Annex D

Environmental Management Programme
Draft Environmental Management Programme for the Gamsberg Zinc Mine and Associated Infrastructure in the Northern Cape

Black Mountain Mining (Pty) Ltd

April 2013

www.erm.com
## Revision Description Sheet

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<th>Rev.</th>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## CONTENTS

### ANNEXURES

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANNEXURES</td>
<td>6</td>
</tr>
</tbody>
</table>

### ABBREVIATIONS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABBREVIATIONS</td>
<td>6</td>
</tr>
</tbody>
</table>

### DEFINITIONS AND TERMINOLOGY

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFINITIONS AND TERMINOLOGY</td>
<td>7</td>
</tr>
</tbody>
</table>

### INTRODUCTION

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

#### 1.1 PROJECT RESPONSIBILITY AND MANAGEMENT FRAMEWORK

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
</tr>
</tbody>
</table>

#### 1.2 OBJECTIVES OF THE EMPR

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
</tr>
</tbody>
</table>

#### 1.3 LEGISLATIVE REQUIREMENTS FOR AN EMPR

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.1 National Environmental Management Act (107 of 1998) (NEMA)</td>
<td>18</td>
</tr>
<tr>
<td>1.3.2 Minerals and Petroleum Resources Development Act (28 of 2002) (MPRDA)</td>
<td>20</td>
</tr>
</tbody>
</table>

#### 1.4 STRUCTURE OF THE EMPR

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
</tr>
</tbody>
</table>

#### 1.5 EXPERTISE OF ESIA TEAM

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
</tr>
</tbody>
</table>

### SUMMARY OF PROJECT DESCRIPTION

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>25</td>
</tr>
</tbody>
</table>

### DESCRIPTION OF AFFECTED ENVIRONMENT

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>35</td>
</tr>
</tbody>
</table>

#### 3.1 AREA OF INFLUENCE

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
</tr>
</tbody>
</table>

#### 3.2 SUMMARY OF KEY ENVIRONMENTAL ASPECTS

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
</tr>
</tbody>
</table>

#### 3.2.1 Climate and topography

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
</tr>
</tbody>
</table>

#### 3.2.2 Water sources

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
</tr>
</tbody>
</table>

#### 3.2.3 Ecological Habitat

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
</tr>
</tbody>
</table>

#### 3.2.4 Socio-economic

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
</tr>
</tbody>
</table>

### IMPACT ASSESSMENT AND SPECIALIST STUDIES

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>39</td>
</tr>
</tbody>
</table>

#### 4.1 SUMMARY OF IMPACT ASSESSMENT

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
</tr>
</tbody>
</table>

#### 4.2 PUBLIC PARTICIPATION PROCESS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2.1 Objectives of public participation</td>
<td>43</td>
</tr>
</tbody>
</table>

### IMPLEMENTATION OF THE EMPR

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>47</td>
</tr>
</tbody>
</table>

#### 5.1 INTRODUCTION

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
</tr>
</tbody>
</table>

#### 5.2 LEGAL OBLIGATIONS

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
</tr>
</tbody>
</table>

#### 5.3 ROLES AND RESPONSIBILITIES

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3.1 The Developer</td>
<td>48</td>
</tr>
<tr>
<td>5.3.2 Site Engineer</td>
<td>50</td>
</tr>
</tbody>
</table>
5.3.3 The Contractor 50
5.3.4 Environmental Control Officer 51
5.4 SITE MEETINGS DURING THE CONSTRUCTION PHASE 52
5.5 ENVIRONMENTAL AWARENESS PROGRAMME 53
5.6 METHOD STATEMENTS 53
5.7 ECO DIARY ENTRIES 54
5.8 SITE MEMO ENTRIES 55
5.9 GRIEVANCE MECHANISM 55
5.10 COMMUNITY RELATIONS 55
5.11 SOCIAL RESPONSIBILITIES 56

6 PLANNING AND DESIGN PHASE EMPR 57

6.1 SCOPE 57
6.2 APPLICATION 57
6.3 PRE-CONSTRUCTION REQUIREMENTS 57
6.3.1 TSF Liner Requirements 57
6.3.2 Refinement of Design 57
6.3.3 Biodiversity Offsetting Process 58
6.3.4 Permit Requirements 59
6.3.5 Tender Documentation 61
6.3.6 Additional Pre – Construction Requirements 62
6.4 DESIGN AND PLANNING COMPLIANCE 62
6.4.1 Generic design and planning requirements: 62
6.4.2 Waste management and classification design and planning requirements 72

7 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME (CEMPr) 77

7.1 SCOPE 77
7.2 APPLICATION 77
7.3 METHOD STATEMENTS 77
7.3.1 Environmental Awareness Training 79
7.3.2 Temporary Construction Camp and Site Division 79
7.3.3 Vegetation Clearing 79
7.3.4 Access/Haul Routes 79
7.3.5 Fuel Storage and Use 79
7.3.6 Solid Waste Management 79
7.3.7 Contaminated Water 80
7.3.8 Hazardous Substances 80
7.3.9 Cement and Concrete Batching 80
7.3.10 Emergency Procedures and Equipment 80
7.3.11 Erosion and Sedimentation Control 80
7.3.12 Blasting 81
7.3.13 Traffic management 81
7.4 SITE ESTABLISHMENT 81
7.4.1 Site Division 81
7.4.2 Site Demarcation 81
7.4.3 Site Clearance 81
7.4.4 Access Routes/ Haul Roads
7.5 GENERAL REQUIREMENTS
7.5.1 Materials Handling, Use and Storage
7.5.2 Fuel (Petrol and Diesel) and Oils (Heavy fuel oils included)
7.5.3 Solid Waste Management
7.5.4 Ablution Facilities
7.5.5 Eating Areas
7.5.6 Drinking Water
7.5.7 Contaminated Water
7.5.8 Hazardous Substances
7.5.9 Site Structures
7.5.10 Lights
7.5.11 Workshop, Equipment Maintenance and Storage
7.5.12 Noise
7.5.13 Environmental Awareness Training
7.5.14 Contractor’s Environmental Officer
7.5.15 "No go" Areas
7.5.16 Construction Personnel Information Posters
7.5.17 Fire Control
7.5.18 Concrete and Cement Work
7.5.19 Emergency Procedures
7.5.20 Safety
7.5.21 Security
7.5.22 Community Relations
7.5.23 Protection of Natural Features
7.5.24 Protection of Flora and Fauna
7.5.25 Erosion and Sedimentation Control
7.5.26 Aesthetics
7.5.27 Dust Control
7.5.28 Pollution
7.5.29 Working Hours
7.5.30 Excavation and Trenching
7.5.31 Stockpiling
7.5.32 Temporary Site Closure
7.6 SITE CLEAN UP AND REHABILITATION
7.6.1 Site Clean Up
7.6.2 Rehabilitation
7.7 TOLERANCES
7.8 MEASUREMENT AND PAYMENT
7.8.1 Basic Principles
7.8.2 Scheduled Items
7.9 CONSTRUCTION PHASE COMPLIANCE: SUMMARY TABLES
7.10 AIR QUALITY AND DUST
7.11 HYDROLOGY
7.12 HYDROGEOLOGY
7.13 BIODIVERSITY MANAGEMENT
7.14 NOISE AND VIBRATION
7.15 SOCIAL
7.16 ECONOMIC
8 OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME (OEMPr) 122

8.1 SCOPE 122
8.2 AIM AND PURPOSE OF THE OEMPr 122
8.3 APPLICATION 122
8.3.1 Environmental Liaison Committee (ELC) 123
8.3.2 Black Mountain Mining 123
8.3.3 Environmental Site Manager (ESM) 123
8.3.4 Independent Environmental Auditor 124
8.4 FINANCING FOR ENVIRONMENTAL MANAGEMENT 124
8.5 DETAILED OPERATIONAL ENVIRONMENTAL SPECIFICATIONS 125
8.5.1 Litter and Waste Management 125
8.5.2 Maintenance of Development 126
8.5.3 Emergency Procedures 126
8.5.4 Operational EMPr Review and Audit 127
8.6 SUMMARY OF OPERATIONAL ENVIRONMENTAL SPECIFICATIONS 127
8.7 AIR QUALITY AND DUST 128
8.8 HYDROLOGY 129
8.9 HYDROGEOLOGY 130
8.10 CLIMATE CHANGE 132
8.11 GREEN HOUSE GAS EMISSIONS 132
8.12 BIODIVERSITY MANAGEMENT 133
8.13 NOISE AND VIBRATION 137
8.14 SOCIAL MITIGATION AND ENHANCEMENT MEASURES 138
8.15 ECONOMIC MITIGATION AND ENHANCEMENT MEASURES 142
8.16 CULTURAL HERITAGE, ARCHAEOLOGY AND PALAEONTOLOGY 143
8.17 TRAFFIC AND TRANSPORT 144
8.18 VISUAL AMENITY AND LIGHTING 146

9 DECOMMISSIONING, POST CLOSURE AND REHABILITATION 148

9.1 SCOPE 148
9.2 CLOSURE AIM AND OBJECTIVES 148
9.3 PROPOSED DECOMMISSIONING METHODS AND MANAGEMENT STRATEGIES 149
9.4 FINANCIAL PROVISION 150
9.5 SUGGESTIONS FOR POST MINING LANDUSE 151
ANNEXURES

Annex A: Draft Decommissioning and Closure Plan (including Preliminary Financial Estimation)

Annex B: Vedanta Policies

ABBREVIATIONS

<table>
<thead>
<tr>
<th>AEL</th>
<th>Atmospheric Emissions License</th>
</tr>
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<tbody>
<tr>
<td>BMM</td>
<td>Black Mountain Mining (Pty) Ltd</td>
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<td>CEMPr</td>
<td>Construction Environmental Management Programme</td>
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<td>DEA</td>
<td>Department of Environmental Affairs</td>
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<td>DENC</td>
<td>Department of Environment and Nature Conservation</td>
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<td>DMR</td>
<td>Department of Mineral Resources</td>
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<td>DWA</td>
<td>Department of Water Affairs</td>
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<td>EA</td>
<td>Environmental Authorisation</td>
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<td>Environmental Control Officer</td>
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<td>Environmental Liaison Committee</td>
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<td>EMP</td>
<td>Environmental Management Plan</td>
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<td>EMPr</td>
<td>Environmental Management Programme</td>
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<td>HNC</td>
<td>Heritage Northern Cape</td>
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<td>MPRDA</td>
<td>Minerals and Petroleum Resources Development Act (28 of 2002)</td>
</tr>
<tr>
<td>NCNCA</td>
<td>Northern Cape Nature conservation Act (No 9 of 2009)</td>
</tr>
<tr>
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</tr>
<tr>
<td>NEM: AQA</td>
<td>National Environmental Management: Air Quality Act (39 of 2008)</td>
</tr>
<tr>
<td>NEM: BA</td>
<td>National Environmental Management Act: Biodiversity Act (10 of 2004)</td>
</tr>
<tr>
<td>NFA</td>
<td>National forestry Act (30 of 1998)</td>
</tr>
<tr>
<td>NHRA</td>
<td>National Heritage Resources Act (25 of 1999)</td>
</tr>
<tr>
<td>NWA</td>
<td>National Water Act (36 of 1998)</td>
</tr>
<tr>
<td>OEMPr</td>
<td>Operational Environmental Management Programme</td>
</tr>
<tr>
<td>OHS</td>
<td>Occupational Health and Safety Act (85 of 1998)</td>
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<tr>
<td>SAHRA</td>
<td>South African Heritage Resource Agency - the statutory national body responsible for heritage resource management.</td>
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<td>WML</td>
<td>Waste Management License</td>
</tr>
</tbody>
</table>
DEFINITIONS AND TERMINOLOGY

**Bund:** Enclosure under / around a storage facility to contain any spillage.

**Batch plant:** Site for the large-scale mixing and production of concrete or plaster, and associated equipment and materials.

**Contractor:** The principal persons /company undertaking the construction of the Development.

- The main contractor as engaged by the Developer;
- Selected subcontractors; and
- Any other contractor from time to time engaged by the Developer directly in connection with the construction part of the Works.

**Contaminated water:** Water contaminated by the Contractor's activities, e.g., concrete water and runoff from plant/ personnel wash areas.

**Construction camp:** The area designated for all temporary site offices, storage sheds and areas, parking areas, maintenance workshops, staff welfare facilities, accommodation, etc.

