legal binding document. The EMPr must ensure that the conditions of the Environmental Authorisation (EA) are implemented and adhered to. Copies of the approved EMPr must be made available to the following persons at all times:

- The applicant;
- The employees and contractors on site who participate in the construction and operation of the proposed mine; and
- All Interested and Affected Parties (I&APs), stakeholders and Non-governmental Organisations (NGOs).

The EMPr must be explained to the applicant, the mine manager, contractors and all employees who will participate in the construction and operation process.

It remains the responsibility of the applicant to ensure that regular internal audits are performed before, during and after construction and during the operation to ensure that the enhancement and mitigation measures are implemented.

## **5 ROLES AND RESPONSIBILITIES**

In order to ensure the success of the EMPr, it is important to assign definite roles and responsibilities. Compulsory adherence is to be made to the EMPr. The obligations of the



## 5.2 Project/Site Manager

The Project/Site Manager will oversee all of the construction activities. He/she will be responsible for the activities on site and see to the implementation of the EMPr. He/she will establish a communication network between the different components conducting the work. All incidents and reports will be made to the Project/Site Manager. Ultimate responsibility in terms of compliance to the EMPr lies with the Project /Site Manager.

## 5.3 Main Contractor

The ultimate on-site responsibility for environmental matters lies with the Main Contractor Engineer. They will be responsible for day to day direction and management on the site throughout the construction phase of the project.

## 5.4 Environmental Officer

An Environmental Officer (EO) or Safety, Health and Environmental Quality (SHEQ) Officer will be appointed by the Main Contractor.

It will be the responsibility of the EO/SHEQ Officer to:

- Oversee that the day to day activities that will take place on site comply with the EMPr and the relevant legislation;
- To prepare a detailed communication strategy for liaison with I&APs, stakeholders and contractors;
- Manage and document forward and backward information flows between the Main Contractor/Engineer and the I&APs and Eloff Mining Company. This includes information pertaining to monitoring and evaluation;
- Assist Eloff Mining Company upon request, with daily project communication with I&APs;
- Ensure meaningful participation with the I&APs, including capacity building exercises where the need is identified;
- Give induction and environmental awareness training;
- Ensure that a record keeping system is maintained; and
- Promote co-regulation, shared responsibility and a sense of ownership amongst all parties involved.

## 5.5 Environmental Control Officer

In order to ensure full compliance to the EMPr and in effect the legislation, Eloff Mining Company must appoint an Environmental Control Officer (ECO) who is an outside, independent proponent.

The responsibilities of the ECO will be:

- To monitor the construction activities through regular site inspections to ensure compliance to the EMPr;
- To assess the EMPr as to its effectiveness in mitigating and preventing impacts;
- To assess compliance to the EA;
- To advise the Project Manager, Resident Engineer, Main Contractor and Environmental Officer in respect to the activities and its impact on the environment;
- To identify any non-compliances and to advise to the immediate action and remediation;
- To compile reports every two weeks and communicate the findings to the Project Manager and contractors;
- To write a monthly compliance reports and submit it to the regulatory authority, in this case the DMR;
- To ensure monthly project meetings are undertaken with the contractors and the Project Manager to discuss the findings made during the site visits;
- To ensure that the best environmental options are followed throughout;
- To ensure that a proper training, awareness and competence training programme is implemented; and
- To, where necessary, update the EMPr as new issues may arise.

## 6 ENVIRONMENTAL OBJECTIVES, MITIGATION AND MANAGEMENT MEASURES

### 6.1 Activities

This EMPr has been compiled for the Proposed Eloff Phase 1, Pit 1. The activities associated with the Project can be divided into the following activities:

- Construction activities:
  - Removal of topsoil;
  - Wind exposure;
  - Vegetation removal;
  - Heavy machinery movement;
  - Poaching;

- Illegal collection or harvesting;
- Hydrocarbon fuel spillage;
- Influx of job seekers; and
- Infrastructure construction.
- Operational activities:
  - Vehicle and machinery movement;
  - Hydrocarbon spills;
  - Poor maintenance; and
  - Opencast Mining.
- Closure Phase
  - Rehabilitation of disturbed areas
- Residual Impacts
- Cumulative Impacts

## 6.2 Environmental Management Measures

In terms of The Constitution of the Republic of South Africa everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for benefit of present and future generations, through reasonable legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The needs of the environment, as well as I&APs should thus be integrated into overall project management. This EMP provides a tool for meeting this objective by providing detailed mitigation and management commitments by Eloff Mining Company for the construction and operation of the proposed project

The management measures have been organised in the following project phases:

- Pre-construction and Construction Phase;
- Operational Phase; and
- Closure Phase.

**Table 6.1 - Table 6.3** provides the management measures recommended to manage the potential impacts rated during the different phases. In addition to the management measures provided the tables indicate the person responsible to ensure that these commitments are adhered to and implemented as well as specifies the priority of these commitments (either prior a phase, during a phase and/or ongoing).

The responsible persons at EMC any have assessed these commitments in detail and have committed to the specific management measures where indicated in the **Table 6.1 - Table 6.3**.

### **6.3 Impact Management Objectives and Outcome**

The identified mitigation measures and action plans will have certain objectives and outcomes to achieve, as detailed in **Table 6.4**.

Table 6.1: Construction Phase Mitigation and Management Measures.

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
<p><b>AREAS:</b> 1. Pit Area 2. Plant and related infrastructure 3.PCD 4. Softs- hards- and topsoil dumps 5. Coal Stockpiles</p> <p><b>CONSTRUCTION PHASE ACTIVITIES:</b> 1 Removal of topsoil, 2 Infrastructure construction, 3 Wind exposure, 4 vegetation removal, 6 Heavy machinery movement, 7 Poaching, illegal collection or harvesting, 8 Hydrocarbon fuel spillage, 9 Influx of job seekers, 10 Mining</p>			
Heritage Impact Assessment	1, 2, 3, 4, 5	2, 6	Avoid grave sites and damage to graves
Damage, alteration of archaeological and paleontological material or objects	1	1, 10	Relocate graves
<b>Wetland and Aquatic Assessment</b>			
Increase sediment transport into wetland	1, 2, 3, 4 & 5	1, 2, 4, 6, 7	Reduce sediment load of surface runoff
Altered runoff characteristics of the landscape	1, 2, 3, 4 & 5	1, 2, 4, 6, 7	Minimise alteration of existing flow paths
Loss and degradation of wetlands	1, 2, 3, 4 & 5	1, 2, 4, 6, 7	Investigate the potential for a biodiversity offset area avoid activities and movement in Wetlands
Displacement of fauna species, human-animal conflicts & interactions	1, 2, 3, 4 & 5	1, 2, 4, 6, 7	Operational plans that allow for animal protection. Staff training and awareness.
Loss of ecological connectivity and ecosystem functioning:	1, 3, 4 & 5	1, 2, 4, 6, 7	Very difficult to mitigate. Contain activities to the construction footprint only.
<b>Terrestrial Biodiversity (Fauna and Flora)</b>			
Loss of flora species of conservation importance (including habitat suitable for these species)	1, 2, 3, 4, & 5	1, 2, 3, 4, 6, 7, 8 & 9	Minimise the area to be cleared. Identify important species in the footprint areas.
Loss of fauna species of conservation importance (including habitat suitable for these species)	1, 2, 3, 4, & 5	1, 2, 3, 4, 6, 7, 8 & 9	Minimise the area to be cleared. Identify important species in the footprint areas.
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	1, 2, 3, 4, & 5	1, 2, 3, 4, 6, 7, 8	Operational plans that allow for animal protection. Staff training and awareness.
Loss of ecological connectivity and ecosystem functioning:	1, 2, 3, 4, & 5	1, 2, 3, 4, 6, 7, 8	Very difficult to mitigate. Contain activities to the construction footprint only. Implement a biodiversity offset
<b>Hydrology</b>			
Sedimentation of downstream drainage/watercourses	All	1,2,4,6	Reduce the risk of sedimentation to downstream drainages/watercourses from dirty water areas
Hydrocarbon Fuel Spillage	All	6, 8	All vehicles must be serviced timeously to ensure the potential for leakages of hydrocarbons are minimized.
Reduction of Catchment Yield	All	2	No mitigation possible
<b>Geohydrology</b>			
Increased infiltration and groundwater levels	All	1,4	Mitigation is not possible.
Groundwater contamination	All	8	Avoid waste spills
<b>Social Impact Assessment</b>			
Effect of temporary workers on social dynamics	Community	Construction activities	Employ local or existing labour as far as possible (within a 20 km radius); Avoid the establishment of camps, hostels or temporary accommodation for workers; Labour associated with the mining development should, as far as practically possible, be housed in nearby towns such as Delmas in order to reduce the impact on the local residents in the rural and informal settlements; and Daily housing allowances should be provided for contact staff (residing outside a 20 km radius) during the construction phase to avoid the establishing of informal settlements, or the assimilation with existing informal settlements.
Waged Labour	Community	Loss of agricultural employment	Consultation with the directly affected farmers should take place in order to assess possible uptake of current farm employees who will lose their jobs; Unskilled and unemployed labour should be sourced from the surrounding local communities as far as possible; Skills development opportunities should be granted to community members and local job seekers; Maximise employment opportunities for the local communities and reduce the influx of a foreign labour force whilst ensuring the effective development of the mine;



POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
<p><b>CONSTRUCTION PHASE ACTIVITIES:</b> 1 Removal of topsoil, 2 Infrastructure construction, 3 Wind exposure, 4 vegetation removal, 6 Heavy machinery movement, 7 Poaching, illegal collection or harvesting, 8 Hydrocarbon fuel spillage, 9 Influx of job seekers, 10 Mining</p>	<p>1. Pit Area 2. Plant and related infrastructure 3.PCD 4. Softs- hards- and topsoil dumps 5. Coal Stockpiles</p>		
			<p>Capture all project relevant skills in the project area with the aim to ensure maximum local employment;            Make use of any existing skills databases and include the local councillors and other representative community structures in the process;            Develop a Recruitment Manual to include a list of employment opportunities that will become available during the project phases and provide guidelines on procedures to be followed by aspiring employment seekers;            Establish an employment information desk to assist with the day to day management of project related labour issues;            Project contracts between ECM and the specialist contractor should stipulate the use of local labour for unskilled and semi-skilled positions and tasks;            Ensure that local businesses, especially those of Historically Disadvantaged Individuals (HDI), women and of Small, Micro and Medium Enterprises (SMMES) get allocated the maximum appropriate share of project related business opportunities;            and            Ensure that the Labour Relations Amendment Act, 2002 (Act No. 12 of 2002) as well as the necessary policies and procedures are taken into consideration to ensure the correct procurement procedures.</p>
Standard of living	Community	Increased household income	<p>To increase the standard of living locally, the contractors employed should aim to ensure that local or surrounding people are employed where possible;            The employment of local residents during operation (as far as practically possible) would increase the standard of living, since they would have a higher disposable income and less transportation costs.</p>
Standard of living	Community	Loss of agricultural livelihoods	<p>Develop a rehabilitation plan; and            Conduct an agricultural assessment and development plan for the affected land area to be reused for farming purposes after closure of the mine.</p>
Conversion and diversification of land use	Community	Sterilisation of agricultural land - reduction of crop production & food security	<p>Develop a rehabilitation plan;            Conduct an agricultural assessment and development plan for the affected land area to be reused for farming purposes after closure of the mine.            Educate landowners in terms of their rights and responsibilities prior to the project going ahead;            Develop clear communication lines when consulting with affected landowners and their employees;            Take into account surrounding land uses and design post-mining land use options to support and enhance long-term development options.</p>
Transport	Community	Increase in road use - coal trucks & commuters	<p>The applicant should, in liaison with the relevant Roads and Traffic Department, identify problem areas and assist with the regular maintenance of the roads frequently used by construction and mine traffic;            Speed limits on the local roads surrounding the mining site should be enforced;            Appropriate traffic management measures should be planned for and implemented;            Appropriate road markings and warning signs should be implemented during construction and the operational phases for safety purposes; and            Recommendations made by the TIA should be employed.</p>
Capacity building and skills transfer	Community	Implementation of the SLP	<p>Where possible, recruit and train local residents to supply unskilled labour during the mine expansion;            Stakeholders should be mutually accountable for increased opportunities regarding skills and competency development (general education and technical training);            Training should be concentrated on skills that can be readily transferred to other employment opportunities in the local area to avoid persons with trained skills leaving the area for work elsewhere;</p>

