



**CHINA AFRICAN PRECIOUS  
METALS**

**ORKNEY GOLD MINE CLOSURE LIABILITY  
UPDATE**

**FEBRUARY 2015**

**SHANGONI**  
*Management Services (Pty) Ltd*



## **MINE CLOSURE LIABILITY UPDATE**

**CHINA AFRICAN PRECIOUS  
METALS**

**ORKNEY GOLD MINE CLOSURE  
LIABILITY UPDATE**

**FEBRUARY 2015**

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# PROJECT DETAILS

## Department of Mineral Resources

**Project Title:** Orkney Gold Mine closure liability update


**Project Number:** CAP-ORK-14-11-26

**Compiled by:** Emma Fourie

**Effective date:** 23 April 2015

**Location:** Orkney, North West

**Technical Reviewer:** Jan Nel



Jan Nel

## EXECUTIVE SUMMARY

The purpose of this document is to supply the Department of Mineral Resources (DMR) with the requested information pertaining to closure cost at China African Precious Metals' (CAPM) Orkney operations, as required by the Mineral and Petroleum Resource Development Act (MPRDA). A detailed assessment was conducted of all the infrastructure and activities taking place that fall within the responsibility of the Orkney operations. The infrastructure was classified in accordance with the DMR tariffs list and the surface areas of the infrastructure were calculated to determine the volume or surface requiring rehabilitation or demolition. A detailed quantum calculation is attached as Appendix 1.

The financial provision according to the previous quantum calculation, completed in April 2012, is **R165 100 644.93**, including P&G and contingency, but excluding VAT. The re-calculated quantum using the 2005 DMR rates but escalated by 6% per annum to 2015 has been calculated at **R206 552 739.20, including P&G and contingency, excluding VAT.**

Reasons for the increase from 2012 include:

- Escalation of the DMR rates by 6% per annum from 2012 to 2015;
- Structures that had previously been excluded from the closure liability, such as the satellite offices and veld fans, were measured by the mine surveyor and included in the 2015 calculation;
- Updated survey plans were utilised for structure measurements.

The demolition of 3 Shaft has been 95% completed and 5 shaft only has the hostels and the Shaft structure remaining. Other structures have all been demolished and removed.

Although closure objectives have been included in the EMP, no formal closure or rehabilitation plan is available to structure concurrent rehabilitation.



# TABLE OF CONTENTS

<b>1. INTRODUCTION.....</b>	<b>10</b>
1.1 Applicant .....	10
1.2 Appointed reviewer.....	10
1.3 List of surface infrastructure.....	11
1.4 Assumptions .....	12
<b>2. APPLICABLE LEGISLATION AND GUIDELINES .....</b>	<b>14</b>
2.1 National Environmental Management Act, 1998 (Act No. 107 of 1998).....	14
2.2 MPRDA .....	15
2.3 Removal of buildings, structures and other objects .....	15
2.4 Regulation R527 of the Mineral and Petroleum Resource Development Act, 2002 requirements. ....	16
<b>3. COST CALCULATION GUIDELINES.....</b>	<b>18</b>
3.1 DMR closure cost calculation guideline.....	18
<b>4. CLOSURE COMMITMENTS.....</b>	<b>19</b>
4.1 Closure objectives .....	19
<b>5. CURRENT CLOSURE PROVISION.....</b>	<b>21</b>
<b>6. INFORMATION USED FOR CALCULATING THE QUANTUM .....</b>	<b>22</b>
6.1 Process followed.....	22
6.2 Tariffs .....	22
6.3 Closure cost calculation.....	23
<b>Appendix 1 – Locality map.....</b>	<b>24</b>



## LIST OF TABLES

TABLE 1: DETAILS OF THE MINE AND MINE OWNER	10
TABLE 2: DETAILS OF THE REVIEWER	10
TABLE 3: SHAFTS AND ASSOCIATED INFRASTRUCTURE	11
TABLE 4: DMR TARIFFS USED FOR QUANTUM DETERMINATION (2005 ESCALATED RATES TO 2015)	22
TABLE 5: SUMMARY OF THE CLOSURE COST CALCULATION	23

## LIST OF APPENDICES

APPENDIX 1: Locality map

## REFERENCES

Department of Minerals and Energy. 2005. Guideline document for the evaluation of the quantum of closure-related financial provision provided by a mine. Government printer.