**Construction Environmental Management Programme (CEMPr):** The construction phase Environmental Management Programme, containing the Environmental Specifications for Civil and Building Works, also forming part of the civils and building contract documentation.

**Engineer:** A person representing the Developer on site and who is responsible for the technical and contractual implementation of the works to be undertaken. This is usually the engineer, but may be any other person, such as an architect or project manager, authorized by the Developer to fulfil this role.

**Environment:** The surroundings within which humans exist and that are made up of the land, water and atmosphere of the earth, *viz.*:

- micro-organisms, plant and animal life;
- any part or combination of the above and the inter-relationships among and between them; and
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

**Environmental Education Programme:** An environmental education course for the Contractor’s management staff and labour force, which informs them
of the requirements of the CEMPr. The ECO will present and co-ordinate such courses.

**Environmental Control Officer (ECO):** The individual or company appointed by the Developer to ensure the implementation of the CEMPr and suitable environmental management practices on site for the duration of the construction phase of the project.

**Environmental Liaison Committee (ELC):** The committee responsible for implementing, amending and monitoring the application of the OEMPr. This shall be made up of representatives of the facility management and local authority.

**Method Statement:** A written submission by the Contractor to the Engineer and ECO in response to the Specifications or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is enabled to assess whether the Contractor’s proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

The Method Statement shall cover applicable details with regard to:

- construction procedures;
- materials and plant to be used;
- transport of materials and plant to and from site;
- how the plant/material will be moved while on site;
- how and where material will be stored;
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- timing and location of activities;
- compliance/non-compliance with the Specifications; and
- any other information deemed necessary by the Engineer.

**No Go Areas:** Areas identified as being environmentally sensitive in some manner and delineated on plan, and on the site with pegs or fencing, and which are out of bounds to unauthorised persons. Authorisation must be obtained prior to entry.

**Operational Environmental Management Programme (OEMPr):** The operation phase Environmental Management Programme, containing the Environmental Specifications for the ongoing maintenance and operational activities, also forming part of the contract documentation.
Potentially hazardous substance: A substance which, in the reasonable opinion of the Engineer, can have a deleterious effect on the environment.

Reasonable: Means, unless the context indicates otherwise, reasonable in the opinion of the Engineer after he has consulted with a person, not an employee of the Employer, suitably experienced in "environmental implementation plans" and "environmental management programmes" (both as defined in the National Environmental Management Act (No 107, 1998)).

Site: The boundary and extent of Development works and infrastructure, including any areas off the main site on which works are to be carried out in order to allow the Development to proceed successfully.

Solid waste: Means all solid waste, including construction debris, chemical waste, excess cement/concrete, packaging materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

Specification: A technical description of the standards of materials and workmanship that the Contractor is to use in the Works to be executed, the performance of the Works when completed and the manner in which payment is to be made.

Works: The construction operations and all related and incidental works, such as site works, earthworks, installation of services, rehabilitation etc., in connection with the execution and carrying to completion of the Development.

Top material: This refers to any surface material in the construction area, whether it be soil, fine material or stones including vegetation.

Topsoil: Means the top 300 mm of soil and may include vegetation and rocks.
INTRODUCTION

This Environmental Management Programme (EMPr) is the mechanism by which Black Mountain Mining (herein referred to as BMM), a subsidiary of Vedanta Resources Plc., shall manage the significant environmental impacts associated with the Gamsberg zinc mine (referred to as the “Project”), situated near the town of Aggeneys, in the Northern Cape (refer to Locality Map in Figure 1.1 below). It is intended that this EMP will serve both as a checklist and framework to effectively manage the implementation of all environmental mitigation actions and monitoring requirements.

This EMPr has been prepared in line with the requirements of the Vedanta’s corporate standards, which provides the overarching guidance to the company for controlling and managing its construction, operational and decommissioning environmental impacts and aspects. Furthermore, Vedanta’s Technical Standards on Environmental Management is to ensure that BMM manage the impacts to the environment through effective management systems and processes and that work towards improving our environmental performance. This technical standard is aligned with IFC Performance Standards (2012).

Compliance with the South African legislation and regulation is equally a foundation of this document as well as referencing applicable international standards such as the International Finance Corporation (IFC) Performance Standards and related Guidelines.

This EMPr relates specifically to the technical environmental aspects/impacts associated with currently ‘permitted’ activities associated with the Project, as described in this document. Chapter 2 provides a detailed description of the project activities and areas covered by this EMPr, which in summary include, *inter alia*:

- Open pit area, including associated haul roads;
- Zinc concentrator plant and associated infrastructure (storage dams, access roads etc.);
- Closed conveyor system;
- Management of waste streams, including domestic waste from the operations and camp site, waste rock and tailings facility.
- Transport of iron ore concentrate to the transhipment point for export; and
- Support infrastructure and activities such as the contractor camp, maintenance facilities, engineering workshops etc.

(1) Please note that a separate Social Management Plan has not been developed. This EMPr includes mitigation and management measures related to the social environment as well.
Vedanta Health, Safety and Environment (HSE) Policy will act as the guiding framework for the implementation of this EMPr. The Policy is presented below:

**HSE Policy**

At Vedanta Resources plc, we believe in sustainable development and are committed to effective management of health, safety and the environment as an integral part of our business. The health and safety of our employees and any other person who may be impacted by Vedanta’s operations is of paramount importance and our aim is zero harm to people and minimal discharge to the environment.

Vedanta strives to:

- comply with applicable national, regional and local Health, Safety and Environment (HSE) regulations and statutory obligations and other requirements as appropriate. We will develop, implement and maintain HSE management systems aligned with our commitments and beliefs and consistent with world class standards. We will drive continuous improvement in HSE through setting and reviewing targets, assessing and reporting HSE performance, using appropriate best available practice and providing all employees with appropriate training;
- prevent injury and ill health to employees and contractors by providing a safe and healthy working environment and by minimizing risks associated with occupational hazards;
- improve and enhance environmental conditions and assets, reduce or mitigate the environmental impacts to neighbouring communities in areas that we operate including air and water emissions and noise;
- conserve natural resources, through adopting environmentally friendly and energy efficient technology and process improvements. We are committed to managing waste from our operations and we will adopt the principles of waste avoidance, reuse, recycling and beneficial utilization to minimize discharge and disposal to the environment;
- promote a positive HSE culture within our organisation through effective communication, participation and consultation with employees in the workplace;
- implement regular health surveillance and risk-based monitoring of employees;
- influence our contractors and suppliers to adopt principles and practices adopted by us and in accordance with our own policies;
- communicate with all our stakeholders on the progress and performance of HSE management.

Each Vedanta business shall sign up to this policy or develop an equivalent which shall be implemented throughout the business. We will measure and report progress against this policy and review performance on a periodic basis to ensure ongoing management of health, safety and the environment. The content and implementation of this policy will be reviewed periodically and sections taken accordingly including the sharing of good practices throughout the Vedanta organisation.

Signed by: [Signature]

[Name]
SE, Vedanta Resources plc

Date: 21st September 2011

### 1.1 PROJECT RESPONSIBILITY AND MANAGEMENT FRAMEWORK

In 1988, Anglo American Corporation acquired BMM and completed prefeasibility and feasibility investigations in order to explore the viability of mining the Gamsberg zinc deposit. The feasibility investigations included an ESIA which addressed the open pit mine development together with all associated infrastructure. The necessary approvals for the mining right and associated EMPr were obtained in 2001. An amendment to this EMPr was approved in 2002 to mine a small part of the deposit, underground. An additional amendment was made to the EMPr in 2009 for surface exploration along the north eastern section of Gamsberg.
Apart for the abovementioned EMPr, all other approvals obtained previously by Anglo American have lapsed. Vedanta Resource Plc. has acquired the BMM in 2012, from Anglo American Corporation.

Although BMM is the applicant for this Project, the prescribed standards and policies of Vedanta Resources (as the parent company) were used to inform the ESIA process and the EMPr.

Vedanta Resources Plc. has developed a suite of environmental policies to guide the company’s activities with respect to environmental management. Copies of Vedanta’s Environmental and Social Policies are attached as Annex B of this EMPr. The policies strive to align with IFC Performance Standards (2012), thus achieving international good practice. The following is a list (1) of Vedanta’s environmental polices developed and incorporated into this EMPr:

- Biodiversity Policy;
- Energy and Carbon Policy;
- HIV/ AID Policy;
- Health, Safety and Environment Policy;
- Human Rights Policy;
- Social Policy; and
- Water Management Policy.

BMM, together with Vedanta Resources Plc., are responsible for implementation (and updating if required) of this EMPr at the various stages of the project planning, construction, operation and decommissioning. A detailed team organogram for this Project is presented below.

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(1) A more detailed description of the relevant policies and standards are contained in Chapter 2 the ESIA Report, and associated Annex’s.
Figure 1.2  Project Organogram
The management approach adopted for this Project is one of continual improvement, including planning, implementation, corrective actions and management review:

- The Planning phase considers the Environmental (and other) policies which provide the framework and platform from which the Project is conducted;
- The strategy formulation considers the specific plans, objectives and expected outcomes;
- The implementation phase involves the development and execution of the required processes, guidelines, procedures, instructions, relating to operational control, training and awareness etc.;
- The checking and corrective action phase of the process involves the application of the strategy and supporting processes to all key operational management processes to ensure compliance with the policy and applicable legislation and also identify areas of non-conformity; and
- The management review phase of the cycle involves an organised and structured performance review of all aspects of the business cycle with the ultimate goal of identifying areas for further environmental performance improvement and the setting of appropriate, achievable and measurable objectives and targets to achieve the identified performance improvements. Monitoring of the sites activities and comparing performance against compliance criteria and targets (i.e. key performance indicators) will be a key driver of improvement within the Project. This will take many forms, including audits of project activities and areas of operation and from direct monitoring of the environment (e.g. groundwater quality and levels, noise, dust, etc.). It is critical that the necessary data is not only collected but also analysed for compliance (e.g. regulatory standards), trends and accuracy.
This process to monitor and evaluate will enable BMM to make management decisions based on actual performance against expectations and make informed decisions about whether the environmental objectives are being achieved. Modifications to the project implementation/management/systems can then be made based on an informed understanding of the Project’s performance and where improvements are required. A proactive monitoring and evaluation program will aid BMM in identifying potential issues early in the project life; reducing potential impacts and increasing the likelihood of success for mitigation plans/actions should they be required. The planning and management will be applied to achieve the mitigation and control of the environmental impacts (and aspects) identified for this Project.

1.2 Objectives of the EMPr

The aim of an EMPr is to facilitate appropriate bio-physical and socio-economic environmental controls during all phases of the project. To achieve this, the EMPr must make recommendations for the planning and design (pre-construction/design phase), specify the limitations the contractor must abide by during construction, detail the issues that should be taken cognisance of and indicate specific actions that must be undertaken so as to mitigate all impacts identified and assessed in the ESIA. The EMPr thus specifies the framework within which the contractor(s) must carry out the construction activities. An operational and decommissioning phase management plan is also included in the EMPr and specifies the framework within which the
developer must carry out the operations during the life of mine and during the decommissioning phases of the development.

In addition, the EMPr provides a clear indication of the environmental and social management requirements of each of the role players involved during the construction, operational and decommissioning phases of the Project. Guidance for the implementation of the EMPr is provided, including the management of method statements which are required to be implemented to achieve compliance with the Environmental Specifications. Corrective actions in the event of non-compliance with the EMPr are also defined.

The EMPr is required in order to:

• assist in ensuring continuing compliance with South African legislation, Black Mountain Mining’s Environmental Health and Safety Policy and international good practice;

• provide a mechanism for ensuring that measures identified in the ESIA Report designed to mitigate potentially adverse impacts, are implemented;

• provide a framework for mitigating impacts that may be unforeseen or unidentified until construction is underway;

• provide assurance to regulators and stakeholders that their requirements with respect to environmental and socio-economic performance will be met; and

• provide a framework for compliance auditing and inspection programs.

The EMPr will remain a draft document until it has been updated with the conditions stipulated in the environmental authorisation. From then onwards it is intended to be a living document that The overall EMPr contains sections that specifically deal with the design and planning phase, the construction phase (Construction EMPr), the operational phase (Operational EMPr) and decommissioning and closure plans. This document will address both biophysical and socio-economic aspects, and present these within the various phases of the Project.