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
<p><b>CONSTRUCTION PHASE ACTIVITIES:</b> 1 Removal of topsoil, 2 Infrastructure construction, 3 Wind exposure, 4 vegetation removal, 6 Heavy machinery movement, 7 Poaching, illegal collection or harvesting, 8 Hydrocarbon fuel spillage, 9 Influx of job seekers, 10 Mining</p>	<p>1. Pit Area 2. Plant and related infrastructure 3.PCD 4. Soft- hards- and topsoil dumps 5. Coal Stockpiles</p>		<p>It is recommended that a comprehensive program for recruiting, hiring, training, orienting and counselling be established, in line with the SLP. The nature of the training provided does not need to be limited to specific project related tasks and can include financial planning, bookkeeping, general arithmetic etc;</p> <p>Ensure that stakeholders have knowledge of the support of legislation and regulations;</p> <p>The implementation of the SLP should be monitored on an annual basis;</p> <p>Ensure compliance to the BBSEC and MPRDA; and</p> <p>Ensure that the employment and training of HDSA and women meet the requirements of the BBSEC.</p>
<p>Deviant social behaviour</p>	<p>Community</p>	<p>Behaviour as excessive alcohol consumption, illegal drug use, prostitution, various types of risk-taking behaviours, trespassing and vandalism.</p>	<p>Establish a code of conduct for mine workers with strict control measures;</p> <p>Require mine personnel to wear identification badges to distinguish them from trespassers or unwanted loiterers;</p> <p>Liaise with the SAPD in order to implement effective crime prevention strategies;</p> <p>Liaise with existing forums in the community to communicate information to the community and to assist in the monitoring of compliance; and</p> <p>Establish a Delmas Mining Forum representing all applicable stakeholders.</p>
<p>Actual health and fertility</p>	<p>Community</p>	<p>Construction activities</p>	<p>HIV / Aids awareness campaigns should be initiated by ECM and provided to all its mine employees on a regular basis;</p> <p>ECM should investigate how they could assist in implementing a community health awareness programme in liaison with the LM;</p> <p>Environmental pollution must be limited as far as possible and the requirements of the EMP be implemented to reduce the impact on surrounding landowners;</p> <p>The necessary safety precautions should be taken and first aid supplies should be made available on site;</p> <p>All mine employees (including contractors) should undergo health and safety training on a regular basis;</p> <p>The general health of employees should be monitored on an on-going basis and employees should be given free access to clinic services;</p> <p>It is advised that ECM, through consultation with the LM investigate ways in which their LED programmes and infrastructure development component of their SLP can assist in improving the overall health services within the communities; and</p> <p>The required safety equipment should be provided to employees as well as on site and should be in a good working order.</p> <p>A comprehensive PPP should be implemented to effectively consult and involve the affected landowners and communities;</p> <p>Continuous consultation with the affected communities should take place to keep them informed;</p> <p>Consultation with the surrounding residents should take place on a continuous basis to understand, assess and mitigate their concerns where appropriate;</p> <p>EMC must be transparent about the areas they intend mining and the proposed mining method and technology; and</p> <p>Information about the proposed mining methods should be made available to stakeholders to educate them about mining in general as well as the proposed mining methods.</p> <p>It is critical that EMC maintain an open and trusting relationship with the affected communities subsequent to the granting of the mining right; and</p> <p>EMC must be honest and transparent about the potential economic benefits and employment opportunities that the proposed mine expansion is likely to effect in these communities, in order to manage any undue expectations; and</p> <p>EMC must acknowledge the financial impact on affected landowners and consult with the landowner in order to obtain a mutually agreed upon outcome.</p>
<p>Feelings in relation to the project</p>	<p>Community</p>	<p>Construction activities</p>	<p>Existing community forums must serve as liaison between the affected stakeholders and EMC and can discuss traffic, dust, noise and blasting related concerns with them;</p> <p>If no community forums are available, a Mining Forum, as described above should be established;</p>
<p>Aspirations for future</p>	<p>Community</p>	<p>Threat to agricultural livelihoods</p>	
<p>Physical quality of the living environment (actual and perceived)</p>	<p>Community</p>	<p>Construction activities</p>	

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
<p><b>CONSTRUCTION PHASE ACTIVITIES:</b> 1 Removal of topsoil, 2 Infrastructure construction, 3 Wind exposure, 4 vegetation removal, 6 Heavy machinery movement, 7 Poaching, illegal collection or harvesting, 8 Hydrocarbon fuel spillage, 9 Influx of job seekers, 10 Mining</p>	<p><b>AREAS:</b> 1. Pit Area 2. Plant and related infrastructure 3.PCD 4. Soft- hards- and topsoil dumps 5. Coal Stockpiles</p>		<p>Prevent dust blowing off transported materials by washing vehicles, wheels and covering loads; Rehabilitate behind production with adequate top soiling, fertilisation, irrigation and correct choice of grasses to ensure year-round cover; Implement dust suppression at the mine; Prepare a noise reduction plan to cover all significant impacts at source and implement noise reduction and screening to limit exposure. Drilling and blasting is generally intermittent and should be limited to daylight hours when ambient noise levels are highest. A hearing conservation programme must be implemented where noise exceeds 85dB(A) in the mine or must not be more than 7dB(A) above ambient residual noise levels beyond mine boundary or nearest residential community; The maximum acceptable night time noise levels should not be exceeded; Noise and vibration must be measured and recorded before and during blasting. Management plans must include protocols for informing neighbours of blasting times and grievance procedure; Traffic calming measures should be put in place to minimise traffic noise; Adequate monitoring of the biophysical impacts should occur in order to address any unnecessary inconveniences to stakeholders; Plant tall trees as barriers around the mining development to reduce the visual and light intrusion, as well as noise impacts; and Recommendations made in the EMP and EMPi should be adhered to.</p>
Aesthetic quality of the living environment	Community	Construction activities	<p>Employ the recommendations as suggested by the Visual Impact Assessment; Implement re-vegetation as levels are abandoned to break the form, reduce colour contrast, dust generation or contaminated runoff; and Recycle dumps or use as backfill with appropriate permission.</p>
Adequacy of physical infrastructure / increased pressure on existing infrastructure	Community	Construction activities	<p>Ensure that the required public services and capital facilities are in place before the peak production occurs; The provision of infrastructural services must be integrated with the economic needs of the community; EMC, in liaison with the municipality should proactively plan for enough infrastructure and services to meet the maximum potential of the mine in terms of service and infrastructure demand; Measures must be taken to address infrastructure development as part of future planning; and The relevant authorities, and bodies involved in the supply of bulk services should be informed about the proposed project to ensure that it gets incorporated into their demand projections.</p>
Adequacy and access to social infrastructure	Community	Construction activities	<p>In consultation with the municipality and other mines operating in the area, ensure that the necessary planning for upgrades of social infrastructure, where lacking due to the proposed mine expansion, take place; Involvement in upliftment programmes should be done according to the priority needs and projects identified as part of the LMs IDP, as well as in consultation with other stakeholders such as the local community representatives, ward committees and youth organisations; Continuous involvement of the mine would be necessary and should be undertaken in a transparent and supportive manner; Implement a regular and formalised consultation process with local government to ensure synergy between the mine's social development and LED focus; Communication of the projects that EMC would be involved in should filter through to all community levels to ensure maximum benefit to the community; and Community development projects initiated by EMC should avoid benefiting only a selected few but should follow a broad based approach, whilst also taking budgeting constraints into consideration.</p>

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
<p><b>CONSTRUCTION PHASE ACTIVITIES:</b> 1 Removal of topsoil, 2 Infrastructure construction, 3 Wind exposure, 4 vegetation removal, 6 Heavy machinery movement, 7 Poaching, illegal collection or harvesting, 8 Hydrocarbon fuel spillage, 9 Influx of job seekers, 10 Mining</p>	<p><b>AREAS:</b> 1. Pit Area 2. Plant and related infrastructure 3.PCD 4. Soft- hards- and topsoil dumps 5. Coal Stockpiles</p>		<p>A geotechnical study is recommended to assess the possible impacts of mining on the forming of sink holes (mainly in the pit area);                      Strict security measures should be put in place. Security personnel should be on site on a permanent basis;                      The mining area should be fenced to avoid unauthorised entry by humans or animals onto the mining area;                      The contractor should communicate the construction and blasting schedule and vehicle movements to the neighbouring property owners in advance;                      Workers must not be allowed to leave the designated mining areas without permission;                      A Health and Safety Plan should be implemented and it must be ensured that all managers are trained in First Aid and other relevant safety courses;                      Implement safety measures to limit fire hazards and implement fire breaks if possible;                      EMC should, in conjunction with the property owners, develop and implement emergency procedures;                      Operational safety risks should be addressed as part of the OHS Act;                      A Fire/Emergency Management Plan should be developed and implemented. It is important that this management plan and associated communication channels are developed at the outset of the project. It would be important to regularly review the functionality and efficiency of such a plan in conjunction with the local emergency teams, mine management and neighbouring landowners;                      Appropriate fire fighting equipment should be on site and employees should be appropriately trained for fire fighting;                      Speed limits on the local roads surrounding the mine works should be enforced; and                      Speeding of mine vehicles must be strictly monitored and fined where appropriate.</p>
Personal safety and hazard exposure	Community	Construction activities	
Crime and violence	Community	Construction activities	<p>Local, unemployed labour should be employed as far as possible;                      EMC must liaise with the LMs and labour unions to establish a protocol for ensuring community safety;                      Mine workers should be clearly identifiable by ensuring they wear uniforms and identification cards that should be exhibited in a visible place on their body; and                      The AgriSA protocol for access to farms should be followed in all instances where access to farmers' land is required.</p>
Loss of natural and cultural heritage	Community	Gravesite in the opencast pit	<p>The recommendations of the HIA should be implemented;                      Local residents and farmers should be consulted to determine any possible heritage sites not identified by the HIA; and                      Local residents and farmers should inform mitigation measures when addressing any potential impact on cultural heritage sites or graves.</p>
Gendered division of labour	Community	Construction activities	<p>Women must have equal employment opportunities;                      Training and skills development should take place for women;                      Salaries of women should be equal to that of men when undertaking the same job;                      Commitments made in the SLP with regard to the employment of women should be adhered to; and                      Institute a well-designed gender equality strategy on the mine.</p>
Soils, Land use, Land Capability			
Disruption of fertile topsoil	All	1, 4	Keep as much original land cover as possible
Soil stockpile erosion	4	1, 2, 3, 4, 6	Keep as much original land cover as possible
Soil compaction	All	2, 6	Restrict movement to footprint area & to designated access roads
Soil erosion	All	2	Restrict movement to footprint area & to designated access roads
Loss of arable land capability	All	2	Keep infrastructure to a minimum to reduce footprint
Chemical soil pollution	All	8	Minimise spillages & conduct quick clean-up when spillages occur

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
<p><b>AREAS:</b> 1. Pit Area 2. Plant and related infrastructure 3.PCD 4. Softs- hards- and topsoil dumps 5. Coal Stockpiles</p> <p><b>CONSTRUCTION PHASE ACTIVITIES:</b> 1 Removal of topsoil, 2 Infrastructure construction, 3 Wind exposure, 4 vegetation removal, 6 Heavy machinery movement, 7 Poaching, illegal collection or harvesting, 8 Hydrocarbon fuel spillage, 9 Influx of job seekers, 10 Mining</p>			
Air Quality			
Air quality impacts could not be accurately determined due to insufficient information on construction, operational and closure /decommissioning activities being provided to the specialist			
Blasting and Vibration			
Blasting and the generation of fly rock and ground vibration	1	10	Reduce charge mass per delay. Change drilling configuration. Alternative blasting. Change initiation systems. Stemming controls. Stemming lengths. Stemming materials.
Visual Assessment			
Visual intrusion of construction of dumps and infrastructure	All	2, 6	No mitigation possible
Negative impact on sense of place	All	1, 2, 4, 6	Revegetation of disturbed areas
Noise			
Noise increase at the boundary of the mine footprint and at the abutting residential areas	All	1, 2, 4, 6	Noise level not to exceed 85.0dBA at 3m from the machinery and/or equipment
Traffic Impact Assessment			
Additional 23 vehicle trips during the peak hour periods will be generated by the development on the external roads.	All	1, 2, 4, 6	The additional construction vehicle trips will not pose significant impacts. Therefore no mitigation is required.

**Table 6.2: Operational Phase Management and Mitigation Measures.**

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
<p><b>AREAS:</b> 1. Pit Area 2. Plant and related infrastructure 3.PCD 4. Softs- hards- and topsoil dumps 5. Coal Stockpiles</p> <p><b>OPERATIONAL PHASE ACTIVITIES:</b> 1. Opencast mining 2. Vehicle and machinery movement 3. Hydrocarbon spills 4. Poor maintenance and management</p>			
Heritage			
Damage, alteration of archaeological and paleontological material or objects	All	2, 6	Avoid grave sites and damage to graves
Wetland and Aquatic Assessment			
Water quality deterioration	All	1, 2, 3 & 4	Ensure correct waste handling
Increase sediment transport into wetland	1,2,4,5	1, 2	Reduce sediment load of surface runoff
Altered runoff characteristics of the landscape	All	1, 2	Minimise alteration of existing flow paths Ensure separation of clean and dirty water
Continued degradation of wetlands	All	1, 2, 3	Keep out of wetland areas Avoid pollution of wetland areas
Displacement and loss of fauna and flora species	All	1, 2	Operational plans that allow for animal protection. Prohibit unnecessary killing of faunal species
Terrestrial Biodiversity (Fauna & Flora)			

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
<p><b>AREAS: 1. Pit Area 2. Plant and related infrastructure 3.PCD 4. Softs- hard- and topsoil dumps 5. Coal Stockpiles</b></p> <p><b>OPERATIONAL PHASE ACTIVITIES: 1. Opencast mining 2. Vehicle and machinery movement 3. Hydrocarbon spills 4. Poor maintenance and management</b></p>			
Loss and degradation of habitats	All	1, 2, 3 & 4	Prevent the spread of impacts to adjacent habitat
Human-animal conflicts & interactions	All	1, 2	Operational plans that allow for animal protection. Staff training and awareness.
Hydrology	All	1, 2, 3, 4	Prevent release of dirty water into the environment
Pollution of downstream watercourse	All	1, 2, 3, 4	Prevent release of dirty water into the environment
Geohydrology	All	1, 2, 3, 4	Prevent release of dirty water into the environment
Drawdown of local Water levels	1	1	Pit dewatering will be necessary to ensure dry and safe working conditions, therefore no mitigation measures are available.
Groundwater contamination from Acidic Leachate and spills	2,3,4,5	1,4	Prevent leachate from entering the environment
Air Quality			
<p>Air quality impacts could not be accurately determined due to insufficient information on construction, operational and closure/decommissioning activities being provided to the specialist</p>			
<p><b>Soils, Land use and Land Capability</b></p>			
Disturbance of the soil ecosystem	1	1	Keep stripping to footprint area
Change in natural landscape	4, 5	1	Keep dumping to designated area
Soil erosion	1	1	Rehabilitate disturbed areas as mine operations progress
Soil contamination by hydrocarbons (Coal residues & precipitates)	5	2	Keep infrastructure to a minimum to reduce footprint; Practice proper waste management; and Keep movement to designated haul roads
Soil contamination by oil, grease and fuel spillages and leakages	2	3	Practice proper waste management
Blasting and Vibration			
Blasting and the generation of fly rock and ground vibration	1	10	Reduce charge mass per delay. Change drilling configuration. Alternative blasting. Change initiation systems. Stemming controls. Stemming lengths. Stemming materials.
Visual Impact Assessment			
Lighting Pollution to regional area	All	1,2	Lighting Plan needed. Lights to be directed towards operational areas only.
Visual intrusion of construction of dumps and infrastructure	All	1,2,3,4	Use earth colours on infrastructure
Noise Impact Assessment			
Noise increase at the boundary of the mine footprint and at the abutting residential areas	All	1,2	Implement rise screens and barriers Reduce noise levels on mine vehicles and machinery where possible Implement traffic control within the mine
Social Impact Assessment			
Effect of temporary workers on social dynamics	Community	Construction activities	Employ local or existing labour as far as possible (within a 20 km radius); Avoid the establishment of camps, hostels or temporary accommodation for workers; Labour associated with the mining development should, as far as practically possible, be housed in nearby towns such as Delmas in order to reduce the impact on the local residents in the rural and informal settlements; and Daily housing allowances should be provided for contact staff (residing outside a 20 km radius) during the construction phase to avoid the establishing of informal settlements, or the assimilation with existing informal settlements.