## DEFINITIONS

### Environment

The surroundings (biophysical, social and economic) within which humans exist and that are made up of

- the land, water and atmosphere of the earth;
- micro-organisms, plant and animal life;
- any part or combination of (i) and (ii) and the interrelationships among and between them; and
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

### Environmental Impacts

Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.

### Financial Provision

The insurance, bank guarantee, trust fund or cash that applicants for or holders of a right or permit must provide in terms of sections 41 and 89 of the MPRDA, guaranteeing the availability of sufficient funds to undertake the agreed work programmes and to rehabilitate the prospecting, mining, reconnaissance, exploration or production areas, as the case may be.

### Land use

The various ways in which land may be employed or occupied. Planners compile, classify, study and analyse land use data for many purposes, including the identification of trends, the forecasting of space and infrastructure requirements, the provision of adequate land area for necessary types of land use, and the development or revision of comprehensive plans and land use regulations.

### Pollution

means any change in the environment caused by -

- (i) substances;
- (ii) radioactive or other waves; or
- (iii) noise, odours, dust or heat,

emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and



productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

## **Pollution Prevention**

Any activity that reduces or eliminates pollutants prior to recycling, treatment, control or disposal.

## **Topography**

Topography, a term in geography, refers to the "lay of the land" or the physio-geographic characteristics of land in terms of elevation, slope and orientation.

## **Vegetation**

All of the plants growing in and characterising a specific area or region; the combination of different plant communities found there.

## **Waste**

Waste is unwanted or undesired material left over after the completion of a process. "Waste" is a human concept: in natural processes there is no waste, only inert end products.





## ABBREVIATIONS

<b>DMR</b>	- Department of Mineral Resources
<b>EMP</b>	- Environmental Management Programme
<b>ha</b>	- Hectares
<b>LOM</b>	- Life of Mine
<b>MPRDA</b>	- Mineral and Petroleum Resource Development Act
<b>MWP</b>	- Mining works programme
<b>NEMA</b>	- National Environmental Management Act
<b>P&amp;G</b>	- Preliminary and general



# 1. INTRODUCTION

China African Precious Metals (CAPM) - Orkney Gold Mine is located in the Matlosana local municipality that falls under the Dr Kenneth Kaunda district municipality in the North West Province. The mine consists of 7 shafts, of which none are currently operational.

Shangoni Management Services (Pty) Ltd was appointed to review the closure cost related to those activities that CAPM are responsible for at the Orkney mine. The closure cost review focused on the premature closure cost, i.e. the immediate closure should mine operations discontinue. This report provides the necessary information to support the calculations of the closure cost assessments as detailed in Appendix 1. A detailed assessment was conducted of all the infrastructure and activities taking place on site that fall within the area of responsibility of the Orkney Mine.

## 1.1 Applicant

**Table 1: Details of the mine and mine owner**

<b>Details of the Mine owner</b>	China Africa Precious Metal (Pty) Ltd - Orkney Mine
	Private Bag X10 Orkney 2619
	1A Milton Avenue Orkney 2620
<b>Farm name and portion on which the activities take place</b>	Portion 167 of Portion 4 of the farm Nooitgedacht No 434-IP and Portion 168 of Portion 101 of the farm Modderfontein No 440-IP, Orkney

## 1.2 Appointed reviewer

**Table 2: Details of the reviewer**

Name of firm	Shangoni Management Services
Postal address	P.O. Box 74726 Lynnwood Ridge 0040
Telephone No.	(012) 807 7036



Fax	(012) 807 1014	
E-mail	emma@shangoni.co.za	
Team of Environmental Assessment Practitioners on project		
Name	Qualifications	Responsibility
Jan Nel	M.Sc. Env. Man (UFS)	Project lead
Emma Fourie	B.Sc. (Hons) Env. Man. (NWU)	Quantum review & report compilation

### 1.3 List of surface infrastructure

The table below provides a summary of the infrastructure associated with each shaft:

**Table 3: Shafts and associated infrastructure**

Shaft No.	Infrastructure
1	<ul style="list-style-type: none"> <li>• Shaft &amp; associated infrastructure;</li> <li>• Parking areas;</li> <li>• Offices;</li> <li>• Cooling plant,</li> <li>• Water tower,</li> <li>• Cement dam, and</li> <li>• Workshops.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Shaft &amp; associated infrastructure;</li> <li>• Hostel buildings;</li> <li>• Parking areas;</li> <li>• Offices;</li> <li>• Fans; and</li> <li>• Workshops.</li> </ul>
3	The area at Shaft 3 consists mainly of building rubble, as most of the infrastructure had been demolished. The shaft has been plugged.
4	<ul style="list-style-type: none"> <li>• Shaft &amp; associated infrastructure;</li> <li>• Hostel buildings;</li> <li>• Parking areas;</li> <li>• Offices;</li> </ul>