1.3 LEGISLATIVE REQUIREMENTS FOR AN EMPR

In light of the nature of the Project, the following legislation, *inter alia* (1), are identified to be applicable:

---

(1) Please note that other applicable legislation, including the National Forest Act, Water Services Act, Northern Cape Nature Conservation Act, Occupational, Health and Safety Act are inherently incorporated into this document.
• National Environmental Management Act (107 of 1998) (NEMA);
• Minerals and Petroleum Resources Development Act (28 of 2002) (MPRDA);
• National Heritage Resources Act (25 of 1999) (NHRA);
• National Environmental Management: Air Quality Act (39 of 2008) (NEM:AQA);
• National Environmental Management Act: Biodiversity Act (10 of 2004) (NEM:BA);
• National Environmental Management: Waste Act (59 of 2008) (NEM:WA); and

Despite the applicability of a suite of legislation, the NEMA and MPRDA are the primary pieces of legislation that govern the content, structure and approach to this EMPr. However, specific mitigation and management requirements in terms of the remaining aforementioned pieces of legislation will be met in this EMPr as well.

The specific legal requirements for an EMPr, as per the NEMA and MPRDA, are presented below, for ease of reference.

1.3.1 National Environmental Management Act (107 of 1998) (NEMA)

In terms of Section 24 (n) of the NEMA, an EMPr is required. Section 33 of the EIA Regulation R543 (2010) outlines specific requirements for the compilation of an EMPr. The specific requirements in terms of the EIA Regulation R543 are as follows:

Table 1.1 Content of draft environmental management programme (Section 33 of the EIA Regulations R543)

<table>
<thead>
<tr>
<th>Relevant Section</th>
<th>Requirements</th>
<th>Applicable Section in EMPr</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>A draft environmental management programme must comply with section 24N of the Act and include –</td>
<td></td>
</tr>
<tr>
<td>33 (a)</td>
<td>details of –</td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>the person who prepared the environmental management programme; and</td>
<td>Section 1.4</td>
</tr>
<tr>
<td>(ii)</td>
<td>the expertise of that person to prepare an environmental management programme</td>
<td>Section 1.4</td>
</tr>
<tr>
<td>33 (b)</td>
<td>information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of—</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>(i)</td>
<td>planning and design;</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>(ii)</td>
<td>pre-construction and construction activities;</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>Relevant Section</td>
<td>Requirements</td>
<td>Applicable Section in EMPR</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>(iii)</td>
<td>operation or undertaking of the activity</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>(iv)</td>
<td>rehabilitation of the environment; and</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>(v)</td>
<td>closure, where relevant.</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>33 (c)</td>
<td>a detailed description of the aspects of the activity that are covered by the draft environmental management programme;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>33 (d)</td>
<td>an identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b)</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>33 (e)</td>
<td>proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>33 (f)</td>
<td>as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development, including, where appropriate, concurrent or progressive rehabilitation measures</td>
<td>Chapter 7 (closure and decommissioning)</td>
</tr>
<tr>
<td>33 (g)</td>
<td>a description of the manner in which it intends to—</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(i)</td>
<td>modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(ii)</td>
<td>remedy the cause of pollution or degradation and migration of pollutants</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(iii)</td>
<td>comply with any prescribed environmental management standards or practices;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(iv)</td>
<td>comply with any applicable provisions of the Act regarding closure, where applicable;</td>
<td>Chapter 7.</td>
</tr>
<tr>
<td>(v)</td>
<td>comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>Relevant Section</td>
<td>Requirements</td>
<td>Applicable Section in EMPr</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>33 (h)</td>
<td>time periods within which the measures contemplated in the environmental management programme must be implemented;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>33 (i)</td>
<td>the process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>33 (j)</td>
<td>an environmental awareness plan describing the manner in which—</td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>the applicant intends to inform his or her employees of any environmental risk which may result from their work; and</td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>risks must be dealt with in order to avoid pollution or the degradation of the environment;</td>
<td></td>
</tr>
<tr>
<td>33 (k)</td>
<td>where appropriate, closure plans, including closure objectives.</td>
<td>Chapter 7</td>
</tr>
</tbody>
</table>

### 1.3.2 Minerals and Petroleum Resources Development Act (28 of 2002) (MPRDA)

Together with the EIA requirements outlined above, this EMPr also meets the specific requirements for the MPRDA. Section 37 of the MPRDA outlines the general requirements for an EMPr, which is tabulated below:

<table>
<thead>
<tr>
<th>Relevant Section</th>
<th>Requirements</th>
<th>Applicable Section in EMPr</th>
</tr>
</thead>
<tbody>
<tr>
<td>39 (1)</td>
<td>Every person who has applied for a mining right in terms of section 22 must conduct an environmental impact assessment and submit an environmental management programme within 180 days of the date on which he or she is notified by the Regional Manager to do so.</td>
<td>This EMPr is attached as an Annex to the ESIA Report.</td>
</tr>
<tr>
<td>39 (2)</td>
<td>Any person who applies for a reconnaissance permission, prospecting right or mining permit must submit an environmental management plan as prescribed.</td>
<td>Not applicable. EMPr is being produced for mining right.</td>
</tr>
<tr>
<td>39 (3)</td>
<td>An applicant who prepares an environmental management programme or an environmental management plan must—</td>
<td></td>
</tr>
<tr>
<td>(a)</td>
<td>establish baseline information concerning the affected environment to determine protection, remedial measures and environmental management objectives;</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>(b)</td>
<td>investigate, assess and evaluate the impact of his or her proposed prospecting or mining operations on—</td>
<td></td>
</tr>
<tr>
<td>(b) (i)</td>
<td>the environment;</td>
<td>Chapter 2</td>
</tr>
</tbody>
</table>
Sections 51 and 52 of the Mineral and Petroleum Resources Development Regulation (2004) outlines the specific requirements for an EMPr and EMP respectively, and must be considered in conjunction with the MPRDA itself. The specific requirements for the Mineral and Petroleum Resources Development Regulation is tabulated below:

Table 1.3  

<table>
<thead>
<tr>
<th>Relevant Section</th>
<th>Requirements</th>
<th>Applicable Section in EMPr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 51: Environmental Management Programme</td>
<td>An environmental management programme contemplated in section 39(1) of the Act must include the following:</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>51</td>
<td>A description of the environmental objectives and specific goals for mine closure;</td>
<td>Chapter 2</td>
</tr>
</tbody>
</table>

### Table 1.3

<table>
<thead>
<tr>
<th>Relevant Section</th>
<th>Requirements</th>
<th>Applicable Section in EMPr</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) (ii)</td>
<td>the socio-economic conditions of any person who might be directly affected by the prospecting or mining operation; and</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>(b) (iii)</td>
<td>any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), with the exception of the national estate contemplated in section 3(2)(vi) and (vii) of that Act;</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>(c)</td>
<td>develop an environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment; and</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(d) (i)</td>
<td>modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(d) (ii)</td>
<td>contain or remedy the cause of pollution or degradation and migration of pollutants; and</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(d) (iii)</td>
<td>comply with any prescribed waste standard or management standards or practices</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>Relevant Section</td>
<td>Requirements</td>
<td>Applicable Section in EMPr</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>(ii)</td>
<td>the management of identified environmental impacts emanating from the proposed mining operation;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(iii)</td>
<td>the socio-economic conditions as identified in the social and labour plan; and</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>(iv)</td>
<td>historical and cultural aspects, if applicable;</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>51 (b)</td>
<td>an outline of the implementation programme which must include -</td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>a description of the appropriate technical and management options chosen for each environmental impact, socio-economic condition and historical and cultural aspects for each phase of the mining operation;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(ii)</td>
<td>action to achieve the objectives and specific goals contemplated in paragraph (a) which must include a time schedule of actions to be undertaken to implement mitigatory measures for the prevention, management and remediation of each environmental impact, socio-economic condition and historical and cultural aspects for each phase of the mining operation;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(iii)</td>
<td>procedures for environmental related emergencies and remediation;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(iv)</td>
<td>planned monitoring and environmental management programme performance assessment;</td>
<td>This divided between pre-construction, construction, operation and closure/decommissioning. This is contained in Chapters, 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>(v)</td>
<td>financial provision in relation to the execution of the environmental management programme which must include-</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>(v) (aa)</td>
<td>the determination of the quantum of the financial provision contemplated in 54; and</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>(v) (bb)</td>
<td>details of the method providing for financial provision contemplated in regulation 53;</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>(vi)</td>
<td>an environmental awareness plan contemplated in section 39(3)(c) of the Act;</td>
<td></td>
</tr>
<tr>
<td>(vii)</td>
<td>all supporting information and specialist reports that must be attached as appendices to the environmental management programme; and</td>
<td>All specialist reports are attached as Annex’s to the Main ESIA Report.</td>
</tr>
<tr>
<td>(viii)</td>
<td>an undertaking by the applicant to comply with the provisions of the Act and regulations thereto</td>
<td></td>
</tr>
</tbody>
</table>

This EMPr is designed to meet the aforementioned legislative requirements, together with the associated requirements of secondary legislation and good practice. The structure of the EMPr is presented below.
### 1.4 STRUCTURE OF THE EMPr

#### Table 1.4 Components of the EMPr

<table>
<thead>
<tr>
<th>Section</th>
<th>Heading</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
<td>Introduction</td>
<td>Provides background information regarding the site, the proposed Development and the legislative framework.</td>
</tr>
<tr>
<td>Section 2</td>
<td>Summary of ESIA Process</td>
<td>Provides a summary of the affected environment, specialist studies undertaken, stakeholder engagement process and findings of the detailed impact assessment.</td>
</tr>
<tr>
<td>Section 3</td>
<td>Implementation of the EMPr</td>
<td>Provides details of the communication and organisational structures within which the EMPr will be implemented, responsibilities of key role players, and provides the terms of reference for the ECO.</td>
</tr>
<tr>
<td>Section 4</td>
<td>Environmental Management Specifications for Pre-construction Phase</td>
<td>Provides environmental specifications for pre-construction phase.</td>
</tr>
<tr>
<td>Section 5</td>
<td>Environmental Management Specifications for Construction Phase (CEMPr)</td>
<td>Provides all construction phase environmental management requirements applicable to the principal construction contractors, and their subcontractors.</td>
</tr>
<tr>
<td>Section 6</td>
<td>Environmental Management Specifications for Operational Phase (OEMPr)</td>
<td>Provides all operational phase environmental management requirements applicable to applicant and any sub-contractors.</td>
</tr>
<tr>
<td>Section 7</td>
<td>Environmental Management Specifications for Decommissioning and Closure Phase.</td>
<td>Provides all decommissioning phase environmental management requirements applicable to applicant and any sub-contractors.</td>
</tr>
<tr>
<td>Section 8</td>
<td>Conclusion and Way forward</td>
<td>Concludes the requirements for the Project and outlines the way forward for the applicant.</td>
</tr>
</tbody>
</table>

### 1.5 EXPERTISE OF ESIA TEAM

ERM is a global environmental consulting firm employing over 4,000 specialists in over 140 offices across 40 countries. ERM Southern Africa in turn is one of the largest environmental consulting firms in the region, with extensive experience in South Africa and several other African countries.

A list of the ESIA project team is tabulate below, together with the associated qualifications and relevant experience:
<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Expertise</th>
</tr>
</thead>
</table>
| Stuart Heather-Clark | Partner in Charge:                | BSc Civil Engineering – Univ. of Cape Town (1992)  
Mr Heather-Clark’s has over 17 years of experience in industrial, oil & gas and infrastructure related ESIA and Strategic Environmental Assessments (SEA) throughout Africa. His experience has afforded him a sound understanding of the sustainability issues facing development in Africa. He has been involved in a number of internationally funded projects in Cameroon, Ethiopia, Zambia, Tanzania, Angola, Botswana, Namibia, Uganda and Mozambique. All of these projects involved interaction with lenders, developers, local stakeholders, including NGO’s, government officials and local communities. Mr Heather-Clark has an in-depth understanding of the Equator Principles and IFC performance Standards. |
| Tania Swanepoel    | Project Manager:                  | BSc Hons (Engineering & Environmental Geology), University of Pretoria, 2000.  
BSc Hons (Geology and Geohydrology), University of the Western Cape, 1997.  
BSc (Geology, Mathematics), University of the Western Cape, 1996. Registered Natural Scientist (Pr Sci Nat).  
Tania Swanepoel is a Principal Consultant in the Impact Assessment and Planning team based in Cape Town, South Africa.  
Tania has over thirteen years of broad based environmental experience. Her experience includes environmental impact assessments, management plans, public participation, environmental site investigations, pollution risk assessments, remedial system monitoring, geotechnical investigations, groundwater monitoring and rural water supply & sanitation studies. |
SUMMARY OF PROJECT DESCRIPTION

BMM intends to establish the Gamsberg mine near the town of Aggeneys, in the Northern Cape (refer to Figure 1.1 above). The Project will result in the generation of a waste rock dump, tailings dam, mine machinery fleet and workshops. A concentrator plant with resultant stockpile areas and supporting infrastructure such as water supply, laboratories, sewage works and office complex will also be established to process the mined ore. An additional 1000 houses will be constructed within the town of Aggeneys, linking the existing northern and southern township.