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
	<p>AREAS: 1. Pit Area 2. Plant and related infrastructure 3. PCD 4. Softs- hards- and topsoil dumps 5. Coal Stockpiles</p>		
Waged Labour	Community	Loss of agricultural employment	<p><b>OPERATIONAL PHASE ACTIVITIES:</b> 1. Opencast mining 2. Vehicle and machinery movement 3. Hydrocarbon spills 4. Poor maintenance and management 5. Coal Stockpiles</p> <p>Consultation with the directly affected farmers should take place in order to assess possible uptake of current farm employees who will lose their jobs;</p> <p>Unskilled and unemployed labour should be sourced from the surrounding local communities as far as possible;</p> <p>Skills development opportunities should be granted to community members and local job seekers;</p> <p>Maximise employment opportunities for the local communities and reduce the influx of a foreign labour force whilst ensuring the effective development of the mine;</p> <p>Capture all project relevant skills in the project area with the aim to ensure maximum local employment;</p> <p>Make use of any existing skills databases and include the local councillors and other representative community structures in the process;</p> <p>Develop a Recruitment Manual to include a list of employment opportunities that will become available during the project phases and provide guidelines on procedures to be followed by aspiring employment seekers;</p> <p>Establish an employment information desk to assist with the day to day management of project related labour issues;</p> <p>Project contracts between ECM and the specialist contractor should stipulate the use of local labour for unskilled and semi-skilled positions and tasks;</p> <p>Ensure that local businesses, especially those of Historically Disadvantaged Individuals (HDI), women and of Small, Micro and Medium Enterprises (SMMEs) get allocated the maximum appropriate share of project related business opportunities; and</p> <p>Ensure that the Labour Relations Amendment Act, 2002 (Act No. 12 of 2002) as well as the necessary policies and procedures are taken into consideration to ensure the correct procurement procedures.</p>
Standard of living	Community	Increased household income	<p>To increase the standard of living locally, the contractors employed should aim to ensure that local or surrounding people are employed where possible;</p> <p>The employment of local residents during operation (as far as practically possible) would increase the standard of living, since they would have a higher disposable income and less transportation costs.</p>
Standard of living	Community	Loss of agricultural livelihoods	<p>Develop a rehabilitation plan; and</p> <p>Conduct an agricultural assessment and development plan for the affected land area to be reused for farming purposes after closure of the mine.</p>
Conversion and diversification of land use	Community	Sterilisation of agricultural land - reduction of crop production & food security	<p>Develop a rehabilitation plan;</p> <p>Conduct an agricultural assessment and development plan for the affected land area to be reused for farming purposes after closure of the mine.</p> <p>Educate landowners in terms of their rights and responsibilities prior to the project going ahead;</p> <p>Develop clear communication lines when consulting with affected landowners and their employees;</p> <p>Take into account surrounding land uses and design post-mining land use options to support and enhance long-term development options.</p>
Transport	Community	Increase in road use - coal trucks & commuters	<p>The applicant should, in liaison with the relevant Roads and Traffic Department, identify problem areas and assist with the regular maintenance of the roads frequently used by construction and mine traffic;</p> <p>Speed limits on the local roads surrounding the mining site should be enforced;</p> <p>Appropriate traffic management measures should be planned for and implemented;</p> <p>Appropriate road markings and warning signs should be implemented during construction and the operational phases for safety purposes; and</p> <p>Recommendations made by the TIA should be employed.</p>
Capacity building and skills transfer	Community	Implementation of the SLP	<p>Where possible, recruit and train local residents to supply unskilled labour during the mine expansion;</p>

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
	<p>AREAS: 1. Pit Area 2. Plant and related infrastructure 3.PCD 4. Softs-hards- and topsoil dumps 5. Coal Stockpiles</p> <p>OPERATIONAL PHASE ACTIVITIES: 1. Opencast mining 2. Vehicle and machinery movement</p>		<p>3. Hydrocarbon spills 4. Poor maintenance and management Stakeholders should be mutually accountable for increased opportunities regarding skills and competency development (general education and technical training);</p> <p>Training should be concentrated on skills that can be readily transferred to other employment opportunities in the local area to avoid persons with trained skills leaving the area for work elsewhere;</p> <p>It is recommended that a comprehensive program for recruiting, hiring, training, orienting and counseling be established, in line with the SLP. The nature of the training provided does not need to be limited to specific project related tasks and can include financial planning, bookkeeping, general arithmetic etc;</p> <p>Ensure that stakeholders have knowledge of the support of legislation and regulations;</p> <p>The implementation of the SLP should be monitored on an annual basis;</p> <p>Ensure compliance to the BBSEC and MPRDA; and</p> <p>Ensure that the employment and training of HDSA and women meet the requirements of the BBSEC.</p>
Deviant social behaviour	Community	Behaviour as excessive alcohol consumption, illegal drug use, prostitution, various types of risk-taking behaviours, trespassing and vandalism.	<p>Establish a code of conduct for mine workers with strict control measures;</p> <p>Require mine personnel to wear identification badges to distinguish them from trespassers or unwanted loiterers;</p> <p>Liaise with the SAPD in order to implement effective crime prevention strategies;</p> <p>Liaise with existing forums in the community to communicate information to the community and to assist in the monitoring of compliance; and</p> <p>Establish a Delmas Mining Forum representing all applicable stakeholders.</p>
Actual health and fertility	Community	Construction activities	<p>HIV / Aids awareness campaigns should be initiated by ECM and provided to all its mine employees on a regular basis;</p> <p>ECM should investigate how they could assist in implementing a community health awareness programme in liaison with the LM;</p> <p>Environmental pollution must be limited as far as possible and the requirements of the EMP be implemented to reduce the impact on surrounding landowners;</p> <p>The necessary safety precautions should be taken and first aid supplies should be made available on site;</p> <p>All mine employees (including contractors) should undergo health and safety training on a regular basis;</p> <p>The general health of employees should be monitored on an on-going basis and employees should be given free access to clinic services;</p> <p>It is advised that ECM, through consultation with the LM investigate ways in which their LED programmes and infrastructure development component of their SLP can assist in improving the overall health services within the communities; and</p> <p>The required safety equipment should be provided to employees as well as on site and should be in a good working order.</p> <p>A comprehensive PPP should be implemented to effectively consult and involve the affected landowners and communities;</p> <p>Continuous consultation with the affected communities should take place to keep them informed;</p> <p>Consultation with the surrounding residents should take place on a continuous basis to understand, assess and mitigate their concerns where appropriate;</p> <p>EMC must be transparent about the areas they intend mining and the proposed mining method and technology; and</p> <p>Information about the proposed mining methods should be made available to stakeholders to educate them about mining in general as well as the proposed mining methods.</p> <p>It is critical that EMC maintain an open and trusting relationship with the affected communities subsequent to the granting of the mining right; and</p> <p>EMC must be honest and transparent about the potential economic benefits and employment opportunities that the proposed mine expansion is likely to effect in these communities, in order to manage any undue expectations; and</p> <p>EMC must acknowledge the financial impact on affected landowners and consult with the landowner in order to obtain a mutually agreed upon outcome.</p>
Feelings in relation to the project	Community	Construction activities	
Aspirations for future	Community	Threat to agricultural livelihoods	



POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
<p>AREAS: 1. Pit Area 2. Plant and related infrastructure 3.PCD 4. Softs-hards- and topsoil dumps 5. Coal Stockpiles</p> <p>OPERATIONAL PHASE ACTIVITIES: 1. Opencast mining 2. Vehicle and machinery movement 3. Hydrocarbon spills 4. Poor maintenance and management</p>	<p>Community</p>	<p>Construction activities</p>	<p>Existing community forums must serve as liaison between the affected stakeholders and EMC and can discuss traffic, dust, noise and blasting related concerns with them;</p> <p>If no community forums are available, a Mining Forum, as described above should be established;</p> <p>Prevent dust blowing off transported materials by washing vehicles, wheels and covering loads;</p> <p>Rehabilitate behind production with adequate top soiling, fertilisation, irrigation and correct choice of grasses to ensure year-round cover;</p> <p>Implement dust suppression at the mine;</p> <p>Prepare a noise reduction plan to cover all significant impacts at source and implement noise reduction and screening to limit exposure. Drilling and blasting is generally intermittent and should be limited to daylight hours when ambient noise levels are highest. A hearing conservation programme must be implemented where noise exceeds 85dB(A) in the mine or must not be more than 7dB(A) above ambient residual noise levels beyond mine boundary or nearest residential community;</p> <p>The maximum acceptable night time noise levels should not be exceeded;</p> <p>Noise and vibration must be measured and recorded before and during blasting. Management plans must include protocols for informing neighbours of blasting times and grievance procedure;</p> <p>Traffic calming measures should be put in place to minimise traffic noise;</p> <p>Adequate monitoring of the biophysical impacts should occur in order to address any unnecessary inconveniences to stakeholders;</p> <p>Plant tall trees as barriers around the mining development to reduce the visual and light intrusion, as well as noise impacts; and</p> <p>Recommendations made in the EMP and EMPr should be adhered to.</p>
<p>Aesthetic quality of the living environment</p>	<p>Community</p>	<p>Construction activities</p>	<p>Employ the recommendations as suggested by the Visual Impact Assessment;</p> <p>Implement re-vegetation as levels are abandoned to break the form, reduce colour contrast, dust generation or contaminated runoff; and</p> <p>Recycle dumps or use as backfill with appropriate permission.</p>
<p>Adequacy of physical infrastructure / increased pressure on existing infrastructure</p>	<p>Community</p>	<p>Construction activities</p>	<p>Ensure that the required public services and capital facilities are in place before the peak production occurs;</p> <p>The provision of infrastructural services must be integrated with the economic needs of the community;</p> <p>EMC, in liaison with the municipality should proactively plan for enough infrastructure and services to meet the maximum potential of the mine in terms of service and infrastructure demand;</p> <p>Measures must be taken to address infrastructure development as part of future planning, and</p> <p>The relevant authorities, and bodies involved in the supply of bulk services should be informed about the proposed project to ensure that it gets incorporated into their demand projections.</p>
<p>Adequacy and access to social infrastructure</p>	<p>Community</p>	<p>Construction activities</p>	<p>In consultation with the municipality and other mines operating in the area, ensure that the necessary planning for upgrades of social infrastructure, where lacking due to the proposed mine expansion, take place;</p> <p>Involvement in upliftment programmes should be done according to the priority needs and projects identified as part of the LMs IDP, as well as in consultation with other stakeholders such as the local community representatives, ward committees and youth organisations;</p> <p>Continuous involvement of the mine would be necessary and should be undertaken in a transparent and supportive manner;</p> <p>Implement a regular and formalised consultation process with local government to ensure synergy between the mine's social development and LED focus;</p> <p>Communication of the projects that EMC would be involved in should filter through to all community levels to ensure maximum benefit to the community; and</p>