	<ul style="list-style-type: none"> <li>• Plant buildings; and</li> <li>• Workshops.</li> </ul>
5	<ul style="list-style-type: none"> <li>• Shaft &amp; associated infrastructure;</li> <li>• Hostel buildings;</li> <li>• Cooling plant.</li> </ul>
6	<ul style="list-style-type: none"> <li>• Shaft &amp; associated infrastructure;</li> <li>• Offices;</li> <li>• Workshops;</li> <li>• Parking area.</li> </ul>
7	<ul style="list-style-type: none"> <li>• Shaft &amp; associated infrastructure;</li> <li>• Offices;</li> <li>• Workshops;</li> <li>• Parking area.</li> </ul>
Satellite office	<ul style="list-style-type: none"> <li>• Offices and associated infrastructure</li> </ul>
Fans	<ul style="list-style-type: none"> <li>• Veldt fan</li> <li>• Kanana fan</li> <li>• Orkney Fan</li> </ul>

Maps indicating the location of each shaft and associated infrastructure are attached to this document in Appendix 1.

## 1.4 Assumptions

As part of the calculation of the closure cost certain assumptions needs to be made. The assumptions supporting the immediate closure costing are the following:

- The provision was determined considering all the successfully completed concurrent rehabilitation activities (shaft 3 and 5) indicated on the latest plans and measurements provided by the CAPM mine surveyor.
- Total brick work and steel work were provided by the CAPM mine surveyor. This information was incorporated into the calculation to determine the quantum. It is assumed that this information is correct as no reference plan or map was provided to support the calculation.
- The surface area at Shaft 3 has been included for cleaning and monitoring purposes only.



- Shaft 3 has been plugged.
- No allowances have been made for money received from sale of equipment, recyclable materials, structures, vehicles or the hiring out of infrastructure.
- No allowances have been made for reuse of buildings and infrastructure, although a significant number of buildings can be reused if not utilised by the mine.
- All Shafts will be plugged as per the DMR requirements.
- All infrastructure will be demolished and disposed of, should no sustainable post-closure/future use be identified.
- Negotiations will commence with parties such as the local municipalities and other government organizations that can utilise infrastructure that will not be used by the mine for mining related purposes.
- All mine residue deposits (tailings storage facility) and waste rock dumps are excluded from the calculation as these dumps are no the responsibility of CAPM –Orkney mine.



## 2. APPLICABLE LEGISLATION AND GUIDELINES

### 2.1 National Environmental Management Act, 1998 (Act No. 107 of 1998)

Section 24P of NEMA, 1998, states the following:

(1) An applicant for an environmental authorisation relating to prospecting, mining, exploration, production or related activities on a prospecting, mining, exploration or production area must make the prescribed financial provision for the rehabilitation, management and closure of environmental impacts, before the Minister of Minerals and Energy issues the environmental authorisation.

(2) If any holder or any holder of an old order right fails to rehabilitate or to manage any impact on the environment, or is unable to undertake such rehabilitation or to manage such impact, the Minister of Minerals and Energy may, upon written notice to such holder, use all or part of the financial provision contemplated in subsection (1) to rehabilitate or manage the environmental impact in question.

(3) Every holder must annually assess his or her environmental liability and, if circumstances so require, must adjust his or her financial provision to the satisfaction of the Minister of Minerals and Energy.

(4) (a) If the Minister of Minerals and Energy is not satisfied with the assessment and financial provision contemplated in this section, the Minister of Minerals and Energy may appoint an independent assessor to conduct the assessment and determine the financial provision.

(b) Any cost in respect of such assessment must be borne by the holder in question.

(5) The requirement to maintain and retain the financial provision contemplated in this section remains in force until the Minister of Minerals and Energy issues a certificate to such holder, but the Minister of Minerals and Energy may retain such portion of the financial provision as may be required to rehabilitate the closed mining or prospecting operation in respect of latent or residual environmental impacts.