Upon processing the zinc ore, the concentrate will be transported to the Port of Saldanha, via two options. A portion of the product will be trucked to the Port of Saldanha (via the N14, N7), with the remainder of the product railed to the Port (via the Loop 10 siding along the Sishen-Saldanha railway line).

Based on environmental sensitivities identified during the Scoping and Impact Assessment phase of the Project, the project layout was finalised (refer to Figure 2.1 below). Cognizance was taken of the mitigation hierarchy, with the application of the avoidance to all environmental sensitivities identified. For sensitivities that could not be avoided, due to technical and financial limitation, the reminder of the mitigation hierarchy was applied in terms of abatement, mitigation and compensation.
A detailed Project description chapter has been included into the ESIA Report (refer to Chapter 3 of the ESIA). For ease of reference, a summary table reflecting all project infrastructure is presented below. Due to the magnitude of the Project, the project infrastructure is divided between construction (Table 2.1) and operational phase project infrastructure (Table 2.2).

### Table 2.1 Summary table of construction phase project infrastructure

<table>
<thead>
<tr>
<th>Project component</th>
<th>Location</th>
<th>Specification/Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Phase components</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Bulk Requirements | Water: Off take from existing bulk supply pipeline between Pella and Aggeneys. | • 2,000 m$^2$ of water per day required.  
• Sourced from the Orange River via an off take pipe of 5 km that extends from the Pella Water Board water pipeline, located to the north of the N14.  
• The off take pipe will be 550 - 750 mm in diameter and will be constructed aboveground from the discharge point to the mine, except for the section that crosses the N14.  
• The off-take pipe covers an area of 0.5 hectares.  
• 1 reservoir located along this pipeline. It will be located near to the plant construction site.  
• The construction footprint of the pipeline is 1000 m$^2$. |
| | Power: | • The construction phase is expected to require a temporary 4 MVA supply point on the existing Gamsberg 11kV line using 21 million kilowatts hour per year.  
• The electricity will be supplied to the construction site via a 5km overhead line and 4 x 500kVA miniature substations.  
• One of the substations will be in a fixed position at the construction camp and the other 3 will be movable units on the construction site. One miniature substation has a footprint of about 4 square meter. |
| | Sewage: Located within the Contractors Camp | • There will be one sewage plant constructed common for the construction and operation |
| | Fuels and lubricants: Located within the contractors camp | Fuel:  
• 50 m$^2$ bund area  
• Total storage of 100 m$^3$ per day  
Lubricants:  
• 10 m$^2$ bund area  
• Total storage of 20 m$^3$ |
| | Linear developments:  
Power lines, pipelines and access roads are depicted on the layout plan. | Please identify and provide all dimensions for any linear developments. |
| Construction Camp | Just on the South side of the | A total area of 2 to 4 hectares, including the following facilities: |
### Temporary Staff Housing

- Located within the contractors camp
- 5 000 construction jobs over a 30 month period
- Total area of approx. 30 hectares
- Total of 500 units
- 0.2 Million kW-hours per annum
- Bulk water requirement of 250 m³ of water/day

### Waste Management Facilities

- Contractors’ camp
- Two separate contractors employed to collect and dispose domestic and hazardous wastes.
  - Domestic wastes:
    - Paper and plastics will be recycling
    - Disposed of at a registered landfill facility – Existing landfill facility at BMM will be used
    - Industrial waste include steel, packaging material and material off-cuts
    - Total area of 200 m²
  - Hazardous wastes:
    - Mainly oil contaminated wastes
    - Storage facility capacity – 0.5 hectares
    - Disposed of at a registered hazardous landfill facility
    - Collected and disposed of once in a month
    - Total area of 100 m²

### Table 2.2 Summary table of operational phase project infrastructure

<table>
<thead>
<tr>
<th>Project Component</th>
<th>Location</th>
<th>Specification/ Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational Phase: On-site Mine Infrastructure</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Open Pit Zinc Mine** | On the Northern side of the Inselberg running from the West of the Kloof to South-West. | Maximum pit dimensions:  
- Total area of approx. 330 hectares  
- Depth approx. 650 m  
- Slope angles – 45 to 53 degrees  
- Length, width, footprint of any buffer areas, access roads, piping, stormwater infrastructure, powerlines, fencing etc. (i.e. any associated infrastructure to the open pit). |
| **Crusher** | Located on Northern side slope of the Inselberg, Approximately 70m from the top of the Inselberg. |  
- Total processing capacity of 10 000 000 tpa  
- Total height of crusher 35 m above ground level  
- Total area of 0.1 hectares  
- Length, width, footprint of any buffer areas, access roads, piping, stormwater infrastructure, powerlines, fencing etc. (i.e. any associated infrastructure to the crusher). |
| **Concentrator Plant** | Located between N-14 and the Inselberg. | - 1 000 000 ore treatment capacity  
- 40 m high  
- A total number of 4 dust extraction vents that are approximately 30m high  
- Total area of 45 hectares  
- Length, width, footprint of any buffer areas, access roads, piping, powerlines, fencing etc. (i.e. any associated infrastructure to the plant). |
|-----------------------|-------------------------------|----------------------------------------------------------------------------------|
| **Tailings Dam**      | Located approximately 2 km north of the Gamsberg Inselberg, along the northern border of the N14. | - Final height of 70 m high  
- Cover a total area of 280 hectares  
- Total storage capacity of 132 million tonnes  
- Length, width, footprint of any buffer areas, access roads, dams, piping, stormwater infrastructure, powerlines, fencing etc. (i.e. any associated infrastructure to the tailings dam). |
| **Waste Rock Dump**   | Located on the North side of the Inselberg. | - Final capacity of 1.5 billion tonnes  
- Total final area of 480 hectares  
- Total final height of 215 m  
- Waste rock slopes with an average slope angle of 35 degrees  
- Length, width, footprint of any buffer areas, access roads, piping, stormwater infrastructure, powerlines, fencing etc. (i.e. any associated infrastructure to the waste rock dumps). |
| **Two Modular Sewage Plants** | One Sewage treatment plant will be located near to the Concentrator mineral processing plant. | - Processing capacity of 600 m³ per day  
- It will service an expected workforce of 2500 people  
- Generate 480 m³ of treated effluent per day  
- Treated effluent will be used for dust suppression and plantation  
- Produce 1500 tons of sludge per month  
- Sludge will be used in the rehabilitation purposes  
- Length and width of any buffer areas, access roads, dams, piping, powerlines, stormwater infrastructure, fencing etc. (i.e. any associated infrastructure to the sewage plant). |
| **Expansion of existing Aggeneys wastewater treatment works.** | Total treatment capacity of 1000 m³ per day  
- Generate 800 m³ of treated effluent  
- Effluent will be used for plantation  
- Generate 2500 MT of sludge per month.  
- Sludge will be used in the rehabilitation purposes  
- Length, width, footprint of any buffer areas, access roads, dams, piping, powerlines, stormwater infrastructure, fencing etc. (i.e. any associated infrastructure to the sewage plant). |
<p>| <strong>Sewerage collection sump</strong> | Near the Concentrator Plant | - Expected to service mine work force of approximately 140 people |</p>
<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Location Description</th>
<th>Details</th>
</tr>
</thead>
</table>
| Treated sewage effluent dam               | Located near Sewage treatment plant                                                   | - Total capacity of 70 m³ (7 days storage)
- Total area of 40 m²
- 7 day capacity
- HDPE lined pond
- Total depth of 5m
- Total height above ground is maximum 1.5 m
- Total storage capacity of 1200 m³
- Total area of approx. 250 m²
- Length and width of any buffer areas, access roads, piping, powerlines, stormwater infrastructure, fencing etc. (i.e. any associated infrastructure to the effluent dam). |
| Salvage Yard                              | Located within the Plant.                                                              | - Total footprint of 750 m²
- Total storage capacity of 1800 m³ for general wastes
- Maximum height of 3 m
- Length and width of any buffer areas, access roads, piping, powerlines, stormwater infrastructure, fencing etc. (i.e. any associated infrastructure to the salvage yard). |
| Domestic Waste Facility                   | Located within the Plant.                                                              | - Total footprint of 100 m²
- Total capacity of 150 m³
- Maximum height of 2 m
- Waste to be disposed of at the designated site.
- Length and width of any buffer areas, access roads, piping, powerlines, stormwater infrastructure, fencing etc. (i.e. any associated infrastructure for this facility). |
| Temporary Hazardous Waste Management      | Located within the Plant.                                                              | - Storage capacity of 100 m³
- Total area of 150 m²
- Maximum height of 2 m
- All hazardous waste collected will be transferred to the Vissershok hazardous waste disposal facility.
- Length and width of any buffer areas, access roads, stormwater infrastructure, fencing etc. (i.e. any associated infrastructure for this facility). |
| Internal Haul and Mine Area Roads          | All haul and mine area roads are depicted on the map.                                  | - 10 km of internal haul and mine area roads
- All haul roads, including the pit access road, is 45 m wide gravel road
- All mine roads would be 10 m wide
- Slope angles of roads not more than 10 degrees
- Gravel road, compacted with surface material
- Total footprint area of internal haul and mine area roads 55 Ha
- Surface material sourced from suitable overburden material and/or available burrow pits at Lemoenplaas |
### Plant Area Roads

Plant area roads are located on the map.

- 4 km of total plant area road
- 6 m and 8 m wide, depending on function
- The construction footprint of the plant roads is maximum 12 m wide
- Total area of off-road parking 5000 m²
- Access tracks for inspection and maintenance: Total area of 1000 m²
- Length and width of any buffer areas, stormwater infrastructure, fencing etc. (i.e. any associated infrastructure)

### Material Laydown and Storage Area

Located within the Plant.

- Total area of 2,500 m²

### Equipment and Engineering Workshops

Workshop one located within the Plant.

- Total area of 1 Ha
- Length and width of any buffer areas, piping, powerlines, stormwater infrastructure, fencing etc. (i.e. any associated infrastructure)

Workshop two (heavy duty workshop) located between the process plant and waste rock dump sites, along the plains.

- Total area of 1.5 Ha
- Length, width, footprint of any buffer areas, piping, powerlines, stormwater infrastructure, fencing etc. (i.e. any associated infrastructure)

### Ore Stockpiles

In-pit open stockpile area (prior to primary crushing). Location reflected on layout plan.

- Total area of 1 Ha
- Maximum height of 4 m
- Length, width, footprint of any buffer areas, fencing etc. (i.e. any associated infrastructure)

Open stockpile area located within the Plant (prior to secondary crushing).

- There is no secondary crushing

Ore stockpiles (4 Nos – two ore, blended ore and one concentrate) area located within the Plant.

- Maximum height of 20 m
- Width of 54 m
- Length of 90 m for high grade, 72 m for low grade and 60 m for blended.

Zinc concentrate stockpile located within the Plant.

- Storage capacity of 7 days
- Total area of 0.25 Ha
- Maximum stockpile height of 12 m
- 50 m in length
- Length, width, footprint of any buffer areas, fencing etc. (i.e. any associated infrastructure)

### Administrative Office Block

Located within the Plant.