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
<p>AREAS: 1. Pit Area 2. Plant and related infrastructure 3.PCD 4. Softs- hards- and topsoil dumps 5. Coal Stockpiles</p> <p>OPERATIONAL PHASE ACTIVITIES: 1. Opencast mining 2. Vehicle and machinery movement</p>			<p>Community development projects initiated by EMC should avoid benefiting only a selected few but should follow a broad based approach, whilst also taking budgeting constraints into consideration.</p> <p>A geotechnical study is recommended to assess the possible impacts of mining on the forming of sink holes (mainly in the pit area);</p> <p>Strict security measures should be put in place. Security personnel should be on site on a permanent basis;</p> <p>The mining area should be fenced to avoid unauthorised entry by humans or animals onto the mining area;</p> <p>The contractor should communicate the construction and blasting schedule and vehicle movements to the neighbouring property owners in advance;</p> <p>Workers must not be allowed to leave the designated mining areas without permission;</p> <p>A Health and Safety Plan should be implemented and it must be ensured that all managers are trained in First Aid and other relevant safety courses;</p> <p>Implement safety measures to limit fire hazards and implement fire breaks if possible;</p> <p>EMC should, in conjunction with the property owners, develop and implement emergency procedures;</p> <p>Operational safety risks should be addressed as part of the OHS Act;</p> <p>A Fire /Emergency Management Plan should be developed and implemented. It is important that this management plan and associated communication channels are developed at the outset of the project. It would be important to regularly review the functionality and efficiency of such a plan in conjunction with the local emergency teams, mine management and neighbouring landowners;</p> <p>Appropriate firefighting equipment should be on site and employees should be appropriately trained for fire fighting;</p> <p>Speed limits on the local roads surrounding the mine works should be enforced; and</p> <p>Speeding of mine vehicles must be strictly monitored and fined where appropriate.</p>
Personal safety and hazard exposure	Community	Construction activities	
Crime and violence	Community	Construction activities	<p>Local, unemployed labour should be employed as far as possible;</p> <p>EMC must liaise with the LMs and labour unions to establish a protocol for ensuring community safety;</p> <p>Mine workers should be clearly identifiable by ensuring they wear uniforms and identification cards that should be exhibited in a visible place on their body; and</p> <p>The AgrISA protocol for access to farms should be followed in all instances where access to farmers' land is required.</p>
Loss of natural and cultural heritage	Community	Gravesite in the opencast pit	<p>The recommendations of the HIA should be implemented;</p> <p>Local residents and farmers should be consulted to determine any possible heritage sites not identified by the HIA; and</p> <p>Local residents and farmers should inform mitigation measures when addressing any potential impact on cultural heritage sites or graves</p>
Gendered division of labour	Community	Construction activities	<p>Women must have equal employment opportunities;</p> <p>Training and skills development should take place for women;</p> <p>Salaries of women should be equal to that of men when undertaking the same job;</p> <p>Commitments made in the SLP with regard to the employment of women should be adhered to; and</p> <p>Institute a well-designed gender equality strategy on the mine.</p>
Traffic Impact Assessment			
Additional 97 vehicle trips during the peak hour periods will be generated by the development on the external roads.	All	2	Avoid congestion during peak hours

Table 6.3: Decommissioning and Closure Phase Mitigation and Management Measures

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
DECOMMISSIONING AND CLOSURE PHASE ACTIVITIES: 1. ACTIVE SURFACE REHABILITATION OF DISTURBED AREAS			
AREAS: 1. Pit Area 3. Softs- hards- and topsoil dumps 4. Coal Stockpiles			
Heritage			
No additional impacts			
Wetland and Aquatic Assessment			
Water quality deterioration	1,2,3,4	1	Prevent contamination of streams and rivers
Compaction of soil surface	1,2,3,4	1	Where compaction is evident, ongoing ripping must be undertaken to break up the compacted soil surface.
Alien Invasive Plant species establishment	1,2,3,4	1	Vegetation establishment of indigenous species in disturbed areas will be maintained
Altered runoff characteristics of the landscape	1,2,3,4	1	Minimise alteration of existing flow paths and rehabilitate topography back to pre-mining state
Terrestrial Biodiversity (Fauna & Flora)			
Indirect impacts to surrounding plant and animal communities (fragmentation)	1,2,3,4	1	Limit activities to the infrastructure footprint.
Loss of flora species of conservation importance (including habitat suitable for these species)	1,2,3,4	1	Identify important species in the footprint areas.
Loss of fauna species of conservation importance (including habitat suitable for these species)	1,2,3,4	1	Identify important species in the footprint areas.
Hydrology			
Siltation of water resources	All	1	Ensure that the surface profile is free draining
Geohydrology			
Increased infiltration and groundwater levels	All	1	Mitigation is not possible.
Air Quality			
Air quality impacts could not be accurately determined due to insufficient information on construction, operational and closure/decommissioning activities being provided to the specialist			
Soils, Land use and Land Capability			
Soil erosion	All	1	Keep movements to designated haul roads and transport routes
Chemical soil pollution	All	1	Restrict vehicle movement to haul roads
Blasting and Vibration			
No closure and decommissioning impacts or mitigation.			
Visual Impact Assessment			
Positive perception in sense of place	All	1	Shape and rehabilitate mined area
Noise Impact Assessment			
Noise increase at the boundary of the mine footprint and at the abutting residential areas	All	1	Noise level not to exceed 85.0dBA at 3m from the machinery and/or equipment
Social Impact Assessment			
Change in social dynamic	Community	Out migration of temporary workers	Where possible avoid unemployment of temporary workers
Standard of living	Community	Continuation of the loss of agricultural livelihoods	Develop a rehabilitation plan; and Conduct an agricultural assessment and development plan for the affected land area to be reused for farming purposes after closure of the mine.
Waged Labour	Community	Continuation of unemployment for those who lost their jobs in	Consultation with the farmers should take place to discuss the employment opportunities if the rehabilitated land is used for agricultural purposes again; and Possible recuperation of part of the farming jobs.

POTENTIAL ENVIRONMENTAL IMPACT	APPLICABLE AREA	ACTIVITY	RECOMMENDED MITIGATION MEASURES
<b>DECOMMISSIONING AND CLOSURE PHASE ACTIVITIES: 1. ACTIVE SURFACE REHABILITATION OF DISTURBED AREAS</b>			
<b>AREAS: 1. Pit Area 3. Softs- hard- and topsoil dumps 4. Coal Stockpiles</b>			
		agriculture due to the project	
Reestablishment of agricultural land	Community	Agriculture	Rehabilitate the mining properties as close to pre-mining land use as possible; and Consultation with farmers in the area to change the land use back from mining to agriculture - e.g. lease/sale of the land.
Loss of mining livelihoods	Community	Retrenchment of mine labourers	Develop and implement a skills training programme to increase employability of mine employees (focused on skills demand in the area); Consultation with the Department of Labour regarding job opportunities for mine employees; and EMC to develop and implement their retrenchment policy.
Loss of household income	Community	Less economic input in the area due to the retraction of mining activities and personnel	EMC to invest in re-establishing the agricultural use of the land to create reinvestment in this sector.
Conversion and diversification of land use	Community	Loss of agricultural (potential) of the land	Implementation of the rehabilitation plan; and Consultation with farmers related to the agricultural potential and sale of the land.
Transport	Community	Decrease of road users	Investment in road maintenance as part of the SLP.
Loss of skills transfer/capacity building	Community	No more SLP investments	Update of the SLP (operational phase SLP) to focus on skills demand in the area; and Consultation with the Local (Victor Khanye) and District Municipalities (Ngkangala) related to skills training and Local Economic Development (LED) programmes to take up in the SLP to create a lasting influence - even after closure of the mine.
Decrease in deviant social behaviour	Community	Out migration of temporary employees	Where possible avoid unemployment of temporary workers
Feelings in relation to mine closure	Community	Feelings of local mine employees and beneficiaries (e.g. hospitality sector)	Develop and implement a skills training programme to increase employability of mine employees (focused on skills demand in the area); Consultation with the Department of Labour regarding job opportunities for mine employees; and EMC to develop and implement their retrenchment policy.
Feelings in relation to mine closure	Community	Feelings of farming community	Rehabilitate the mining properties as close to pre-mining land use as possible; and Consultation with farmers in the area to change the land use back from mining to agriculture - e.g. lease/sale of the land.
Physical quality of the living environment	Community		Implement the mitigation measures as taken up in the EMP (e.g. air quality, visual)
Traffic Impact Assessment			
No additional vehicles trips will be generated by the development during the peak hour periods			

**Table 6.4: Management objectives and outcomes (All Phases).**

POTENTIAL ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION PLAN (AVOID, MODIFY, REMEDY, CONTROL OR STOP)	PRESCRIBED ENVIRONMENTAL MANAGEMENT STANDARDS OR PRACTICES	OUTCOME
Air Quality				
Air quality impacts could not be accurately determined due to insufficient information on construction, operational and closure/decommissioning activities being provided to the specialist				
Soil, Land Use and Land Capability				
Destruction of soil profiles	Minimise the disturbance footprint	Control - Restrict surface disturbance through fencing and clear restricted areas signs	Code of good practice	Reduced area of soil profile destruction

POTENTIAL ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION PLAN (AVOID, MODIFY, REMEDY, CONTROL OR STOP)	PRESCRIBED ENVIRONMENTAL MANAGEMENT STANDARDS OR PRACTICES	OUTCOME
Soil chemical pollution	Avoid chemical spills	Control - Immediate clean-up of spills	Code of good practice	Containment of any chemical spills to the immediate area
Soil compaction	Minimise the disturbance footprint	Avoid - Adhere to waste management plans	Code of good practice	Reduced area of soil compaction
Soil erosion	Prevent erosion and runoff	Avoid, Control - Soil management Plan	Code of good practice	Little to no erosion on site
Loss of land capability	No objective as this will be a permanent structure	Not applicable	Not applicable	No mitigated outcome as this will be a permanent structure
Loss of land use	No objective as this will be a permanent structure	Not applicable	Not applicable	No mitigated outcome as this will be a permanent structure
Traffic Volumes				
Change in traffic volumes	Make road users aware of road construction	Avoid, Control - Notification of changes and impact on travel time through use of sign boards and other notification methods to road users.	Committee of Transportation Officials (COTO), 2002. National Guidelines for Road Access Management in South Africa.	Reduced change in traffic volumes
Change in travel time	Make road users aware of road construction	Avoid, Control - Notification of changes and impact on travel time through use of sign boards and other notification methods to road users.	TMH 16, COTO: South African Traffic Impact and Site Traffic Assessment Standards and Requirements, Version 1.01, February 2014.	Reduced change in travel time
Impact on road safety	Increase road safety	Avoid, Control - Provision of street lights at the access	National Department of Transport (NDoT), 1996. National Guidelines for Traffic Calming. National Department of Transport (NDoT), 1986. National Urban Transport Guidelines: Geometric Design of Urban Arterials.	Less incidents and accidents
Noise				
Increase in noise impact	Restrict noise impacts	Remedy - Monthly noise monitoring to be done	SANS 10103 of 2008	Reduced noise nuisance to surrounding residents
Increased noise impact	Restrict noise impacts	Remedy - Monthly ambient noise monitoring to be done		Reduced noise nuisance to surrounding residents
Blasting and Vibration				
Damage to nearby infrastructure	Manage blasting activities	Control - Minimise blasting area to manage fly rock and ground vibrations	Not applicable	Reduced noise nuisance to surrounding residents
Heritage				
Destruction of graves at Grave Site 1	Avoid destruction of grave sites	Avoid - Relocation of the graves by following process prescribed in SAHRA	South African Heritage Resources Agency (SAHRA); National Heritage Resources Act	Graves stay successfully intact
Destruction of graves at Grave site 3	Avoid destruction of grave sites	Avoid - Relocation of the graves by following process described in SAHRA	South African Heritage Resources Agency (SAHRA) National Heritage Resources Act	Successful relocation of graves
Biodiversity				
Habitat loss and fragmentation of sensitive habitat (high fauna sensitivity)	Avoid unnecessary habitat loss and fragmentation	Control - Erosion management programme, Control - Hydrological functionality and integrity management programme. Remedy - Biodiversity monitoring programme, Remedy - Monitor bird distribution and abundance patterns, Control - Hydrological functionality and integrity management programme. Remedy - Conduct long-term water birds counts.	Not applicable	Successful rehabilitation of habitat, limited fragmentation
Displacement of fauna	Protection of fauna			Minimal mortalities and disturbance of faunal species
Spread of alien and invasive species	Maintain natural vegetation	Remedy - Biodiversity monitoring programme.		Destruction and prevention of the increase of Alien invasive species

POTENTIAL ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION PLAN (AVOID, MODIFY, REMEDY, CONTROL OR STOP)	PRESCRIBED ENVIRONMENTAL MANAGEMENT STANDARDS OR PRACTICES	OUTCOME
Potential loss of water bird habitat	Protection of water bird habitat	Remedy - Biodiversity monitoring programme. Control - Erosion management programme. Remedy - Monitor bird distribution and abundance patterns, Control - Hydrological functionality and integrity management programme.		Minimal destruction and successful rehabilitation of water bird and grass owl habitat
<b>Hydrology</b>				
Siltation of wetlands and other nearby watercourses.	Avoid siltation of watercourses	Avoid, Control - Adhere to SWMP and EMPr. Remedy - Monitoring in accordance to approved IWUL	General Notice 704 and Regulation 77 of the NWA	Effective sediment trapping with minimal siltation of watercourses
Flooding:	Avoid flooding and structural failure due to flooding	Avoid, Control - Emergency Response plan	Not applicable	Effective flood management
Reduction of Water Quality	Avoid spills and other pollution from entering watercourses	Avoid, Control - Adhere to EMPr. Monitoring in accordance to approved IWUL	SANS 241.1.2015 Drinking Water Standards Department of Water Affairs (DWA) ideal values for various uses including, Drinking, Domestic Use, Aquatic Ecosystems, Agricultural Use: Livestock Watering and Agricultural Use: Irrigation (DWA, 2006).	Successful spill management and stormwater management
<b>Wetlands</b>				
Loss of wetland habitat	Avoid loss of wetland habitat	Avoid - Optimise design and alignment of road Avoid, Control - Clearly demarcate and fence off servitude. Avoid - No stockpiling of materials in wetlands or within buffer area Avoid - Use existing farm tracks for access during construction phase. Avoid, Control - Clearing and management of alien vegetation. Remedy - Focus construction during the dry season.	General Notice 704 and Regulation 77 of NWA	Successful protection, and rehabilitation of wetland areas after construction
Concentration of flows	Avoid channelling and erosion in wetlands	Avoid, Control - Development of detailed construction method statements to minimise impact (to be approved by a Wetland specialist) Avoid - In the case of hilllope seepage wetlands crossed roughly perpendicular to the direction of flow Avoid - All culvert discharge points should be suitably protected against erosion. Remedy - The road verges should be landscaped following the completion of construction activities to ensure that no preferential flow paths exist that might lead to the concentration of flows. Avoid, Control - The installation of regular low level humps to slow down flows should be considered.	General Notice 704 and Regulation 77 of NWA	Spread of flow across the full width of the wetland with no additional channel formation
Impoundment of flows	Avoid damming and impoundment of flows	Avoid, Control - Development of detailed construction method statements to minimise impact Control, Remedy - Develop and implement a wetland monitoring and Management plan.	General Notice 704 and Regulation 77 of NWA	Adequate flow of water and minimal damming
Interception of subsurface flows	Avoid damming and impoundment of flows	Avoid, Control - Development of detailed construction method statements to minimise impact Control, Remedy - Develop and implement a wetland monitoring and Management plan.	General Notice 704 and Regulation 77 of NWA	Adequate flow of water and minimal damming
Increased risk of erosion	Avoid channelling and erosion in wetlands	Avoid, Control - Development of detailed construction method statements to minimise impact Avoid - Prior to the commencement of construction activities that the entire construction servitude be fenced off and clearly demarcated. Control, Remedy - Develop and implement a wetland monitoring and Management plan.	Not applicable	Spread of flow across the full width of the wetland to ensure flow dissipation