(6) The Insolvency Act, 1936 (Act No. 24 of 1936), does not apply to any form of financial provision contemplated in subsection (1) and all amounts arising from that provision.



(7) The Minister, or an MEC in concurrence with the Minister, may in writing make subsections (1) to (6) with the changes required by the context applicable to any other application in terms of this Act.

## **2.2 MPRDA**

### **2.2.1 Financial provision for remediation of environmental damage**

Section 41 of MPRDA requires the following:

- An applicant for a right must provide the prescribed financial provision for the rehabilitation or management of negative environmental impacts before the EMP can be approved.
- If the holder of a right fails to rehabilitate or manage, or is unable to undertake such rehabilitation or to manage any negative impact on the environment, the Minister may use all or part of the financial provision to rehabilitate or manage the negative environmental impact in question.
- The requirement to maintain and retain the financial provision remains in force until the Minister issues a certificate in terms of section 43 to such holder, but the Minister may retain such portion of the financial provision as may be required to rehabilitate the closed mining or prospecting operation in respect of latent or residual environmental impacts.

### **2.2.2 Issuing of a closure certificate**

Section 43 of the act addresses the issuing of a closure certificate and mentions the following:

- The holder of the right remains responsible for any environmental liability, pollution or ecological degradation, and the management thereof, until the Minister has issued a closure certificate to the holder concerned.

## **2.3 Removal of buildings, structures and other objects**

Section 44 of the act describes the removal of infrastructure or objects prior to closure and requires that the following approach is followed:

- When a right lapses, is cancelled or is abandoned or when any prospecting or mining operation comes to an end, the holder of any such right or permit may not demolish or remove any building, structure or object-
  - which may not be demolished or removed in terms of any other law;
  - which has been identified in writing by the Minister for purposes of this section; or
  - which is to be retained in terms of an agreement between the holder and the owner or occupier of the land, which agreement has been approved by the Minister in writing.



## **2.4 Regulation R527 of the Mineral and Petroleum Resource Development Act, 2002 requirements.**

### **2.4.1 Methods for financial provision**

Regulation 53 makes provision for various methods of establishing a fund to support the quantum calculated. The options include the following:

- An approved contribution to a trust fund
- a financial guarantee from a South African registered bank or any other bank or financial institution approved by the Director-General
- a deposit into the account specified by the Director-General in the format as approved by the Director-General from time to time; or
- any other method as the Director-General may determine.

### **2.4.2 Quantum of financial provision**

Regulation 54 of the act provides guidance on what should be used when calculating the quantum for financial provision. It includes the following:

- premature closure regarding-
  - the rehabilitation of the surface of the area
  - the prevention and management of pollution of the atmosphere; and
  - the prevention and management of pollution of water and the soil; and
  - the prevention of leakage of water and minerals between subsurface formations and the surface.
- decommissioning and final closure of the operation; and
- post closure management of residual and latent environmental impacts.

### **2.4.3 Principles for mine closure**

Regulation 56 states the following with regards to closure principles.

In accordance with applicable legislative requirements for mine closure, the holder of a right must ensure that-

- the closure of a prospecting or mining operation incorporates a process which must start at the commencement of the operation and continue throughout the life of the operation;
- risks pertaining to environmental impacts must be quantified and managed pro-actively, which includes the gathering of relevant information throughout the life of a prospecting or mining operation;
- residual and possible latent environmental impacts are identified and quantified;





- the land is rehabilitated, as far as is practicable, to its natural state, or to a predetermined and agreed standard or land use which conforms with the concept of sustainable development.

#### 2.2.4 Application for closure certificate

Regulation 57 describes the process that must be applied when an application is made for a closure certificate.

- An application for a closure certificate by the holder of a right must be completed in the form of Form P;
- The application must be accompanied by the following documentation-
  - A closure plan containing the following:
    - a description of the closure objectives and how these relate to the prospecting or mine operation and its environmental and social setting;
    - a plan contemplated in regulation 2(2), showing the land or area under closure;
    - a summary of the regulatory requirements and conditions for closure negotiated and documented in the environmental management programme or environmental management plan, as the case may be;
    - a summary of the results of the environmental risk report and details of identified residual and latent impacts;
    - a summary of the results of progressive rehabilitation undertaken;
    - a description of the methods to decommission each prospecting or mining component and the mitigation or management strategy proposed to avoid, minimize and manage residual or latent impacts;
    - details of any long-term management and maintenance expected;
    - details of a proposed closure cost and financial provision for monitoring, maintenance and post closure management;
    - a sketch plan drawn on an appropriate scale describing the final and future land use proposal and arrangements for the site;
    - a record of interested and affected persons consulted; and
    - technical appendices, if any.
  - an environmental risk report contemplated in regulation 60;
  - a final performance assessment report contemplated in regulation 55(9).