- Total area of 1,500 m²
- Maximum height of 12 m
- Expected to contain more than 100 employees, working 7 days a week
| **Control Rooms** | Control room 1: Located within the Plant. | • Total area of approximately 300 m²  
• Maximum height of 12 m  
• Length, width, footprint of any buffer areas, piping, powerlines, stormwater infrastructure, fencing etc. (i.e. any associated infrastructure) |
| **Equipment Wash Area** | Located within the Plant. | • Total area of 750 m²  
• 45,000 m³ of water will be required annually  
• The water will be sourced from recycled water reservoirs only  
• Length, width, footprint of any buffer areas, piping, powerlines, berms, fencing etc. (i.e. any associated infrastructure) |
| **Explosives Storage Area and Ammonium Nitrate and Emulsion Silos** | Located on the North of Inselberg, in the plain area. | • Total area of 20 hectares  
• Total height of 12m  
• 2 x 85 ton Emulsion silos and 2 x 50 ton silos  
• Length, width, footprint of any buffer areas, piping, powerlines, berms, fencing etc. (i.e. any associated infrastructure) |
| **Parking Area** | Located adjacent to the Plant. | • Total area of 5,000 m²  
• The material to tar the road will be sourced from waste rock / borrow pit  
• It will accommodate 300-350 vehicles |
| **Stormwater Management Infrastructure** | Storm water dam to be constructed adjacent to and south of the Plant and along the western foothills of the Inselberg. | • There will be one storm water dam  
• Total storage capacity will be 5000 m³  
• Each dam cover a total area of 1000 m²  
• Wall height above ground of 3 m (Partially below ground) |
| **Bulk Storage Tank Farms** | Adjacent to the Plant as reflected on the layout plan. | • Store 100 m³ of diesel and petrol  
• Total area of 400 m² (fuel, oil and lubricants storage area)  
• 2 fuel supply points  
Located adjacent to the mine workshop area (Fuel, oil & lubricant storage) as depicted on the layout plan. | • Store 500 m³ of diesel  
• Total area of 2,500 m²  
• 6 re-fueling bays  
• 5,000 litres of lubricants  
• Total area of 1,000 m² |
| **Medical clinic** | Located within the Plant. | • Total area of 80 m²  
• Total height of 6 m  
• Result in production of hazardous wastes of 5-6 kg per month |
| **Internal Conveyor System** | From the Primary crusher located at open pit to the northern face of the Inselberg up to the stockpiles | • Closed system;  
• The conveyor will be 2 m wide and approximately 2.5 km long. |
| **Raw water Storage Dam** | Located within the Plant. | • 1 dam  
• Storage capacity of 25,000 m³  
• Wall height of 4.5 m  
• Source of water: Orange River, via the Pella Water Board water supply system. |
| **Process Water Dam** | Located within the Plant. | • A total number of 1 dam  
• Storage capacity of 25,000 m³ |
<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust Suppression Tank</td>
<td>Located in the plain area adjacent to the plant.</td>
</tr>
<tr>
<td>Fire Control System</td>
<td>Water from raw water storage dam is pumped to a clean water tank. From there it will be pumped to the fire hydrant pipe network.</td>
</tr>
<tr>
<td>Return water dams</td>
<td>Located between the tailings dam and N14</td>
</tr>
<tr>
<td>Entrance and Exit Points</td>
<td>Main entrance/exit point will be located along the southern border of the N14.</td>
</tr>
<tr>
<td>Security and induction training areas</td>
<td>Near the main entrance, along the southern border of the N14.</td>
</tr>
<tr>
<td>Operational Phase: Off-site Mine Infrastructure</td>
<td>Power Infrastructure Including Sub-stations and Distribution Lines Two sub-stations along the northern and southern border of the N14 and two connecting distribution lines.</td>
</tr>
<tr>
<td>Operational Phase Housing</td>
<td>Located in the town of Aggeneys, between the northern and southern township.</td>
</tr>
</tbody>
</table>

- Wall height of 4.5m
- Sources of process water: recycled water from the plant, treated water and make-up water from raw water dam
- There will be one metallic/concrete tank
- Storage capacity of 1,000m³
- Max height of 4.5m
- Source of water: raw water dam
- There will be a tank with a storage capacity of 2000 m³
- Wall height of 5m
- Source of water: raw water dam
- Three pollution control dams to be constructed adjacent to the tailings facility.
- A total cumulative storage capacity of 25,000 m³.
- Three meters high dam wall and cover a total area of half hectare.
- HDPE lined.
- Main entrance/exit point: Total width of 45 m; Tar road.
- Second entrance/exit point: Total width of 15 m; Compacted gravel road
- Surface material sourced from existing borrow pit located north of the inselberg.
- Security single storey building, covering a total area of approximately 120 m²
- Induction training area covering a total area of approximately 500 m²
- The 220kV/66V substation will cover a total area of 2 hectares and reach a total height of 8 m
- 66 kV/11kV sub-station
- The 660kV/11KV substation will cover a total area of 1 hectares and reach a total height of 8 m
- Two 66 kV distribution lines
- The connecting distribution lines will extend 3 km and require 12 pylons, with a span length of 6m each.
- The distribution lines will cover a total distance of 10 km and total footprint of 2 Ha.
- An additional 1000 houses
- Will cover a total area of 100 hectares
- Require 12 Million kW-hour of power per annum
- Generation of approximately 1,200 m³ of additional sewage per day
- Requires 1500 m³ of water per day
### Transport Corridor:
Extends from proposed mine to Saldanha Bay Port, via two transport options.

#### Option 1:
- Truck via the N14 and N7 to Saldanha Bay Port.
- No. of trucks required per day: Phase 1 = 30; Phase 2 = 30; Phase 3 = 45.

#### Option 2:
- Concentrate will be trucked 160 km along the Loop 10 Gravel Road to Loop 10 siding and then loaded onto the Sishen-Saldanha Railway Line during phases 2 and 3.
- No. of trucks required per day: Phase 2 = 30; Phase 3 = 45.

### Loop 10
Infrastructure for the storage and handling of zinc concentrate will be required at Loop 10

BMM has an existing offloading facility at Loop 10 siding. The existing storage shed at the siding covers a total area of 2000 m² and has a total height of 10 m. It is anticipated that additional facilities, located within the existing disturbed footprint will accommodate Phase 2 volumes of zinc concentrate generated by Gamsberg. However, due to the expected volumes at Phase 3 of production (500 000 Mtpa), additional infrastructure will be required at BMM’s existing Loop 10 siding facility, which is as follows:
- Truck unloading and wash station;
- Truck Loading Facilities and Equipment (324nos of 67t trucks per week);
- Truck Cue/Parking;
- Concentrate Storage Facility;
- Support Facilities/offices/lab;
- Rail Wagon Loading Facilities and Equipment; and
- Rail Yard/Storage.
DESCRIPTION OF AFFECTED ENVIRONMENT

The following sections provide a brief summary of the affected environment. This is followed by the list of specialist assessments completed, public consultation efforts and a summary of impacts assessed. A detailed list of applicable environmental legislation is contained in Section 1.2 above.

Note that the following is an abbreviated version of information. Should further detail regarding the ESIA be required, please refer to the ESIA Report.

3.1 AREA OF INFLUENCE

The Project is located within the Northern Cape Province and the NDM, along the N14 national road which bisects BMM’s mining license area (refer to Figure 1.1). The Project is situated wholly in the Khai Ma LM, approximately 45 km to the west of Pofadder and 120 km to the east of Springbok. The Gamsberg Inselberg itself is located approximately 33 km south of the Orange River, South Africa’s longest river and an important river in the Northern Cape Province.

3.2 SUMMARY OF KEY ENVIRONMENTAL ASPECTS

3.2.1 Climate and topography

The Northern Cape Province is characterised as a dry region, with portions of the Kalahari Dessert falling within the province. Rainfall patterns for the towns of Aggeneys and Pella are similar, with Springbok (and to a lesser extent Pofadder) receiving far greater volumes of monthly average rainfall. The Gamsberg region receives more than 75% of its rainfall from January to June annually (i.e. approximately 68 mm), with the months of January and April averaging the highest rainfall. On average, no rainfall is experienced during the month of September.

The local topography is mainly characterised with undulating plains, containing low growing shrubby vegetation and grasses. The surrounding plains are approximately 750 – 900 meters above mean sea level (mamsl), with the highest areas of the Gamsberg inselberg varying between 1100 – 1150 mamsl. The Gamsberg inselberg is approximately 7.2 km east – west and approximately 4.6 km north – south. Erosion along the top of the inselberg has resulted in the creation of a basin within the feature, which subsequently varies between 60 – 70 m below the rim of the inselberg.
3.2.2 Water sources

The northern section of the Project area drains into the Orange River Basin, whereas the southern section drains into a catchment referred to as an endoreic area, (i.e. an interior catchment that doesn’t feed out into the ocean) (SRK Consulting, 2010). The Orange River basin is considered to be the largest river basin in South Africa with a total catchment area of approximately 1 000 000 km$^2$ (www.dwa.gov.za, 2012). Approximately 600 000 km$^2$ of the total catchment area is located inside the Republic of South Africa (refer to Figure 4.1 below). The remainder of the catchment area is spread across Lesotho, Botswana and Namibia.

Groundwater is mainly found within secondary fractured-rock aquifers and tends to be found along fractures within hydraulically isolated rocks of low permeability, which are commonly found in the surrounding areas. According to the baseline report, the transmissivity of the fractured aquifers is considered to be low (SRK Consulting, 2010).

3.2.3 Ecological Habitat

The Gamsberg inselberg sits within what is termed the Bushmanland Inselberg Region (BIR), which includes all the large, quartzite-capped inselbergs located in the northern Bushmanland plains in South Africa. The BIR is said to cover a total area of about 6 300km$^2$ (Desmet, 2010). The BIR extends through the boundary between summer and winter rainfall systems in Southern Africa. Based on this location, the vegetation found on the plains and along the warmer north-facing slopes is characteristic of the Nama Karoo Biome whereas that of cooler higher-elevation plains and south-facing slopes is characteristic of the Succulent Karoo Biome. The overlap of these biomes makes these inselbergs a unique feature, thus forming the fundamental difference of these inselbergs as compared to other inselbergs found elsewhere in the Nama Karoo. Due to erratic rainfall experienced during different seasons, summer and winter rainfall flora can co-exist in this region, and thus contributing to its unique value.

The vegetation found on these inselbergs forms a distinct centre of plant endemism located within the larger Eastern Gariep Centre of Endemism (Desmet, 2010), which includes the Orange River valley between Vioolsdrif and Pofadder/Onseepkans. As there are a number of species identified that is considered to be endemic to the Bushmanland inselbergs and the BIR itself, the region has been termed “Bushmanland Inselberg Centre of Endemism” or sometimes the “Gamsberg Centre of Endemism”.

Based on the field work and observations undertaken, it was confirmed that no Red Data invertebrate species were identified in the Gamsberg region (Groundtruth, 2010). This was said to unlikely change through further investigations as most of the Red Data invertebrates in South Africa are butterfly’s, with none of which expected to occur in the Gamsberg region. The
region is known however to accommodate a suite of reptilian, avi-faunal, vertebrate and invertebrate species.

Based on the results of the sampling undertaken at the four sites, the aquatic ecology at Gamsberg was characterised as a “poor ecological” state. However, as there were no symptoms of water quality/river heath degradation, it is suspected that the “poor” ecological state is directly attributed to the fact that samples were taken from stagnant pools of water. As the pools were identified as stagnant, nutrients (or other water quality parameters) have likely accumulated over a period of time and is subsequently of a concentrate state.

### 3.2.4 Socio-economic

The Northern Cape is characterised by an extreme disparity in wealth, with 44.7% of the population earning less than 9.8% of the income. The unequal income distribution has severely hampered development (1). Migration patterns suggest that there has been economic decline in the area, as people have been leaving the area in search of opportunities in other Provinces such as the Western Cape, Gauteng and Eastern Cape Provinces. Rapid population growth has given rise to a very young population structure.

Rising levels of unemployment and the increase in the economically inactive population has resulted in increased pressure on the diminishing employed population and a high dependency on the State for support. The mining sector continues to be the dominant economic sector although recent trends in the sector show the sector to be in decline. This is evident from the mine closures in the District (e.g. Kleinsee and Steinkopf). Provision of services and infrastructure continues to be a challenge. This is exacerbated by the highly dispersed distribution of settlements.

The significance of economic impacts is often highly dependent on the environment or context within which they occur. For example, job creation in a small local community with a stagnating economy will be far more significant than it would be in a larger community with a healthy economy.