POTENTIAL ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION PLAN (AVOID, MODIFY, REMEDY, CONTROL OR STOP)	PRESCRIBED ENVIRONMENTAL MANAGEMENT STANDARDS OR PRACTICES	OUTCOME
Increased sedimentation	Avoid sedimentation of watercourses	<p><b>Avoid, Control</b> - Implementation of construction stormwater management plan and sedimentation control measures</p> <p><b>Avoid</b> - Build fences or other suitable sediment barriers should be installed down slope of construction activities to trap any sediment washed off these areas by surface run-off</p> <p><b>Avoid, Control</b> - Clearly demarcate the required construction servitude and maintain all activities within the demarcated area</p> <p><b>Avoid</b> - Locate all stockpiles, laydown areas and temporary construction infrastructure at least 50m from the edge of delineated wetlands.</p> <p><b>Avoid, Control</b> - Implementation of construction stormwater management plan and sedimentation control measures</p> <p><b>Avoid</b> - Potential contaminants used and stored on site should be stored and prepared on bunded surfaces to contain spills and leaks.</p> <p><b>Remedy</b> - Develop and implement a wetland monitoring and Management plan.</p>	General Notice 704 and Regulation 77 of NWA	Effective sediment trapping with minimal sedimentation of watercourses
Water quality deterioration	Avoid spills and other pollution from entering watercourses	<p><b>Avoid, Control</b> - Implementation of construction stormwater management plan and sedimentation control measures</p> <p><b>Avoid</b> - Potential contaminants used and stored on site should be stored and prepared on bunded surfaces to contain spills and leaks.</p> <p><b>Remedy</b> - Develop and implement a wetland monitoring and Management plan.</p>	General Notice 704 and Regulation 77 of NWA	Successful spill management and stormwater management
<b>Social</b>				
Negative change in social dynamic of resident communities	Minimise change in social dynamic	<b>Avoid</b> - Source contract workers from local communities.	Not applicable	Local employment creation
Change in living standards	Minimise negative change in living standards	<b>Avoid</b> - Source contract workers from local communities.	Not applicable	Local employment creation, community upliftment
Increase in waged labour opportunities	Employ local residents	<p><b>Control</b> - Develop a Recruitment Manual. Establish an employment information desk to assist with the day to day management of project related labour issues</p> <p><b>Control</b> - Ensure that the Labour Relations Amendment Act, 2002 (Act No. 12 of 2002) as well as the necessary policies and procedures are taken into consideration to ensure the correct procurement procedures</p> <p><b>Remedy</b> - Employ local residents and communities</p> <p><b>Remedy</b> - Use local construction companies whenever possible</p> <p><b>Remedy</b> - Use local suppliers as far as possible.</p>	Labour Relations Amendment Act, 2002 (Act No. 12 of 2002)	Local employment creation, community upliftment
Employment creation and decrease in unemployment	Employ local residents	<p><b>Remedy</b> - Use local construction companies whenever possible</p> <p><b>Remedy</b> - Use local suppliers as far as possible.</p>	Labour Relations Amendment Act, 2002 (Act No. 12 of 2002)	Local employment creation, community upliftment
Change in landuse	Avoid drastic negative effects due to landuse change	<b>Avoid</b> - Implement an ongoing stakeholder engagement strategy	Not applicable	Effective consultation with stakeholders
Increase in traffic and heavy machinery on roads	Maintain efficient traffic control	<b>Avoid, Control</b> - Apply recommendations made by the TIA	Not applicable	Minimal disruption to road users
Increase in local economy and social development	Employ local residents	<b>Remedy</b> - Institute a joint municipal coordinating and implementing committee to support the municipality's local economic and social develop needs and requirements, where feasible.	Not applicable	Local employment creation, community upliftment
Increase in crime and intrusion on privacy	Avoid an increase in crime and intrusion on privacy	<p><b>Avoid</b> - Implement management measures from specialists</p> <p><b>Avoid, Control</b> - Spot checks at entrance points to site should be implemented</p> <p><b>Remedy</b> - Mine workers should be clearly identifiable</p> <p><b>Avoid, Control</b> - Implement AIDS awareness training</p>	Not applicable	Effective crime prevention, and demarcation for no-go areas
Overall health and safety risk of workers	Avoid on-site incidents and spread of disease	<p><b>Avoid, Control</b> - Implement EMP management measures</p> <p><b>Avoid</b> - Health and safety training should be provided during induction</p> <p><b>Avoid</b> - PPE should be worn at all times</p> <p><b>Avoid</b> - Appropriate firefighting equipment should be on site and construction workers should be appropriately trained for firefighting;</p>	Operational Health and Safety Act	Incident, disease free workplace

POTENTIAL ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION PLAN (AVOID, MODIFY, REMEDY, CONTROL OR STOP)	PRESCRIBED ENVIRONMENTAL MANAGEMENT STANDARDS OR PRACTICES	OUTCOME
Negative feelings in relation to the project	Avoid negative feelings due to miscommunication	<b>Avoid, Control</b> - Implement a stakeholder engagement strategy	Not applicable	Effective consultation with stakeholders
Negative change in sense of place	Avoid drastic negative effects due to change	<b>Avoid, Control</b> - Establish community forum <b>Avoid</b> - Enforce speed limits	Not applicable	Effective consultation with stakeholders and minimal disruption to road users
Loss of natural and cultural heritage	Avoid disturbance or destruction of graves	<b>Avoid</b> - Consult with local residents and landowners regarding grave locations	SAHRA	Effective protection and relocation of graves where required.
Gendered division of labour	Employ and train woman	<b>Avoid, Remedy</b> - Training and skills development for women;	Labour Relations Amendment Act, 2002 (Act No. 12 of 2002)	Female workplace upliftment



## 7 MONITORING PLAN

**Table 7.1** details the monitoring and management plan for the management measures and actions identified in the impact assessment. Where specific monitoring and management plans are required, these are detailed in **Section 7.1**.

Table 7.1: Monitoring and Management Plan (All Phases).

IMPACT MANAGEMENT ACTION	MONITORING/MANAGEMENT METHOD	MONITORING FREQUENCY	RESPONSIBLE PERSON/DEPARTMENT	COMPLIANCE MECHANISM	COMPLIANCE REPORTING FREQUENCY
Air quality					
Dust/Wet suppression/Chemical stabilization of unpaved roads	Visually Dust monitoring (PM <sub>10</sub> and PM <sub>2.5</sub> ) with dust buckets	Daily Monthly during construction	EMC Site manager EMC ECO EMC Site manager EMC ECO	Internal Audit by EMC specialists Internal Audit by EMC specialists	Quarterly Quarterly
Soil, Land Use and Land Capability					
Restrict surface disturbance through fencing and clear restricted areas signs	Inspect fences and signs for faults and efficacy	Weekly	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Immediate clean-up of spills	Send samples of spill site for testing to accredited laboratory	As suggested by specialist clean up and remediation team	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Minimise area of compaction	Manage according to the Soil Management Plan	Weekly	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Manage terrain stability	Inspect road servitudes for any instability	Weekly	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Maintain vegetation to avoid soil erosion	Inspect road servitudes for any erosion areas	Weekly	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Traffic Assessment					
No monitoring required					
Noise					
Monthly noise monitoring to be done	Ambient noise measurements using Larsen Davis Integrated Sound Level meter Type 1 Larsen Davis Pre-amplifier Larsen Davis ½" free field microphone	Monthly during construction	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Heritage					
This Phase 1 heritage impact assessment needs to be approved by SAHRA which will advise regarding the way forward					
Biodiversity					
Erosion management programme	Inspect road servitudes for any erosion areas	Weekly	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Biodiversity monitoring programme	Conduct monitoring for the presence of terrestrial faunal species	Quarterly	EMC EO	Internal Audit by EMC specialists	Quarterly
Monitor bird distribution and abundance patterns	Conduct bird counts at the realigned roads. Monitor for the continued presence of the breeding grass owl pair.	Quarterly	EMC EO	Internal Audit by EMC specialists	Quarterly
Hydrological functionality and integrity management programme	Conduct biomonitoring upstream and downstream of road crossings	Quarterly during construction	EMC ECO	Internal Audit by EMC specialists	Quarterly
Blasting					
Inspections of nearby infrastructure prior to blasting events	Assess nearby infrastructure for pre-existing damage prior to blasting and then reassess after blasting for post-blasting damage	Per blasting event	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Hydrology					
Adhere to SWMP	Inspect Stormwater structures for cracks, trapped debris, and efficacy.	Monthly during construction	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Monitoring in accordance to approved IWUL	Conduct water flow, quality and quantity monitoring upstream and downstream of road crossings	Quarterly	EMC ECO	Internal Audit by EMC specialists	Quarterly
Wetlands					

IMPACT MANAGEMENT ACTION	MONITORING/MANAGEMENT METHOD	MONITORING FREQUENCY	RESPONSIBLE PERSON/DEPARTMENT	COMPLIANCE MECHANISM	COMPLIANCE REPORTING FREQUENCY
No stockpiling of materials in wetlands or within buffer area	Conduct inspection of movement in sensitive areas	Weekly	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Clearing and management of alien vegetation.	Monitor the spread of Alien invasive species	Quarterly during construction	EMC ECO	Internal Audit by EMC specialists	Quarterly
All culvert discharge points should be suitably protected against erosion. The road verges should be landscaped following the completion of construction activities to ensure that no preferential flow paths exist that might lead to the concentration of flows.	Inspect culvert discharge points for any erosion areas	Weekly	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Build fences or other suitable sediment barriers should be installed	Inspect sediment structures for efficacy	Weekly	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
construction activities to trap any sediment washed off these areas by surface run-off	Conduct water quality monitoring upstream and downstream of road crossings	Quarterly	EMC ECO	Internal Audit by EMC specialists	Quarterly
Potential contaminants used and stored on site should be stored and prepared on bunded surfaces to contain spills and leaks.	Send samples of spill site for testing to accredited laboratory	As suggested by specialist clean up and remediation team	EMC Site manager EMC ECO	Internal Audit by EMC specialists	Quarterly
Social	Conduct water quality monitoring downstream of chemical, hydrocarbon and hazardous material storage areas	Construction - Monthly	EMC ECO	Internal Audit by EMC specialists	Quarterly
No monitoring requirements					

## 7.1 Specific Monitoring and Management plans

### 7.1.1 Noise Management Plan

The following three primary variables should be considered when designing acoustic screening measures for the control of sound and/or noise:

- The source - Reduction of noise at the source;
- The transmission path - Reduction of noise between the source and the receiver; and
- The receiver - Reduction of the noise at the receiver.

The last option is not applicable as it was decided to control the noise levels at the source.

### Acoustic Screening Recommendations

The acoustic screening measures for the project are given in **Table 7.2**. These are based on the best practicable methods, acoustic screening techniques and the IFCs Health and Safety Regulations.

**Table 7.2: Acoustic Screening Recommendations.**

ACTIVITY	RECOMMENDATIONS
Construction phase	<ul style="list-style-type: none"> <li>• Machinery with low noise levels which complies with the manufacturer's specifications to be used.</li> <li>• Construction activities to take place during daytime period only.</li> <li>• Earthberm of at least 15 m high will have to be erected along the boundary facing the residential houses to the north of the mine.</li> <li>• Noise monitoring on a monthly basis.</li> </ul>
Operational phase	<ul style="list-style-type: none"> <li>• Emergency generators to be placed in such a manner that it is away from any residential area.</li> <li>• Noise monitoring to be done along the mine footprint and noise sources within the mine boundary on a monthly basis for the three years after which the frequency can change to a quarterly basis.</li> <li>• Earthberms between the residential areas to the east to be maintained to ensure that the mine activity is screened adequately so</li> </ul>

ACTIVITY	RECOMMENDATIONS
	<p>that there is not an increase of more than 5.0 dBA at the abutting residential area.</p> <ul style="list-style-type: none"> <li>• Any part of the processing plant equipment (Screening &amp; Crushing) which produces more than 85.0 dBA will have to be acoustically screened off.</li> <li>• Roads to be kept pothole free and the speed limit along the haul roads may not exceed 40 km/h at any one time.</li> <li>• Hauling vehicles to be maintained and any defects which may increase the prevailing ambient noise level under operational conditions to be repaired.</li> <li>• Complaint facilities will have to be made available to ensure that noise related incidents/complaints is evaluated and attended to.</li> <li>• Actively manage the process and the noise management plan must be used to ensure compliance to the noise regulations and/or standards. The levels to be evaluated in terms of the baseline noise levels.</li> </ul>
Decommissioning and Closure phase	<ul style="list-style-type: none"> <li>• Machinery with low noise levels which complies with the manufacturer's specifications to be used.</li> <li>• Activities to take place during daytime period only.</li> <li>• Vehicles to comply with manufacturers' specifications and any activity which will exceed 90.0 dBA to be done during daytime only.</li> <li>• Noise monitoring on a quarterly basis.</li> </ul>

### 7.1.2 Stormwater Management Plan

A stormwater management plan is required so as to ensure there is adequate clean and dirty water separation such that, all water emanating from the mine area (dirty water) is captured, conveyed and safely contained, whilst the clean water emanating from the upstream environment is diverted away to the nearest watercourse or downstream environment.