#### 2.2.5 Closure objectives

Regulation 61 is clear on the setting of closure objectives and the requirements on the inclusion in the EMP. The requirements include the following:

Closure objectives form part of the draft environmental management programme or environmental management plan, as the case may be, and must-



- Identify the key objectives for mine closure to guide the project design, development and management of environmental impacts;
- provide broad future land use objective(s) for the site; and
- provide proposed closure costs.

### 3. COST CALCULATION GUIDELINES

#### 3.1 DMR closure cost calculation guideline

The personnel within the Department of Mineral Resources (DMR) Regional Offices are required to review and approve the quantum, that is, the monetary value of the financial provision that has been computed by the holder of a prospecting right, mining right or mining permit during the annual review as being sufficient to cover the environmental liability at that time and at closure of the mine. This guideline document entitled “Guideline document for the evaluation of financial provision made by the mining industry” has been developed to address this need, and is for use by the DMR personnel in the Regional Offices.

The guideline for the calculation of closure cost issued by DMR in 2005 was used to support the calculation of the closure cost quanta.

The tariffs used in the guideline document have been increased to support inflation increases since 2005. Tariffs were increase, as per the DMR guideline, by 6% per annum based on the inflation levels as documented by the Reserve Bank of South Africa.



## 4. CLOSURE COMMITMENTS

### 4.1 Closure objectives

The following post-closure objectives have been identified by the mine in the EMPR, reference number NW30/5/1/2/2/76MR:

- To achieve the optimal form of land use for the mining right area commensurate with the needs of local communities and South Africa as a whole;
- To achieve closure within a realistic financial framework which is acceptable to the stakeholders involved;
- To leave behind a land use and infrastructure assets which meets the needs of the present without compromising the ability of future generations to meet their own needs;
- To ensure that all arable land, grazing land, wetland and wilderness areas are left behind as self-sustaining land assets for the use of future generations; and
- To ensure, as far as is practically possible, that all mining infrastructure, which cannot be used or demolished, is rendered safe to humans and animals alike.

#### Geology and the mineral resource

- The removal of material from underground shall not adversely affect the geology.

#### Topography

- To reduce the visual impact of the altered topography by a process of reclamation and rehabilitation
- To dispose of saleable assets

#### Soils

- To identify alternate use of as much of the infrastructure as possible
- To the extent to which it is reasonably feasible to do, to remove infrastructure not required in situ and restore the land to grassland.
- To cover mining areas with sufficient soil in order to maintain vegetation.
- To treat all soil pollution found during rehabilitation.

#### Land capability, surrounding land use and landscape character

- To identify alternate use of as much of the infrastructure as possible
- To the extent which it is reasonably feasible to do, to remove infrastructure not required in situ and restore the land to grassland
- Investigate what infrastructure can have alternative uses
- Remove all un-sealable infrastructures where it is reasonably feasible to do so.



- Reinstatement of mining land to grasslands infrastructure where it is reasonably feasible to do so.
- To hand over land to a person interested in developing the land.

#### Natural vegetation

- To achieve self-sustaining vegetation on all rehabilitated areas.
- To treat soil allowing vegetation to sow itself in areas not implemented for other use.

#### Surface water

- To minimise the risk of escape of polluted water from the mine property into natural watercourses.
- To reduce, as far as reasonably feasible, the contamination of surface water thus obviating the need to treat excessive quantities of polluted water.
- To measure water quality chemical/bacteriological and submit reports – action any anomalies.

#### Groundwater

- Minimise all long-term effects which individual facilities may have in terms of quality on other groundwater users.
- To measure water quality chemical/bacteriological and submit reports – action any anomalies.

#### Air quality

- Dust emanating from rehabilitated land should not exceed normal levels associated with agricultural and residential areas.
- To remove the surface fans and seal off the up and down cast shafts.

#### Noise

- To remove all sources with noise levels above 85 dBA.

#### Visual aspects

- Limit long-term visual impact of mining activities.
- No excessive expenditure on structures such as head gears.