The Northern Cape Province recorded the lowest average annual growth rate between 2001 and 2011. This figure relates to approximately 2.4%, compared to the national growth rate of 4.0% over the same period (2). Despite this, the contribution of the Northern Cape economy to the national GDP has remained constant at between 2 and 2.2%, throughout the period 1996 to 2011. This indicates that the province has kept pace with economic growth in general but has not experienced accelerated economic development.

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(1) Northern Cape Provincial Growth and Development Strategy (NCPGDS), July 2011.
From a sector perspective, mining was the biggest contributing sector with 27% contribution to GGP. To illustrate the national importance of the Northern Cape mining sector, in 1998 the Province produced around 37% of South Africa’s diamond output, 44% of its zinc, 70% of its silver, 84% of its iron-ore, 93% of its lead and 99% of its manganese (1). Mining is followed by general government services at 13%; finance, real estate and business services at 12%; and wholesale, retail and motor trade including catering and accommodation at 10%. Tourism is of growing importance in the NDM with the main attraction being the wild flower displays which occur from August to October annually (2).

A detailed review of the socio-economic context of the impact region is provided in Chapter 6 of the ESIA Report.


Based on the outcomes of the Scoping Report, a number of key issues were identified to have a potentially significant impact on the bio-physical and/or socio-economic environment. For ease of reference, all specialist studies undertaken are tabulated below, for ease of reference:

**Table 4.1  Specialist studies completed for ESIA process**

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr David Morris</td>
<td>McGregor Museum</td>
<td>Heritage and Archaeology</td>
</tr>
<tr>
<td>Mr John Pether</td>
<td>Private Consultant</td>
<td>Palaeontology</td>
</tr>
<tr>
<td>Mr Bertie Phillips</td>
<td>Kantey &amp; Templer</td>
<td>Traffic</td>
</tr>
<tr>
<td>Mr Graham A Young</td>
<td>Newtown Landscape Architects</td>
<td>Visual</td>
</tr>
<tr>
<td>Mr Demos Dracoulides</td>
<td>DDA Environmental Engineers</td>
<td>Noise &amp; Vibration and Air Quality</td>
</tr>
<tr>
<td>Dr Mark Graham</td>
<td>GroundTruth</td>
<td>Fauna (aquatic and avi-fauna) (on-site mine infrastructure)</td>
</tr>
<tr>
<td>Dr Phillip Desmet</td>
<td>Private Consultant</td>
<td>Terrestrial and aquatic flora (on-site mine infrastructure)</td>
</tr>
<tr>
<td>Dr Hugo Van Zyl</td>
<td>Independent Economic Researcher</td>
<td>Marco-economics</td>
</tr>
<tr>
<td>Dr David Baldwin</td>
<td>Private Consultant</td>
<td>Waste Classification and Management</td>
</tr>
<tr>
<td>Mr Simon Todd</td>
<td>Simon Todd Consulting</td>
<td>General ecologist (terrestrial and aquatic biodiversity) (off-site infrastructure)</td>
</tr>
<tr>
<td>Mr Stefan Muller</td>
<td>ERM</td>
<td>Hydrogeology</td>
</tr>
<tr>
<td>Mr Stewart Whyte</td>
<td>ERM</td>
<td>Geochemistry</td>
</tr>
<tr>
<td>Mr Fred de Villiers</td>
<td>HHO</td>
<td>Hydrology</td>
</tr>
<tr>
<td>Ms Mariam January</td>
<td>ERM</td>
<td>Social Specialist</td>
</tr>
<tr>
<td>Ms Lisa Constable</td>
<td>ERM</td>
<td>Climate Change and Green House Gas Emissions</td>
</tr>
</tbody>
</table>

A detailed summary of the findings of each specialist study, including copies of the full specialist reports, are included in the ESIA Report.

Potential impacts that have been identified and assessed in the ESIA Report, is as follows:

- Impact on traffic in the region;
- Impact of noise and vibration;
- Impact on air quality (including dust);
- Impact of waste management;
- Impact of geochemical processes (ARD and metal leachate);
• Impact on hydrogeology;
• Impact on hydrology;
• Impact on climate change and GHG emissions;
• Impact on terrestrial and aquatic flora (on-site infrastructure);
• Impact on terrestrial, aquatic and avi-fauna (on-site infrastructure);
• Impact on general ecology (off-site infrastructure);
• Impact on heritage, archaeology and palaeontology;
• Impact on the social environment;
• Impact on the visual environment; and
• Impact on the economic environment.

4.1 SUMMARY OF IMPACT ASSESSMENT

It is acknowledged that the Project will be developed in a sensitive biophysical environment, where the interdependencies of groundwater, surface water and ecological functioning of the Gamsberg inselberg will be important to understand. While the biophysical environmental is sensitive, the socio-economic environment is such that the Project could result in significant socio-economic benefits at a local, district and provincial levels in an environment of high unemployment, low levels of education and several other socio-economic challenges.
Table 4.2 Summary of impact assessment (pre & post mitigation)

<table>
<thead>
<tr>
<th>Primary/Secondary Impact</th>
<th>Construction Phase</th>
<th>Operational Phase</th>
<th>Decommissioning Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-mitigation</td>
<td>Residual Impact</td>
<td>Pre-mitigation</td>
</tr>
<tr>
<td></td>
<td>Significance</td>
<td>Significance</td>
<td>Significance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Biophysical Impacts**

**Impact on Air Quality**

- **Impact on Air Quality**
  - Pre-mitigation Significance: NEGLIGIBLE (-ve)
  - Residual Impact Significance: NEGLIGIBLE (-ve)

**Impact on Groundwater**

- **Impact of Drought on Groundwater Resource**
  - Pre-mitigation Significance: NEGLIGIBLE (-ve)
  - Residual Impact Significance: NEGLIGIBLE (-ve)

**Impact on Groundwater Quality**

- **Impact of Water Quality on Groundwater Users**
  - Pre-mitigation Significance: NEGLIGIBLE (-ve)
  - Residual Impact Significance: NEGLIGIBLE (-ve)

**Impact on Biodiversity**

- **Habitat Loss Caused by the Mine Footprint and Associated Activities**
  - Pre-mitigation Significance: MAJOR (-ve)
  - Residual Impact Significance: MODERATE (-ve) to MAJOR (-ve)

- **Impacts resulting from Habitat Degradation from Dust Deposition**
  - Pre-mitigation Significance: MODERATE (-ve)
  - Residual Impact Significance: MODERATE (-ve)

**Impact on Surface Hydrology**

- **Removal and alteration of natural water courses**
  - Pre-mitigation Significance: MODERATE (-ve)
  - Residual Impact Significance: MODERATE (-ve)

- **Impact of reduced peak runoff and discharge volumes on water courses**
  - Pre-mitigation Significance: MODERATE (-ve)
  - Residual Impact Significance: MODERATE (-ve)

**Socio-Economic Impacts**

**Impact on Economic Environment**

- **Impacts linked to Project expenditure**
  - Pre-mitigation Significance: MODERATE (+ve)
  - Residual Impact Significance: MODERATE (+ve)

- **Impacts on key macro-economic variables**
  - Pre-mitigation Significance: NEGLIGIBLE (-ve)
  - Residual Impact Significance: NEGLIGIBLE (-ve)

- **Impacts on tourism**
  - Pre-mitigation Significance: MODERATE (-ve)
  - Residual Impact Significance: MODERATE (-ve) to MAJOR (-ve)
<table>
<thead>
<tr>
<th>Impacts on surrounding land uses</th>
<th>MODERATE (-ve)</th>
<th>MINOR (+ve) TO MODERATE (-ve)</th>
<th>MODERATE (-ve)</th>
<th>MINOR (+ve) TO MODERATE (-ve)</th>
<th>MINOR (+ve)</th>
<th>MINOR (+ve) TO MODERATE (+ve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts on municipal services</td>
<td>MODERATE (-ve)</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (-ve)</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
</tr>
<tr>
<td>Impact on Social Environmental</td>
<td>MODERATE (-ve)</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (-ve)</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (-ve)</td>
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<tr>
<td>Employment opportunities</td>
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<td>Training and skills development</td>
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<tr>
<td>Procurement and services</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<td>Economic diversification</td>
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<td>MODERATE (+ve)</td>
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<tr>
<td>Unmet Expectations and Potential for Social Unrest</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<tr>
<td>Increased Pressure on Infrastructure and Services (Direct)</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<tr>
<td>Road Infrastructure and Transport (Direct)</td>
<td>MODERATE (+ve)</td>
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<tr>
<td>Health Impacts: Communicable diseases</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<tr>
<td>Health Impacts: Road traffic accidents</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<td>MODERATE (+ve)</td>
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<tr>
<td>Impact in Relations between Locals and In-migrants</td>
<td>MODERATE (+ve)</td>
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<td>MODERATE (+ve)</td>
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<tr>
<td>Impact on Social Pathologies</td>
<td>MODERATE (-ve)</td>
<td>MODERATE (+ve)</td>
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<tr>
<td>Impact on Sense of Place</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<tr>
<td>Local Cultural and Social Values</td>
<td>MODERATE (+ve)</td>
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<tr>
<td>Increased Pressure on Infrastructure and Services (Indirect resulting from Influx)</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<td>MODERATE (+ve)</td>
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<tr>
<td>Communicable Diseases (Indirect resulting from Influx)</td>
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<td>Impact on Visual Resources</td>
<td>MODERATE (+ve)</td>
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<tr>
<td>Impact on the Aesthetic Value of the Landscape</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<tr>
<td>Impact on Traffic and Transport</td>
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<tr>
<td>Impact on Transport Networks</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<td>MODERATE (+ve)</td>
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<tr>
<td>Impact on Cultural Heritage and Sense of Place</td>
<td>MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
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<tr>
<td>Impact on Palaeontology</td>
<td>MODERATE (+ve)</td>
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**Notes:**
- MODERATE (-ve) indicates moderate negative impacts.
- MINOR (+ve) indicates minor positive impacts.
- MODERATE (+ve) indicates moderate positive impacts.
- MAJOR (+ve) indicates major positive impacts.
- MINOR (-ve) indicates minor negative impacts.
- MODERATE (-ve) indicates moderate negative impacts.
- MAJOR (-ve) indicates major negative impacts.
- NEGLIGIBLE (-ve) indicates negligible negative impacts.
4.2 **PUBLIC PARTICIPATION PROCESS**

The public participation process (PPP) has been designed to comply with the regulatory requirements set out in the NEMA, NEM:WA, NEM:AQA, NEM:BA, MPRDA and NWA, as well as international good practice. The PPP is also aligned with the International Finance Corporation (IFC) which is recognised as international good practice.

4.2.1 **Objectives of public participation**

The PPP has been designed to achieve the following objectives:

- To ensure that stakeholders are well informed about the proposed development;
- To provide a broad set of stakeholders sufficient opportunity to engage and provide input and suggestions on the Project;
- To verify that stakeholder issues have been accurately recorded;
- To draw on local knowledge in the process of identifying environmental and social issues associated with the Project, and to involve stakeholders in identifying ways in which these can be addressed; and
- To comply with the legal requirements and international good practice.