The regulation which allows for the management of clean and dirty water within a mining environment is Government Notice 704, and is described in the section below.

#### 7.1.2.1 Government Notice 704

GN 704 (Government Gazette 20118 of June 1999) was established to provide regulations on the use of water for mining and related activities aimed at the protection of water resources.

The five main principle conditions of GN 704 applicable to this project are:

- Condition 4 which defines the area in which, mine workings or associated structures may be located, with reference to a watercourse and associated flooding. Any residue deposit, dam, reservoir together with any associated structure or any other facility should be situated outside the 1:100 year flood-line. Any underground or opencast mining, prospecting or any other operation or activity should be situated or undertaken outside of the 1:50 year flood-line. Where the flood-line is less than 100 metres away from the watercourse, then a minimum watercourse buffer distance of 100 metres is required for infrastructure and activities.
- Condition 5 which indicates that no residue or substance which causes or is likely to cause pollution of a water resource may be used in the construction of any dams, impoundments or embankments or any other infrastructure which may cause pollution of a water resource.
- Condition 6 which describes the capacity requirements of clean and dirty water systems. Clean and dirty water systems must be kept separate and must be designed, constructed, maintained and operated to ensure conveyance of flows of a 1:50 year recurrence event. Clean and dirty water systems should not spill into each other more frequently than once in 50 years. Any dirty water dams should have a minimum freeboard of 0.8m above full supply level.
- Condition 7 which describes the measures which must be taken to protect water resources. All dirty water or substances which may cause pollution should be prevented from entering a water resource (by spillage, seepage, erosion etc) and ensure that water used in any process is recycled as far as practicable.
- Condition 10 which describes the requirements for operations involving extraction of material from the channel of a watercourse. Measures should be taken to prevent impacts on the stability of the watercourse, prevent scour and erosion resulting from operations, prevent damage to in-stream habitat through erosion, sedimentation, alteration of vegetation and flow characteristics, construct treatment facilities to treat water before returning it to the watercourse, and implement control measures to prevent pollution by oil, grease, fuel and chemicals.

The proposed infrastructure layout plan is shown in **Figure 7.1**.



**Figure 7.1: Summary of infrastructure layout.**

As mentioned a stormwater management plan is required as per GN 704 of the NWA, with the main objective of the proposed stormwater management plan being to ensure the separation of clean and dirty water during the proposed mining operation. The section below details the proposed stormwater management.

#### *7.1.2.2 Conceptual sizing of clean channels*

Based on the project layout placement, the drainage direction within close proximity of the primary infrastructure areas occurs in a north west to south east direction. Therefore, all clean water runoff emanating from the upstream catchment boundary is to be diverted around the proposed infrastructure area to the nearest watercourse or clean water environment.

It is proposed that all clean water channels be unlined vegetated trapezoidal channels of which an example is shown in **Figure 7.2**.

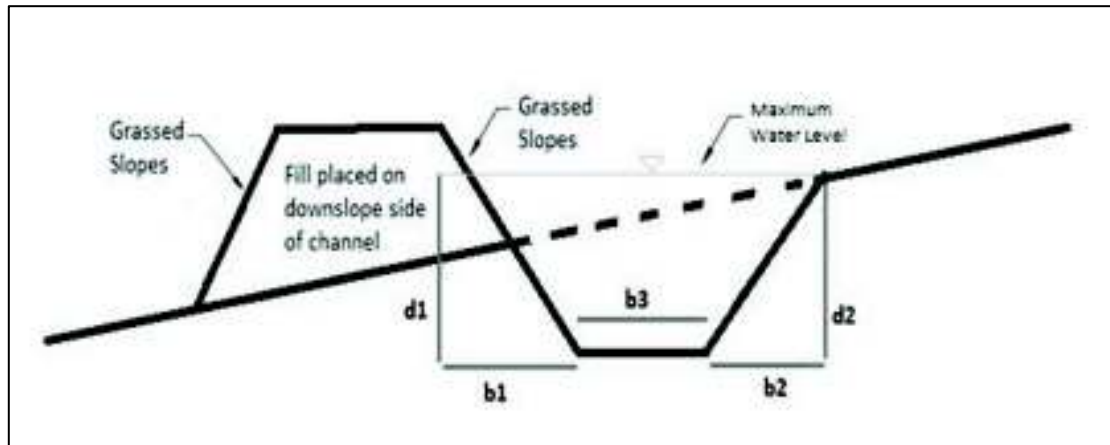


Figure 7.2: Clean water diversion channel conceptual design.

Summary of the catchment hydrology, peak flow estimations and clean water conceptual sizing of the trapezoidal channels are shown below in Table 7.3, Table 7.4, and Table 7.5 respectively.

Table 7.3: Summary of catchment hydrology.

NAME	AREA (km <sup>2</sup> )	LENGTH OF LONGEST WATERCOURSE (m)	HEIGHT DIFFERENCE (m)	RAINFALL INTENSITY (Q <sub>50</sub> )	TC (HOURS)	C-FACTOR
Catch A-B	0.4786	1391	12.2	96	0.53	0.29
Catch C-D	0.3687	1537	14.6	94	0.55	0.29
Catch D-G	1.6951	3812	28.82	56	1.22	0.29
Catch E-D	1.3264	3352	28.94	61	1.05	0.29
Catch E-F	0.1163	792	11.73	149	0.28	0.29

Table 7.4: Summary of peak flows for clean water catchments.

NAME	PEAK FLOWS FOR VARIOUS RECURRENCE INTERVALS (YEARS)					
	2 YEAR	5 YEAR	10 YEAR	20 YEAR	50 YEAR	100 YEAR
Catch A-B	0.87	1.27	1.63	2.09	3.06	4.13
Catch C-D	0.65	0.95	1.22	1.57	2.30	3.11
Catch D-G	1.79	2.62	3.37	4.33	6.33	8.55
Catch E-D	1.53	2.24	2.87	3.69	5.40	7.28



NAME	PEAK FLOWS FOR VARIOUS RECURRENCE INTERVALS (YEARS)					
	2 YEAR	5 YEAR	10 YEAR	20 YEAR	50 YEAR	100 YEAR
Catch E-F	0.33	0.48	0.61	0.79	1.15	1.56

Table 7.5: Summary of clean water channel sizing.

CHANNEL SECTION	LENGTH (M)	Q (M <sup>3</sup> /S)	LEFT AND RIGHT SLOPE	BOTTOM WIDTH (m)	CALCULATED TOP WIDTH (m)	CALCULATED DEPTH (m)	VELOCITY (m/s)	DESIGN DEPTH (m)	TYPE
A-B	807	3.06	3	1.0	5.70	0.78	1.16	1.0	Trapezoidal
C-D	835	2.30	3	1.0	5.15	0.69	1.08	1.0	Trapezoidal
D-G	536	6.33	3	4.0	8.56	0.76	1.33	1.0	Trapezoidal
E-D	1934	5.40	3	3.0	7.67	0.78	1.30	1.0	Trapezoidal
E-F	789	1.15	3	1.0	4.03	0.50	0.91	1.0	Trapezoidal

### 7.1.2.3 Conceptual sizing of dirty water channels

It is proposed that all runoff emanating from office and maintenance area, the pit area and the stockpile area must be captured and contained in a PCD. The runoff captured within the pit will be inclusive of groundwater ingress which is assumed to be 1 l/s. The captured water can either be reused within the mine operations or it can be evaporated naturally.

Summary of the catchment hydrology and estimated peak flows for the dirty water areas are listed in Table 7.6 and Table 7.7.

Table 7.6: Summary of catchment hydrology for dirty water areas.

NAME	AREA (km <sup>2</sup> )	LENGTH OF LONGEST WATERCOURSE (m)	HEIGHT DIFFERENCE (m)	RAINFALL INTENSITY (Q <sub>50</sub> )	TC (HOURS)	C-FACTOR
Office and maintenance area	0.8300	1915	7.2	66	0.94	0.58
Stockpile Area	0.2850	1676	13.5	86	0.63	0.54

**Table 7.7: Summary of peak flows (m<sup>3</sup>/s) for dirty water catchments.**

NAME	PEAK FLOWS FOR VARIOUS RECURRENCE INTERVALS (YEARS)					
	2 YEAR	5 YEAR	10 YEAR	20 YEAR	50 YEAR	100 YEAR
Office and maintenance area	3.52	4.82	5.83	6.97	8.93	10.85
Stockpile Area	1.56	2.14	2.58	3.08	3.93	4.76

Dirty water within the office and maintenance area is to be captured and conveyed to the PCD via lined concrete rectangular channels. Based on a conservative peak flow estimation of 8.93 m<sup>3</sup>/s for the 1:50 year storm event, it is proposed that the size of the dirty water channel be based on a width of 3 m and maximum depth of 1 m.

Rectangular concrete lined channels must be constructed around the stockpile area to capture dirty water runoff and convey it to the PCD. The channel sizing for the mentioned dirty water areas are to be based on a 1:50 year peak flow of 3.93 m<sup>3</sup>/s, with the proposed channel dimensions having a depth of 1 m and a width of 2 m.

It is important to note that areas estimated are conservative to provide an added safety factor.

As mentioned all dirty water will be captured and contained in the proposed PCD. Details of the conceptual sizing of the PCD are described in the sections that follow.

#### 7.1.2.4 Conceptual sizing of PCD

To calculate the amount of dirty water runoff captured via the proposed dirty water infrastructure areas of the Eloff project, the Soil Conservation Services (SCS) method, described fully in Schmidt and Schulze (1987) is used. The SCS method is particularly suited to small catchments (less than 30 km<sup>2</sup>) and takes into account most of the factors that affect runoff, such as quantity, time distribution and duration of rainfall, land use, soil type and size and characteristics of the generating catchment. It is based on the principle that runoff is caused by the rainfall that exceeds the cumulative infiltration of the soil. Soil types are divided into four hydrological groups, ranging from soils with low runoff potential (well-drained with high infiltration ability and permeability such as sand and gravel) to soils with high runoff potential (very low infiltration rates and permeability such as shallow soils with clay, peat or rock).

The method used a curve number (CN) which can be determined from observation of the characteristics of the catchment. The curve number expresses a catchments stormflow response to a rainfall event (Schulze et al. 1992). This response is dependent on the catchment characteristics such as hydrological soil properties, catchment slope and land use. For the project area the adopted CN for all surface areas is estimated to be 60 and is based on a mixture of different surface areas such as the main infrastructure areas which is primarily impermeable to the open pit and hard and soft dump areas which are semi permeable and do allow for infiltration. The SCS storm flow depth equation is given below:

$$Q = \frac{(P - I_0)^2}{P - I_0 + S} \text{ for } P > I_0$$

where

$Q$	=	stormflow depth (mm).
$P$	=	daily rainfall depth (mm), usually input as a one-day design rainfall for a given return period.
$S$	=	potential maximum soil water retention (mm).
	=	index of the wetness of the catchment's soil prior to a rainfall event.
$I_0$	=	initial losses (abstractions) prior to the commencement of stormflow, comprising of depression storage, interception and initial infiltration (mm)
	=	0.1 S

Sizing of the proposed PCD is based on the dirty water runoff collected from the total catchment area of the main infrastructure area, the hard and soft dump areas and the open pit. The total catchment area is therefore estimated at 1,565 km<sup>2</sup> (conservative estimation). The sizing of the PCD also took into consideration a daily maximum groundwater ingress rates into the open pit which was estimated at 10 l/s. Summary of results are shown in Table 7.8.

**Table 7.8: Summary of PCD sizing (m<sup>3</sup>).**

NAME	AVERAGE CN ADOPTED	1:50 YEAR STORM RUNOFF VOLUME (m <sup>3</sup> )	DAILY GROUNDWATER INGRESS VOLUME (m <sup>3</sup> )	REQUIRED VOLUME (m <sup>3</sup> )
PCD	60	83 254	864	84 118

As indicated above the proposed PCD required to contain all the dirty water emanating from the mentioned dirty water areas, should be sized so as to 84,118 m<sup>3</sup>.

It should be noted that the groundwater ingress rate used when developing the water balance (see section 7) is lower than what was used to estimate the PCD size. The higher groundwater ingress rate was used to obtain a more conservative sizing of the PCD.

It is important to note that areas estimated are conservative to provide an added safety factor.

A summary of the stormwater management plan is shown in **Figure 7.3**.



**Figure 7.3: Summary of stormwater management plan.**

#### 7.1.2.5 Stormwater Maintenance Plan and Monitoring

The primary purpose of the stormwater maintenance plan is to ensure proper functioning of the stormwater controls. The stormwater maintenance plan is to be carried out during specific periods of the year, these periods include pre wet season, pre dry season and peak wet season months.

The rationale behind these key periods is listed below:

- Pre wet season - During the period leading up to the wet season various activities are required to ensure that all stormwater controls are functioning effectively. These activities include undertaking a site inspection to assess blockages/debris within key locations including main channels (clean and dirty water). Levels of siltation should also be checked and the appropriate action taken to ensure sufficient storage is available for the wet period. The pre wet season site inspection should occur towards the end of September.
- Peak wet season - During this period site inspections should be undertaken as a follow up on the initial pre wet season site inspection. This is undertaken so as to determine

if the preceding rains resulted in any damages to the stormwater controls, and if any blockages had occurred at key locations mentioned. Peak wet season month site inspections should occur towards the end of December and January.