#### Regional socio-economic aspects

- To leave structures and infrastructures for future use where appropriate
- To hold meetings with I&APs and communicate any changes
- To hand over to any persons interested to take-over property after closure



## 5. CURRENT CLOSURE PROVISION

The financial provision for premature closure of CAPM Orkney Mine was calculated in December 2012 for the amount of **R165 100 644.93**. An amount of **R43 296 259.90** (22 January 2015) is currently provided for in a trust fund.

The DMR rates have been increased from the original basis rates of 2005 by 6% on an annual basis. Applying the DMR rates the premature closure quantum has been calculated in 2015 at **R206 552 739.20**. The trust fund shortfall amounts to R163 256 497.30.

Reasons for the increase from 2012 to 2015 include:

- Escalation of the DMR rates by 6% per annum from 2012 to 2015;
- Structures that had previously been excluded from the closure liability, such as the satellite offices, recreational club and veld fans, were measured by the mine surveyor and included in the 2015 calculation;
- Updated survey plans were utilised for structure measurements.

### 5.1 Knowledge gaps

The following gaps in knowledge or opportunities have been identified:

- The heritage value of mining structures has not been evaluated. A heritage assessment could identify structures with historical value that may not be demolished.
- Asbestos in mine structures may increase closure costs. An asbestos survey was done by CAPM.
- The mine does not have a rehabilitation plan or closure plan.
- No formal assessment has been performed to determine the potential secondary use of infrastructure. This may support the decrease of the quantum in future if structures such as hostels and the satellite office can be removed from the mining area.



## 6. INFORMATION USED FOR CALCULATING THE QUANTUM

### 6.1 Process followed

A detailed site assessment was conducted on the 22<sup>nd</sup> of January 2015 to identify all the relevant infrastructure and actions that would need to be included in the calculation of the financial provision. Survey plans were used to identify and mark the shafts and related infrastructure. Once this was complete a list of infrastructure was compiled. The infrastructure was classified in accordance with the tariffs list and the surface areas of the infrastructure were calculated to determine the volume or surface requiring rehabilitation or demolition.

A detailed list has been attached as Appendix 1.

### 6.2 Tariffs

**Table 4: DMR Tariffs used for quantum determination (2005 escalated rates to 2015)**

	Description	Rate
1	Dismantling of processing plant and related structures (Including overland conveyors and power lines)	R12.94
2a	Demolition of steel buildings and structures	R180.34
2b	Demolition of reinforced concrete buildings and structures	R265.75
3	Rehabilitation of access roads	R32.26
4a	Demolition and rehabilitation of electrified railway lines	R313.35
4b	Demolition and rehabilitation of non-electrified railway lines	R170.85
5	Demolition of housing and/or administration facilities	R360.68
6	Opencast rehabilitation including final voids and ramps	R189,070.54
7	Sealing of shafts, adits and inclines	R96.81
8a	Rehabilitation of overburden and spoils	R126,047.02
8b	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	R156,989.29
8c	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	R455,971.31
9	Rehabilitation of subsided areas	R105,545.37
10	General surface rehabilitation	R99,850.51
11	River diversions	R99,850.51
12	Fencing	R113.89
13	Water management	R5,300.00
14	2 to 3 years of maintenance and aftercare	R13,288.08



### 6.3 Closure cost calculation

The following table contains a summary of the calculations made for the premature closure cost.

**Table 5: Summary of the closure cost calculation**

No	Description	Unit	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rand)
		Step 4.5	Step 4.3	Step 4.3	Step 4.4		
2(A)	Demolition of steel buildings and structures	m2	21495	R 180.33	1	1.1	R4,263,853.65
2(B)	Demolition of reinforced concrete buildings and structures	m2	356192	R 265.75	1	1.1	R104,124,374.97
5	Demolition of housing and/or administration facilities	m2	144287	R 360.68	1	1.1	R57,244,844.66
7	Sealing of shafts, adits and inclines	m3	20320	R 96.81	1	1.1	R2,163,802.81
10	General surface rehabilitation	ha	7.4439	R 99,850.51	1	1.1	R817,604.90
						Sub Total	<b>R168,614,480.98</b>
	Preliminary and General		12.5% of Subtotal 1				R21,076,810.12
	Contingency		10.0% of Subtotal 1				R16,861,448.10
<b>Total</b>							<b>R206,552,739.20</b>



## Appendix 1 – Locality map