A summary of the stakeholder engagement processes undertaken as part of the ESIA process is tabulated below:

<table>
<thead>
<tr>
<th>Table 4.3</th>
<th>Summary of public participation activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity</strong></td>
<td><strong>Details</strong></td>
</tr>
<tr>
<td><strong>Initial consultation</strong></td>
<td></td>
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</tbody>
</table>
| Meeting with authorities. | Provision of information and general discussion around the Gamsberg Project. The following authorities were consulted on 10 July 2012:  
- Department of Mineral Resources (DMR);  
- Department of Environment and Nature Conservation (DENC); and  
- Department of Water Affairs (DWA). |
| Meeting with key stakeholders. | Provision of information and general discussion around the Gamsberg Project. The following key stakeholders were consulted on 20 and 21 June 2012:  
- Pella Local Municipality and community leaders (20 June, Pella);  
- South African National Botanical Institute (SANBI) (20 June, Springbok);  
- Khai-Ma Local and Namakwa District Municipalities (21 June, Pofadder); and  
- Pofadder Landbou Vereniging (21 June, Pofadder). |
| Identification of stakeholders. | Stakeholder database which includes interested and affected parties from various sectors of society including directly affected and adjacent landowners in and around the Project area. |
| **Pre-Scoping Phase** | |
| Distribution of Project announcement letter and Background Information Document | BID and announcement documentation emailed and posted to stakeholders on 30 July 2012.  
(Registration period of 30 days: 30 July – 29 August 2012). |
| (BID). | Placing of adverts. | Afrikaans adverts were placed in the Die Plattelander (3 August 2012), Die Namakwalander (3 August 2012), Eland (8 August 2012), Die Burger West (5 August 2011) newspapers and English adverts were placed in the Die Gemsbok (3 August 2012). |
| Putting up of site notices. | Eight Afrikaans and eight English site notices were put up at the Project area, local libraries, municipal offices and frequently visited shops or recreational venues Pella, Aggeneys and Pofadder: |
| | • Gamsberg Project area; |
| | • Aggeneys Kaffee; |
| | • Aggeneys Recreation Hall; |
| | • Black Mountain Main Building Aggeneys; |
| | • Pella Library; |
| | • Pella Municipal Office; |
| | • Pofadder Library; and |
| | • Pofadder Municipal Office. |
| Meetings with relevant stakeholders. | Meetings and telephonic consultations were conducted with the following stakeholders in mid-August 2012: |
| | • Landowners/farmers telephonic consultations (27 July); |
| | • Environmental NGOs telephonic consultations (8 August); |
| | • Pofadder Landbou Vereniging meeting (15 August, Pofadder); |
| | • Conservation South Africa, SANBI and NAGO meeting (16 August, Springbok); and |
| | • Khai-Ma Local Municipality meeting (16 August, Pofadder). |
| Obtained comments from stakeholders. | Comments, issues of concern and suggestions received from stakeholders are included in the Final Scoping Report. |

### Scoping Phase

| Announcement of DSR. | Draft Scoping Report announcement letter sent to all I&APs on the database on 9 November 2012. An English and Afrikaans adverts was placed in the following newspapers: |
| | • Die Gemsbok |
| | • Die Plattelander |
| | • Die Namakwalander |
| | • Eland |
| | • Die Burger West |
| | • Express Northern Cape |
| Making Draft Scoping Report available to I&APs. | Draft Scoping Report in English, a Non-Technical Summary in English and Afrikaans accompanying documents were placed at the following public places within the Project area: |
### Stakeholder meetings to present Draft Scoping Report

Details of public meetings undertaken during the Scoping Phase are as follows:

- **Pofadder Community Hall**  
  27 November 2012  
  16:00 – 18:00

- **Pella Community Hall**  
  28 November 2012  
  16:00 – 18:00

- **Aggeneys Recreational Club**  
  29 November 2012  
  16:00 – 18:00

Details of focus group meetings undertaken during the Scoping Phase are as follows:

- **Pofadder Landbou Community Hall**  
  Pofadder Farmers Association  
  28 November 2012  
  10:00 – 12:00

- **Conservation South Africa Offices**  
  Social and Environmental Non-Governmental Organisations  
  28 November 2012  
  16:00 – 18:00

### Obtain comments from stakeholders on the Draft Scoping Report

Comments, issues of concern and suggestions received from stakeholders during the Draft Scoping Report public review period were captured in the Comment and Response Report. These comments were addressed in the Final Scoping Report, which was distributed for a public comment period.

### Making Final Scoping Report available to I&APs

The Final Scoping Report was simultaneously submitted to the competent authority and made available to I&APs for a 21 day comment period (from 14 January 2013 to the 4 February 2013). During this time the public could submit their comments directly to DENC.

### ESIA Phase

A Draft ESIA report announcement letter was sent to all I&APs on the database on in April 2013. Adverts placed in the following newspapers:

- **Die Gemsbok**
<table>
<thead>
<tr>
<th>Task</th>
<th>Details</th>
</tr>
</thead>
</table>
| Making Draft ESIA report available to I&APs                        | The Draft ESIA report in English, a Non-Technical Summary in English and Afrikaans accompanying documents were placed at the following public places within the Project area:  
  - Pofadder Public Library  
  - Pofadder Local Municipal Offices  
  - Springbok Municipal Offices  
  - Springbok Library  
  - Aggeneys Public Library  
  - Pella Public Library and Local Municipality  
  - Project website                                                                                                                                 |
| Making the Draft ESIA Report available to I&APs                     | The Draft ESIA report and associated documents were placed on the following website: www.erm.com/Gamsberg                                                                 |
| Stakeholder meetings.                                               | Public meetings are scheduled from 13 to 17 May.                                                                                                                                               |
| Obtain comments from stakeholders.                                  | Comments, issues of concern and suggestions received from stakeholders on the Draft ESIA Report will be captured in the Comment and Response Report (in the Final ESIA), which will also be made available to I&APs. The Comment and Response Report will also be distributed to all I&APs who submitted comment. |
| Making ESIA Report available to I&Ps                               | The Final ESIA Report will be simultaneously submitted to competent authority and made available to I&APs. A public review period of 21 days will be provided for I&APs to provide comments directly to DENC. |
5 IMPLEMENTATION OF THE EMPr

5.1 INTRODUCTION

This document describes mitigation measures in detail, and is partly prescriptive in identifying specific people or organisations to undertake specific tasks in order to ensure that impacts on the bio-physical and socio-economic environment are minimised during the lifecycle of this project. The EMPr is applicable to all works comprising the pre-construction, construction, operation and decommissioning of the Project. It is an open-ended document implying that information gained during pre-construction, construction, operational, decommissioning and closure activities and/or monitoring of procedures on site could lead to changes in the EMPr.

The appointed Environmental Control Officer (ECO) will monitor compliance with the construction EMPr and other Conditions of Approval as they relate to environmental matters. This EMPr gives direction and guidance to all responsible parties. The responsible parties are expected to co-operate closely to minimise or avoid unnecessary environmental impacts. The mitigation hierarchy must be abided to, when implementing this EMPr. The mitigation hierarchy is contained below, for ease of reference:

Figure 5.1 Mitigation hierarchy

- **Avoid at Source; Reduce at Source**: avoiding or reducing at source through the design of the Project (e.g., avoiding by siting or re-routting activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).

- **Abate on Site**: add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimeter screening and landscaping).

- **Abate at Receptor**: if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site).

- **Repair or Remedy**: some impacts involve unavoidable damage to a resource (e.g. agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.

- **Compensate in Kind; Compensate Through Other Means**: where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).
The Contractor is obliged to inform the ECO immediately of events that may cause serious environmental damage or breach the requirements of the EMPr. The ECO in turn will immediately inform the site Engineer and BMM and, if necessary the Local, Provincial and or National Authority, of such events (depending on the nature of the event).

5.2 LEGAL OBLIGATIONS

Obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation (i.e. the Environmental Authorization in terms of the National Environmental Management Act No.107 of 1998, as amended) and in terms of amendments to the Particular Conditions of Contract that pertain to this project.

The requirements of this EMPr do not release the Developer from the requirements of any other legislation that may be applicable to the project.

5.3 ROLES AND RESPONSIBILITIES

The key role-players during the construction phase of the Project, for the purposes of environmental management on site, include but are not limited to: the Developer (BMM), the Engineer, the main Contractors (direct appointments including civil works contractor, building contractor, landscape contractor etc.), the ECO, and representatives of the relevant Authority/ies.

Details of the responsibilities of each of the key role-players have been provided below. Lines of communication and reporting between the various parties are also illustrated below.
5.3.1 The Developer

For the purpose of this document, “the Developer” and its appointed facilitators refers to those to whom permission has been granted to proceed with the Project (i.e. BMM), and who is thus ultimately responsible for compliance with all conditions of approval of the Development or any aspect thereof by any authority.

With respect to the pre-construction phase of the Development, the Developer is to:

- Implement the recommendations outlined in the pre-construction EMP; and
- Implement as many recommendations as possible that will lessen the total environmental impact of the proposed Development from the design stage, through to construction and ultimately the operational phase.

With respect to the construction phase of the Development, the Developer is to:

- Ensure that all relevant approvals and permits have been obtained prior to the start of construction activities on site;
- Ensure that the EMPr has been approved by DENC and DMR prior to the start of construction activities on site;
- Ensure that DENC has been notified of the date on which construction activities will be starting, prior to commencement of the activity;
- Ensure that all conditions of approval have been complied with;
- Appoint all the required specialists to make input into the pre-construction/design phase (refer to Section 6.3); and
- Appoint a suitably qualified and experienced ECO prior to the start of construction activities on site, and for the duration of the construction phase.

With respect to the operational phase of the Development, the developer is to:

- Ensure that operation of the zinc mine is undertaken in line with the requirements of the operational phase EMP; and
- Continuously seek to improve any negative environmental impacts which result from the operational phase.

5.3.2 Site Engineer

For the purposes of this document, “Site Engineer” refers to the engineer for the Development, or any other person authorised by the Developer, to be responsible for the technical and contractual implementation of the works to be undertaken.

The responsibilities of the Site Engineer are to:

- Ensure that the requirements as set out in this EMP and by the relevant Authorities are adhered to and implemented;
- Assist the ECO in ensuring that the conditions of the Construction EMP are being adhered to and promptly issuing instructions requested by the ECO, to the Contractor. All site instructions relating to environmental matters issued by the Engineer are to be copied to the ECO;
- Assist the ECO in making decisions and finding solutions to environmental problems that may arise during the construction phase;
- Review and approve construction method statements with input from the ECO;
- Order the removal of person(s) and/or equipment not complying with the specifications (as required by the ECO or otherwise); and
- Provide input into the ECO’s ongoing internal review of the EMP.

5.3.3 The Contractor

For the purposes of this document “The Contractor” refers to any directly appointed (by the Developer) company or individual undertaking the implementation of the works.

The Contractor is to:
• Ensure implementation of all applicable Environmental Specifications, including all additional requirements related to approved method statements, during all works on site.

• Ensure that all of its sub-contractors’, employees, suppliers, agents etc. are fully aware of the environmental requirements detailed in the Environmental Specifications;

• Liaise closely with the Engineer and the ECO and ensure that the works on site are conducted in an environmentally controlled manner;

• Inform the Engineer as well as the ECO should environmental conditions on site deteriorate, e.g. dumping, pollution, littering and damage to vegetation; and

• Carry out instructions issued by the Engineer, on request of the ECO, required to fulfil his/her compliance with the Construction EMPr.

5.3.4 Environmental Control Officer

During the construction phase of the project, the ECO is to:

• Ensure that the Contractor has a copy of the Construction EMPr and all agreed method statements;

• Undertake weekly site inspections (frequency may change as required, depending on the activity) to audit compliance of all parties with the requirements of the Construction EMPr;

• Advise/recommend on actions or issues impacting on the environment to the Engineer, who shall issue any required Site Instructions to the Contractor;

• Environmentally educate and raise the awareness of the Contractor and his/her staff as to the sensitivity of the site and to facilitate the spread of the correct attitude during works on site;

• Review and approve construction/landscape method statements together with the Engineer/Landscaper (when applicable);

• Assist the Contractor in finding environmentally responsible solutions to problems;

• Recommend to the Engineer the removal of person(s) and/or equipment not complying with the Specifications;

• Undertake photographic monitoring of the construction site;

• Keep records of all activities/ incidents concerning the environment on site in a Site Diary;

• Complete temporary and permanent site closure checklists;

• Compile and maintain a complaints register;

• Take immediate action on site to stop works where significant and irreparable damage is being inflicted on the environment, and to inform
the Engineer, BMM and relevant authorities immediately of the occurrence and action taken; and

- Undertake a continual internal review of the EMPr and make recommendations regarding its updating to the Engineer and Developer.

The ECO has the authority to recommend to DENC that works be stopped, if in his/her opinion serious harm to, or impact on the environment is imminent, is likely to occur or has occurred and such actual or potential harm or impact is in contravention of the EMPr, and which is, or may be, caused by construction or related works.

Upon failure by the Contractor or Contractor’s employee to show adequate consideration to the environmental aspects of this contract, the ECO may recommend to the Engineer and the project management team to have the Contractor’s representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the Contractor.

The ECO shall keep a Site Diary in which events and concerns of environmental significance are to be recorded. The ECO will compile a monthly report of such events, concerns, public complaints and general compliance of the Contractor with the construction phase of the EMPr. This report will be submitted to the Engineer and if required, to DENC, DMR and the Namakwa District Municipality. The ECO is also required to attend regular site meetings of the project management team to report on environmental issues and to minute the requirements that emerge.