- Pre dry season - During this period, a site inspection should be undertaken to assess and rectify any damages as a result of the rainfall for the remainder of the wet season following January. Although during the dry season no major rainfall is anticipated, there may be short duration high intensity rainfall events that could produce high peak flows at the stormwater control outlets. It is therefore necessary to undertake a site visit to ensure all stormwater controls are functioning correctly. Pre dry season site inspection should be undertaken towards the end of April.

A summary of the stormwater maintenance plan is provided in **Table 7.9**.

**Table 7.9: Summary of stormwater maintenance plan.**

MONTHS	DRY SEASON	WET SEASON	SITE INSPECTION AND REMEDIATION		
			PRE WET SEASON	PRE DRY SEASON	PEAK WET SEASON
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					

A monitoring programme is essential as a management tool to detect negative impacts as they arise and to ensure that the necessary mitigation measures are implemented. It also ensures that storm water management structures are in working order. Monitoring should be implemented throughout the project life.

### 7.1.3 Surface Water Quality Monitoring Plan

A surface water monitoring programme is recommended at the EMC in terms of the Best Practice Guidelines G3: Water Monitoring Systems (DWAf, 2006). The monitoring programme will assist with overall water management at the site, including but not limited to:

- Develop an understanding of the current water quality on site and monitor how it changes over time;
- Monitor pollution and assess the impact which could possibly lead to pollution prevention; and
- Assess performance of pollution prevention measures, i.e. compliance with license conditions.

The monitoring programme should be amended according to on-site operations and future permit requirements.

It is recommended that all water crossings be monitored for water quality and quantity on a quarterly basis. The water quality results should meet applicable standards or ensure that water released into the environment, either intentionally or unintentionally, are of appropriate quality and associated risks are well understood. Streams or natural drainage lines with flowing water within the catchment of the site (zone of impact) should be monitored on a quarterly basis. A biomonitoring programme is recommended for perennial streams. The programme should be on a bi-annual basis upstream and downstream of the site and include at least macro-invertebrate and habitat integrity assessments, but further assessments may be required, depending on the stream conditions. Proposed surface water sampling points are presented in **Table 7.10**.

**Table 7.10: Propose surface water monitoring points.**

SURFACE WATER SAMPLING POINTS			SITE DESCRIPTION
POINT	LATITUDE	LONGITUDE	STREAM/SWAMP/DAM
SW1	-26.227200°	28.661180°	Non-Perennial Pan
SW2	-26.229820°	28.561000°	Marsh and Swamp
SW3	-26.210630°	28.555420°	Marsh and Swamp
SW4	-26.235970°	28.628770°	Dam
SW5	-26.227050°	28.638230°	Non-Perennial Pan
SW6	-26.197780°	28.679120°	Non-Perennial Pan
SW8	-26.224600°	28.567600°	Marsh and Swamp
SW9	-26.268350°	28.614220°	Perennial Stream

The water quality results should be compared to the limits specified in the Water Use Licence (WUL). If a WUL is not available or limits for some parameters are not specified in the WUL, the Department of Water and Sanitation (DWS) (previously Water Affairs), South African Water Quality Guidelines (SAWQG) Target Range, Volume 1, Domestic Use (1996) and the South African National Standards for Drinking Water (SANS 241:2015) should be used.

#### *7.1.4 Groundwater Quality Monitoring Program*

Groundwater monitoring should be conducted to assess the impacts (if any) of the proposed new mining activities on groundwater quality and quantity (water levels).

Groundwater monitoring (i.e. sampling and water level measurements) should be conducted at quarterly intervals. It must be mentioned that this monitoring schedule should be re-assessed by a qualified geohydrologist at a later stage in terms of stability of water levels and quality. If the sampling program requires changes, it should be done so in consultation with the appropriate authorities.

At first only source monitoring boreholes in close proximity to the potential sources of groundwater contamination are necessary. Only after the source monitoring program has positively identified a pollution breakthrough would additional plume monitoring boreholes be required further away (down gradient) from the now confirmed sources. A total of six source monitoring boreholes are recommended for the mining rights area and their positions are indicated in **Figure 7.4**. More information regarding these six boreholes is provided in **Table 7.11**.



Figure 7.4: Conceptual positions of source monitoring boreholes.

Table 7.11: Summary of proposed source monitoring boreholes.

BH	COORDINATES (WGS 84)		ELEVATION (mamsl)	DEPTH (m)	COMMENTS
	SOUTH	EAST			
BH01	-26.2066	28.6351	1 600	30	Down gradient from pollution control dam.
BH02	-26.2087	28.6354	1 603	30	Down gradient from mining infrastructure area.
BH03	-26.2123	28.6324	1 609	30	Up gradient from mining infrastructure area.
BH04	-26.2169	28.6377	1 606	30	Down gradient from stockpile.
BH05	-26.2246	28.6376	1 601	30	Down gradient from topsoil and overburden storage area.
BH06	-26.2286	28.6355	1 603	30	Down gradient from pit decant position.

Groundwater samples should be analysed for chemical and physical constituents normally associated with coal mining (Table 7.12).



**Table 7.12: Groundwater constituents for routine analysis**

MONITORING	VARIABLE
Quarterly	EC, pH, TDS, total hardness, total alkalinity, calcium, magnesium, sodium, potassium, chloride, sulphate, fluoride, nitrate, iron, manganese, aluminium and turbidity.

Laboratory results should be analysed against the target water quality guidelines for domestic use, the aquatic environment, livestock watering and irrigation (according to the South African National Standards for drinking water; *SANS 241:2015*). The strictest value between the target water quality objectives or objectives through a reserve determination should be used.

Monitoring results should be entered into an electronic database as soon as results are available, and at no less than one quarterly interval, allowing:

- Data presentation in tabular format;
- Time-series graphs with comparison abilities;
- Statistical analysis (minimum, maximum, average, percentile values) in tabular format;
- Graphical presentation of statistics;
- Linear trend determination;
- Performance analysis in tabular format;
- Presentation of data, statistics and performance on diagrams and maps; and
- Comparison and compliance to the South African National Standards for drinking water (*SANS 241:2015*).

The quarterly report should be an update of the database with time-series graphs and statistical analysis (average, maximum, minimum, 5 -, 50 - and 95 percentile values as well as linear performance). Data should also be presented in a map format to present a clear picture of the water quality situation. Furthermore, an annual detailed evaluation report on the groundwater monitoring results should be prepared to investigate trends and non-compliance over the monitoring year.

In terms of flow, all water uses and discharges should be measured on an ongoing basis. The flows include:

- Volumes of groundwater seepage into the opencast pit, and
- Volumes of contaminated water used for dust suppression.

As far as possible, the same monitoring points should be used from the construction phase through the operational and decommissioning phases to after mine closure to develop a long data record, which will enable trend analysis and recognition of progressive impacts with time.

The following maintenance activities should be adhered to:

- Monitoring boreholes should be capped and locked at all times,
- Borehole depths should be measured quarterly and the boreholes blown out with compressed air, if required and
- Vegetation around the boreholes should be removed on a regular basis and the borehole casings painted, when necessary, to prevent excessive rust and degradation.

#### *7.1.5 Heritage/Archeology Management Plan*

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below. This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

The impacts on identified heritage resources in the study area resulting from this project can be mitigated to an acceptable level with the correct mitigation measures and management

actions. Furthermore, the socio-economic benefits derived from this project outweigh the impact on heritage resources with the correct mitigation measures in place. It is therefore recommended the project is authorised from a heritage perspective on the condition that the recommendations as made in this report are implemented as part of the EMPr and based on approval from SAHRA.

## **8 ENVIRONMENTAL AWARENESS PLAN**

### **8.1 Communication chain**

The communication of the environmental risks for each phase of the project will take place for the management, administrative and worker sectors of the project, as well as contractors.

#### *8.1.1 Management Sector*

A workshop will be conducted to inform all management of the risks associated with the mine. The risks for all aspects will be explained and the appropriate management options discussed. The workshop will also elaborate on the monitoring programmes that will be implemented to identify and monitor the level of impact on the environment and discuss various remediation actions, should there be deterioration.

The evaluation process is integral in the assurance that the mine reduces any possible environmental risks associated with the project. The workshop will be conducted prior to the construction phase to ensure that all risks are discussed before there is any chance of the impacts occurring.

The workshop may be repeated at certain stages during the construction phase, in the case of new employees.

#### *8.1.2 Administrative Sector*

The communication of the environmental risks to the administrative sector will occur through a workshop/half day course. This workshop will seek to explain the following necessary actions:

- Risks associated with each aspect will be discussed to ensure that there is an understanding of how each action of the project may impact on the environment.
- The mitigation of the environmental risk will be elaborated on.
- It is important that each person understand these management strategies as it ensures that the impact on the environment is kept to a minimum.

- Data collection regarding each aspect will also be explained to ensure that each aspect is monitored according to those protocols specified by the authorisations and license. Along with data collection the reporting of findings will be discussed.
- This workshop will take place before the construction phase begins, thus ensuring a full understanding of the project and its associated environmental risks before any construction activity is undertaken.
- The workshop will be repeated at the beginning of the operational phase as part of a handover to the next responsible party during the Eloff Phase 1 project.
- The following communication channels and media will/can be used to communicate environmental issues within Eloff Mining Company during construction:
  - (Head of Department) HOD Meetings: The Mine Manager communicates information to senior management on environmental issues and the information is minuted.
  - HSEC Meetings: 'Environmental issues' should be an agenda item on monthly safety, health and environmental meeting agendas.
  - Publications: Leaflets, posters etc. are produced by the relevant department or other designated persons, for use on notice boards, and distribution.
  - EMS Database: Feedback from line management on objectives, targets and actions.
  - Daily/Weekly Safety Meeting: All meetings are scheduled to commence with a discussion on safety, health & environmental topics.

### ***8.1.3 Construction Workers Sector***

The workers associated with the construction activities will attend a half day induction course to ensure that each person is aware of the environmental risks associated with the project. This induction will form part of the health and safety induction. The environmental risks of each aspect as well as the mitigation will be elaborated on.

### ***8.1.4 Contractors***

An environmental awareness section will be added to the contractor's health and safety induction programme. The environmental induction will focus on activities that carry an environmental risk, actions to be taken to reduce these risks, and procedures to be followed in the event of an incident.

### ***8.1.5 Environmental Control Officer***

The ECO will oversee environmental awareness induction training to all contractor staff. The ECO will ensure that the necessary environmental induction training takes place and that records of attendance are maintained and up to date.

## **8.2 Method of communication**

### **8.2.1 Induction**

All full time staff and contractors are required to attend an induction session. Employees are inducted when they start on the project. Any contractor, who works on the project for a period of 24 hours or more, is required to undergo the prescribed induction training. This induction will form part of the health and safety induction.

Environmental issues and aspects related to the project will be addressed in the induction sessions. All environmental impacts and aspects and their mitigatory measures will be discussed, explained and communicated to employees. The induction sessions will be modified according to the level of employee attending the induction session so that all employees gain a suitable understanding of environmental issues and pollution.

The records of all individuals attending induction sessions to be kept; the records to be kept include names, identity numbers, contact details, designation and signature.

### **8.2.2 On the Job Training**

On the job training is an essential tool in environmental awareness. Employees will be given details of the expected environmental issues and concerns specifically related to their occupation. Employees will be trained on how to respond if an environmental problem or source of environmental pollution arises. The training will be on-going, and all new employees will be provided with the same standard of training as existing employees.

The records of all individuals receiving on the job training to be kept; the records to be kept include names, employee number contact details, designation and signature.

#### **8.2.2.1 Hazardous substances**

Individuals dealing with potential hazardous situations and risks that could lead to hazardous spills, pollution incidents, excessive dust or other forms of environmental damage to receive appropriate job specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. All these actions will be done in accordance to Eloff Mining Company procedures on management of hazardous substances

#### **8.2.2.2 Delivery of hazardous substances**

All hazardous substances is delivered directly to the Supply Chain management stores. Personnel responsible for the supervision of delivery, collection and transport of hazardous

substances to receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. This all makes part of competency declaration for use. Material Safety Data Sheets (MSDSs) of each hazardous substance delivered must be kept at the Supply Chain management stores as well as point of distribution. Prior to any use of a new chemical, the Material Safety Data Sheet of each substance must be delivered to the SHEC department of EMC for approval of use by the Environmental Specialist.

#### *8.2.2.3 Dust mitigation*

Individuals dealing with potential situations and risks that could lead to excessive dust to receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation

#### *8.2.2.4 Fire incidents*

Individuals dealing with potential hazardous situations and risks that could lead to fire incidents or emergencies to receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

#### *8.2.2.5 Pollution incidents or forms of environmental damage*

Any incident or form of environmental damage must be dealt with in accordance with an incident management procedure.

Individuals dealing with potential situations and risks that could lead pollution incidents or other forms of environmental damage to receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

#### *8.2.2.6 Waste management*

Mining personnel and contractors responsible for the operation and safe handling of the various waste streams will receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. Ensure that training and awareness programmes cover the safe transportation, handling, storage, transfer, handling, use and disposal of all waste streams, and the location of waste

receptacles for each waste stream. All waste management activities must be done in accordance to Eloff Mining Company procedures and in terms with registers dealing with storage of waste in specific areas.

Staff awareness training programme will accommodate training, on which bin to use for organic waste and on sealing the lid on the bin once organic waste has been discarded.

#### *8.2.2.7 Water Management*

All persons responsible for active water management will receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

#### *8.2.2.8 Water Consumption and Use*

All staff will receive training on minimising water consumption and how to use water sparingly.

### **8.3 Environmental Communication Strategies**

Mine management has established procedures for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to environmental risks for each phase of the project will take place for the management, administrative and worker sectors of the project, as well as contractors. The organisation shall conduct processes for external communication on its significant environmental aspects and record its decision in line with Eloff Mining Company communication policy as well as conditions stated in any authorisation.

#### *8.3.1 Internal Communication*

Internal communication is done within the Administrative Sector.

#### *8.3.2 External Communication Strategies*

The following communication channels and media will/can be used to communicate environmental issues to individuals who are not employed by Eloff Mining Company or their subcontractors:

- Environmental Stakeholder engagement meeting: An Environmental Stakeholder engagement meeting has been established and used as a forum to keep interested and affected parties informed of the significant environmental aspects identified through the Environmental Impact Assessments and Management Plans. This is also

the forum where interested and affected parties get the opportunity to raise environmental concerns. Records are kept of all decisions and concerns. The Environmental Stakeholder engagement meeting is chaired by the Mine Manager, or another appropriately appointed competent individual.

- **Publications:** Selected publications should be produced and used to communicate environmental issues to outside parties. Examples include newsletters and Annual Reports.
- **Communication from External Parties and Employees:** A clear communication point is established within the company through the Eloff Mining Company Corporate Communication procedure that determines who is responsible for liaison with the media in respect of any crisis that may arise. A complete procedure for media liaison is available to all employees. Communication from external interested and affected parties may be received by email, fax, telephonically or by mail. Where required, a written response will be sent, on receiving such communication, by the appropriately appointed individual under signature of the Mine Manager, to the respective interested and/or affected party. All telephonic or facsimile correspondence received on the mine must be forwarded to the relevant department for action. All events or concerns will be captured and actioned on an existing and/or future database.
- **E-mail:** E-mail communication received must be stored, with replies, in an appropriate folder on a server. E-mail messages, relevant to environmental management, should be kept for a minimum of two years before deletion.
- **Mail:** Correspondence received by mail must be filed, along with the response (where relevant), within the relevant department's filing system for a minimum period of two (2) years. Paper correspondence will be archived in this department.
- **Telephone:** A register of telephonic environmental queries should be kept by the relevant department detailing caller, contact details, date, query, action taken and response. Furthermore, the person answering the call will be responsible for logging their particulars against the call, as well as ensuring that all communication that leads to an aspect or an impact, is entered on the database.
- **Storage of Correspondence:** All original correspondence must be retained by the Mine Manager for a minimum period of two years.
- **Environmental Reports:** Copies of relevant specialist study reports and Environmental Impact Assessments will be available on request from an external party by the Mine Manager.
- **Queries from Interested and Affected Parties:** Response to queries about environmental impacts and aspects will be addressed by the relevant department, and approved by the Mine Manager.



- Queries and Requests from the Media: Requests for articles from the media on environmental issues regarding the road construction will be co-ordinated by the Corporate Communication manager according to the public communication strategy, with input from the relevant department, as approved by the General Manager, in line with the Eloff Mining Company Public and Community Communication and liaison Strategy. Due to the environmental awareness generated by induction, on the job training etc., employees are able to identify environmental problems, issues, concerns and pollution timeously.

#### **8.4 Evaluation of the Environmental Awareness Plan**

The evaluation of the environmental awareness and training plan will be conducted by Eloff Mining Company. This evaluation will entail the auditing of the operation in the construction phase once activity has commenced. The environmental awareness and training plan described above is sufficient to make all those involved in the project aware of those risks that may occur as well as the necessary mitigation required to minimise these risks.

The environmental awareness and training plan indicates that Eloff Mining Company is serious about the environments well-being and empowerment of the local people. Environmental issue will be highlighted at monthly meetings scheduled at the mine.

#### **8.5 Emergency Incident Reporting**

Environmental incident reporting is a vital part of communication at the Eloff Mining Company operations. Employees are required to report any and all environmentally related problems, incidents and pollution, so that the appropriate litigator action can be implemented timeously. In the event of an Environmental Incident, the incident must be reported according to the Incident Reporting Procedure.

### **9 ENVIRONMENTAL EMERGENCY PREPAREDNESS AND RESPONSE PLAN**

The purpose of this Environmental Emergency Preparedness and Response Plan is to provide guidance to all relevant employees and contractors, in terms of the identification, reporting and handling of an environmental emergency incident or accident at the mine. The Environmental Emergency Preparedness and Response Plan will also provide guidance to ensure that:

- Danger to the environment is minimised;
- Legal liability is managed and minimised; and

- Public relations are effectively managed during and following an environmental emergency situation and accident.

### **9.1 Objective of the Environmental Emergency Preparedness and Response Plan**

The objective of the Environmental Emergency Preparedness and Response Plan is to allow rapid and efficient response to environmental emergencies and to manage environmental contamination through pollution source control, containment and/or remedial action. This will be done through appropriate effective response as per the procedures developed for dealing with the environmental emergencies and/or accidents.

### **9.2 Requirements of the Environmental Emergency Preparedness and Response Plan**

- The Environmental Emergency Preparedness and Response Plan to be disseminated to all employees and contractors.
- The coordinated Environmental Emergency Preparedness and Response plan must be in place at all times.
- In the event of an emergency; the Environmental Emergency Preparedness and Response Plan will be consulted.
- Develop and implement control measures to ensure efficient and effective response to emergency incidents/events.
- The relevant specific environmental emergency and response procedures are to be placed around the mine where they will be easily viewed.
- Interactive and hands on competency training to be provided for individuals responsible for emergency response.
- Regular drills and reviews of these emergency procedures are required and to involve, where appropriate, all affected parties.
- The names and contact details of Eloff Mining Company and Contractor personnel responsible for emergency response to be communicated to Eloff Mining Company management and supervisors and to be clearly displayed on notice boards.
- Contact details of emergency services, including firefighting service, ambulance/paramedics, police, spills response are to be clearly displayed where they will be easily viewed/accessed by employees and contractors.
- All personnel and Contractors to obtain approval from the health and safety representative prior to entering restricted areas, & the ECO in terms of sensitive sites.

- All accidental spillages to be immediately cleaned up in accordance with Spill prevention and response procedures
- Address unplanned on-site and, where appropriate, off-site releases of hazardous substances in accordance with the hazardous substance storage and handling procedure
- Pollution incidents must be dealt with immediately, and in the correct manner, using the appropriate procedure in order to limit any negative impact on the environment.
- All Environmental Emergencies and accidents should be recorded and followed up according to Incident Reporting and Management Procedure.
- If the emergency has the potential to affect surrounding communities, they should be contacted in person in accordance to the public and community communication and liaison strategy.
- The mine will test the specific Environmental Emergency Preparedness and Response Procedures in order to identify any areas for improvement.
- Communication is vital in an emergency and thus communication devices, such as mobile phones, two-way radios, pagers or telephones, must be placed around the mine.
- A checklist of emergency response units must be consulted and the relevant units notified.
- The checklist includes:
  - Fire department;
  - Police;
  - Emergency health services such as ambulances, paramedic teams, poisons centres;
  - Hospitals, both local and further afield, for specialist care;
  - Public health authorities;
  - Environmental agencies, especially those responsible for air, water and waste issues;
  - Other industrial facilities in the vicinity with emergency response facilities; and
  - Public works and highways departments.
- Prevention is better than cure - it is every person's duty to prevent negligence and carelessness since this may lead to a catastrophe.
- All equipment intended to be used to respond to any emergency situation at the site is to be installed diligently and maintained.
- Staff must be trained on the use of the emergency response equipment in order to obtain maximum benefit during an emergency situation.

- Staff must undergo environmental awareness training in order to be environmentally conscious whilst carrying out their daily tasks.
- Emergency contact numbers to be updated and distributed by the Environmental Control Officer on a regular basis.
- It is the responsibility of each section head to ensure that these numbers are displayed at relevant places.
- Current mine telephone directories must be kept on hand at all telephones and offices.
- Appropriate 'no entry' signage to be in place at all required areas.

### **9.3 Environmental Specialist**

- The Environmental Specialist is responsible to update the environmental emergency and response procedure as required.
- The Environmental Specialist is to provide copies of EMP procedures (and all revisions) to Contractors appointed by Eloff Mining Company, if the procedures apply to the nature of their activities and contract.
- The Environmental Specialist is to keep proof that documentation has been provided to the Contractor.
- S/he must ensure that the relevant persons, who have responsibilities under the relevant procedures, follow the instructions laid out in the respective procedures.
- Where necessary, the Environmental Specialist will address and correct non-compliances to the Environmental Emergency Preparedness and response procedures.
- The Environmental Specialist is to report environmental incidents and major EMP non-compliances (that could result in significant environmental damage or pollution) to the Eloff Mining Company Management/General Manager who will then be responsible to report to competent authorities.
- The Environmental Specialist is to manage environmental incidents in accordance with the formal incident response and reporting procedure.
- The Environmental Specialist to oversee environmental awareness induction training to all contractor staff prior to these staff working on site.
- The Environmental Specialist to ensure that the necessary environmental induction training takes place for all staff and that records of attendance are maintained and up to date.
- The Environmental Specialist to put in place an incident reporting procedure and to keep this up to date at all times.

- Environmental Specialist to arrange regular submission of monitoring and compliance reports (performance assessments and other audits) to competent authorities as required by the various authorisations issued.

#### 9.4 Contractors

- Contractors to carry out the environmental emergency preparedness and response procedure issued to them by the Environmental Specialist.
- Contractors not to deviate from the environmental emergency preparedness and response procedure and/or instruction issued by the Environmental Specialist without written approval by the Environmental Specialist .
- Contractors to be responsible for rectifying and rehabilitating, at their own expense, any environmental damage caused by their activities on surroundings.
- Measures to repair damage and rehabilitate the affected area to be approved and signed off by the Environmental Specialist.
- Contractors shall nominate a capable and suitably qualified staff member as SHE officer to supervise implementation of the EMP as it applies to the nature of the contract.
- The SHE officer shall mean a staff member that has attended an environmental management system or environmental audit course or has a proven track record of managing site environmental matters.

#### 9.5 Environmental Emergency Response Procedure

Environmental emergencies occur over the short term and require an immediate response.

There are six main steps in managing an environmental emergency, from the identification of the situation to final close off. These are as follows:

1. Find and identify;
2. Ensure human safety;
3. Reporting;
4. Containment and clean-up;
5. Corrective action; and
6. Monitoring.

##### 9.5.1 Find and Identify

In handling any emergency remember to assess the situation. Take into consideration all factors, including:

- Is there a fire, a spill or a leak?

- What are the weather conditions?
- What is the terrain like?
- Who/what is at risk: people, property and/or the environment?
- What actions should be taken: Is an evacuation necessary?
- What resources (human and equipment) are required and are they readily available?
- What can be done immediately?

#### 9.5.2 *Ensure Human Safety*

- Remain calm and do not panic.
- No person, other than those persons directly involved, is to interfere with the situation on hand.
- During an emergency response, access to hazardous areas is to be restricted.
- When investigating the incident, priority must be given to safety.

#### 9.5.3 *Reporting*

- Environmental incident reporting is integral. Employees are required to report any and all environmentally related problems, incidents and pollution, so that the appropriate corrective and preventative actions can be implemented timeously.
- The observer will as soon as possible verbally report the occurrence to the Mine Manager and the Environmental Management Representative.
- In the case of Off Site Emergency Situation the observer is to verbally report the occurrence to the Environmental Specialist and safety officer and call the applicable emergency services such as firefighting service, ambulance/paramedics, police, spills response etc.
- All Environmental Emergency incidents are to be reported as soon as possible and in person or telephonically to the Environmental Specialist, and thereafter in writing as per the incident reporting procedure.
- All environmental incidents will be captured in the incident reporting procedure as soon as possible, but at least within 48 hours.
- Under no circumstances must any person, other than the designated person, communicate with the news media during an emergency.
- The Environmental Specialist is to report environmental incidents and major EMP non-compliances (that could result in significant environmental damage or pollution) to Management/General Manager.
- Senior management will report major environmental incidents and major EMP non-compliance (that could result in notable environmental damage or pollution) to the competent authorities as per applicable legislation and regulatory requirements.

#### **9.5.4 Containment and Cleanup**

The Environmental Specialist will assess the situation from the information provided, and set up an investigation team of relevant personnel.

#### **9.5.5 Corrective and Preventative Actions**

All incidents are to be investigated and appropriate corrective actions to be implemented, including measures to prevent recurring incidents.

The Environmental Specialist will register all environmental incidents, and ensure investigation, follow-up and close out of all incidents.

#### **9.5.6 Monitoring/Evaluation of Corrective and Preventative Actions**

Where applicable, monitoring will take place once the corrective and preventative action has been implemented.

When the monitoring shows that the incident has been corrected, the incident can be closed out. If the monitoring results show that the corrective action was not successful then further investigation and corrective action will be required. Preventative measures needs to be put in place to ensure that the emergency incident will not be repeated. This will then be followed by monitoring. This will repeat until the incident is closed out.

The type of monitoring needed will depend on the environmental emergency which occurred. Monitoring procedures include:

- Surface water monitoring procedure;
- Noise monitoring procedure;
- Soil monitoring procedure;
- Air quality monitoring procedure;
- Rehabilitation monitoring procedure;
- Biodiversity monitoring procedure; and
- Alien vegetation monitoring procedure.

## **10 CONCLUSION**

It is vital for Eloff Mining Company to ensure that all management and mitigation measures are adhered to in order to comply with the EMPr and to ensure minimum harm to the environment. The impacts identified for the construction of the roads are mostly medium in nature and with the proper implementation of the mitigation measures proposed; these

impacts can be further reduced to avoid long term damage to the biological and social environment.



**APPENDIX A: CURRICULUM VITAE OF THE EAP**