The ECO will be responsible for the compilation of a final completion checklist for the project, completed when all construction works related to the project have terminated and the site has been cleared of all construction related debris, materials or equipment not forming part of the permanent works. This checklist will audit the Contractor’s compliance with the construction phase of the EMPr throughout the duration of the construction phase and, together with a final written report, will be submitted to DENC, DMR and the Namakwa District Municipality in order to achieve “environmental closure” for the construction phase of the project.

### 5.4 SITE MEETINGS DURING THE CONSTRUCTION PHASE

The ECO is required to attend regular site meetings of the project management team to facilitate the transfer of information and to update all parties on the environmental compliance of the project as a whole, and minute the consequential requirements.
The ECO will present a summary report, outlining the main construction activities that relate to the environment, at this meeting. The minutes of these meetings will form part of the construction phase EMPr records. These minutes will reflect environmental queries, agreed actions and dates of eventual compliance by the Contractor.

The following people should attend these meetings:

- BMM representative;
- Engineer;
- ECO; and
- Contractor(s) representative.

5.5 **ENVIRONMENTAL AWARENESS PROGRAMME**

The Contractor, in consultation with the ECO, shall arrange for a presentation to site staff to familiarise them with the environmental aspects of the construction phase of the EMPr within seven days from the commencement date of construction. This presentation should take cognizance of the level of education, designation and language preferences of the staff. General site staff would commonly receive a basic environmental awareness course highlighting general environmental “do’s and don’ts” and how they relate to the site. Management on site, e.g. site agents and foremen, who require more detailed knowledge about the environmental sensitivities on site and the contents and application of the construction phase of the EMPr document itself, will benefit from a separate presentation dealing with these issues. The ECO may call upon the services of a specialist environmental education translator should this be required.

5.6 **METHOD STATEMENTS**

The Contractor shall provide Method Statements for approval by the ECO and the Engineer prior to work commencing on aspects of the project deemed or identified to be of greater risk to the environment and/or which may not be covered in sufficient detail in the construction phase of the EMPr, when called upon to do so by the Engineer or ECO.

A Method Statement is a “live document” in that modifications are negotiated between the Contractor and the ECO/Engineering team, as circumstances unfold. All Method Statements will form part of the construction phase of the EMPr documentation and are subject to all terms and conditions contained within the construction phase of the EMPr.
Note that a Method Statement is a starting point for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment.

Changes to, and adaptations of, Method Statements can be implemented with the prior consent of all parties.

A Method Statement describes the scope of the intended work in a step-by-step description, in order for the ECO and the Engineer to understand the Contractor’s intentions. This will enable them to assist in devising any mitigation measures, which would minimize environmental impact during these tasks.

For each instance where it is requested that the Contractor submit a Method Statement to the satisfaction of the Engineer and ECO, the format should clearly indicate the following:

- **What** - a brief description of the work to be undertaken;
- **How** - a detailed description of the process of work, methods and materials;
- **Where** - a description/sketch map of the locality of work (if applicable);
- **When** - the sequencing of actions with due commencement dates and completion date estimates;
- **Who** – The person responsible for undertaking the works described in the Method Statement; and
- **Why** – a description of why the activity is required.

All Method Statements are to be to the satisfaction of the ECO, Engineer and, where practical and deemed necessary, should be endorsed as being acceptable by the environmental representative of the DENC and DMR.

A list of some of the Method Statements that the Contractor may need to submit during the course of the construction contract has been provided in Section 4, along with an indication of those which the ECO may require the Contractor to provide prior to the start of works on site (see Appendix 1 for a Method Statement Template).

### 5.7 ECO Diary Entries

The ECO will maintain a site diary that relates to environmental issues as they occur on site for record keeping purposes. Comments from this diary will form part of reports presented at site meetings by the ECO.
5.8 Site Memo Entries

Site memos, stipulating recommended actions required to improve compliance with the construction phase of the EMPr by the contractor, will be issued by the ECO to the Engineer, who in turn will ensure that the Contractor is informed of the said instruction.

Comments made by the ECO in the Site Memo book are advisory and all consequential Site Instructions required may only be issued by the Engineer. Site Memos will also be used for the issuing of stop work orders for the purposes of immediately halting any particular activity(ies) of the Contractor deemed to pose immediate and serious risk of unnecessary damage to the environment.

5.9 Grievance Mechanism

Any disputes or disagreements between role players on site (with regard to environmental management) will firstly be referred to the Engineer during the construction phase, or to a DENC environmental officer during the operational phase. If no resolution on the matter is possible during the construction phase, the matter will be elevated to DENC for clarification.

BMM should develop a grievance procedure to ensure fair and prompt resolution of problems arising from the Project. The grievance procedure should be underpinned by the following principles and commitments:

- Implement a transparent grievance procedure, and disseminate key information to directly impacted stakeholders;
- Seek to resolve all grievances timeously; and
- Maintain full written records of each grievance case and the associated process of resolution and outcome for transparent, external reporting.

The responsibility for resolution of grievances will lie with BMM and its Contractors.

5.10 Community Relations

BMM should continue to engage with stakeholders throughout the project construction and operation. Communication with local communities and other local stakeholders will be a key part of this engagement process and is one where BMM and the Contractor will need to work closely together during
the construction period. Development of a Community Engagement Plan (CEP) is important to facilitate this communication.

The objectives of communication and liaison with local communities are the following:

- To provide residents in the direct and indirect vicinity of the Development and other interested stakeholders with regular information on the progress of work and its implications;
- To monitor implementation of mitigation measures and the impact of construction on communities via direct monitoring and feedback from those affected, in order to ensure that mitigation measures are implemented and the mitigation objectives achieved; and
- To manage any disputes between BMM, the Contractors and Interested and Affected Parties.

5.11 **SOCIAL RESPONSIBILITIES**

The Developer and Contractors shall encourage and implement wherever possible the procurement of locally based labour, skills and materials, in line with BMM’s existing Procurement Plan.
6 PLANNING AND DESIGN PHASE EMPr

6.1 SCOPE

This section covers the mitigation measures and recommendations that may be considered in the pre-construction and design stage of the project.

6.2 APPLICATION

This specification covers the requirements for mitigating the impact on the environment during the detailed design phase of the Project.

6.3 PRE-CONSTRUCTION REQUIREMENTS

6.3.1 TSF Liner Requirements

The ESIA and specialist recommendation with regards to reducing the impact the TSF may have on groundwater quality is to construct a natural liner system as specified by the design engineers beneath the TSF. The detailed specifications of the liner system requirements will be agreed upon by the Department of Water Affairs and be in line with the conditions of the Water Use License.

The detailed design of the TSF liner system will be informed by the following during the final design phase:

- Permeability testing of the subsurface in the area of the TSF; and
- Geophysical investigations.

6.3.2 Refinement of Design

The preferred site layout may be refined, based on the completion of detailed design. Regardless of the extent of changes made to the current design, the applicant must engage with the DENC to determine if the refinements to the design are considered substantive. The DENC will determine whether the refinements warrant additional public engagement and revisions to the current ESIA Report and associated EMPr.

Explosives Magazine

Based on recommendations from the Hydrologist, it was requested that the location of the explosives magazine storage area be relocated from the top of the inselberg (due to the proximity of three watercourses). During the ESIA process, BMM agreed that the explosives magazine area would be relocated to the plains, between the N14 and inselberg, outside of any watercourses. This
design refinement has therefore already been accommodated in the final layout as presented in the ESIA report.

_Floodline Determination_

Lastly, the hydrologist requested that an in-depth floodline determination study be undertaken, once the detailed surveying is complete, of all major watercourses in the affected mining license area. Based on the findings of this study, project infrastructure location must be refined to remain outside the 1:100 year floodline of watercourses.

_Waste Rock Dump_

The extremities of the waste rock dump may still be adjusted, where technically feasible through discussions with the botanist and engineering team. The results of this will not change the significance ratings on the impact assessment and may require some fine adjustments to the residual impact and resultant offsets. This will be finalised in the offset report.

Consider designing and constructing a rock dump comprising only quartzite rock to fill the remaining portion of the western Kloof thereby shielding the main Kloof from any direct impacts of mining activities in the pit. Careful placement of this barrier must be defined with input from a qualified botanist prior to the placement of the rock.

Consider designing and constructing a rock-dump (or berm), where technically feasible, in the crater to the south and south-eastern side of the pit to shield the remainder of the basin/crater from mining activities. The berm should be constructed to the same elevation as the plateau comprising a non-acid leaching rock core and a quartzite rock outer layer. Careful placement of this barrier must be defined with input from a qualified botanist and the engineering team prior to the placement of rock.

Associated with the two above mitigations, the botanist will work with the engineering team to consider the design and construction of appropriate structures to deal with erosion, storm water and dirty water within the crater.

6.3.3 _Biodiversity Offsetting Process_

It is the responsibility of BMM to ensure that the Biodiversity Offset process is finalised and mutually agreed to with the relevant authorities and stakeholders (i.e. DENC and NGO’s), prior to commencement of construction. Proof of agreement of the finalisation of the biodiversity offset is required. All relevant stakeholders of the biodiversity offset process must be notified, two weeks prior to commencement of construction. If any further issues arise around the biodiversity offset, these would need to be addressed to the mutual agreement of the relevant stakeholders, before construction may commence.
6.3.4 Permit Requirements

Activities undertaken during site preparation, construction and operation may require additional permits, over and above the Environmental Authorisation. BMM is responsible for ensuring that they hold the necessary permits in order to comply with national and local regulations. Additional permit requirements that may be required are described below.

National Water Act

There are licensing procedures that need to be followed for particular “water uses”. Water uses that may be of relevance to the Development include the following:

- Taking of water from a water resource, including a water course, surface water, estuary or aquifer (i.e. borehole);
- altering the bed, banks, course or characteristics of a water course; and/or
- impeding or diverting of a flow in a water course.

Under the National Water Act (No 36 of 1998), either a General Authorisation or a Water Use Licence may be required for the project.

National Environmental Management: Biodiversity Act

The NEM:BA identifies a number of plant species that, if removed, require a permit prior to proceeding.

The Botanical Impact Assessment undertaken as part of this ESIA process confirmed that there are a number of species identified on site which will require a permit in terms of the Biodiversity Act. A permit application will need to be submitted to the Provincial Department of Environment and Nature Conservation for approval, before proceeding with the activity. This Permit Application must be accompanied by a detailed Biodiversity Management Plan. A detailed BMP will be developed as part of this EMP and cover the following aspects / requirements:

- Appropriate management of the set aside conservation area.
- The set aside conservation area under the control of the mine will be maintained in a good ecological state through controlled access, prohibition on livestock grazing and proactive management.
- An Alien Plant Control Plan to prioritise the species for control and present the most effective control measures based on available technology and levels of infestation.
• Continued scientific research of ecological habitat (including fauna and flora) will be required. The regional importance of the unnamed ant species identified on the inselberg, will need to be completed, prior to commencement of construction. BMM will explore additional research areas to help feed into the current gaps present on the ecological habitat of the affected region.

• Search and Rescue operations to capture and translocate faunal species that are not able to escape prior to any land clearing exercises.

• Translocation of plants will be considered under the following circumstances:
  o Translocation only from areas about to be destroyed through clearing of vegetation cover;
  o For research purposes (e.g. to botanical gardens);
  o For landscaping purposes around the mine;
  o Species with very limited numbers and of high conservation value will be translocated within the Gamsberg.
  o In some cases translocated plants will be used to restore degraded habitat within the offset area.

• Any clearing within or close to watercourse or wetland vegetation communities will employ adequate erosion and sedimentation mitigation measures to ensure that aquatic ecosystems are not impacted and vegetation is not affected.

• Design the southern approach road using built retaining walls rather than simple cut and fill method.

National Forestry Act

The National Forests Act (84 of 1998) (NFA) deals with the protection of trees. The Minister is required to annually publish a list of all species protected under Section 12. No person may undertake any of the following restricted activities involving a listed tree species, except under licence granted by the Minister:

• cut, disturb, damage, destroy or remove any listed tree species; or
• collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any listed tree species.

Applications for such activities shall be made to the responsible official in the Northern Cape Province.
Northern Cape Nature Conservation Act

Consideration will also be given to the Northern Cape Nature Conservation Act (NCNCA), which came into force on 21 January 2010 and which repealed the Ordinance on Nature Conservation in the Northern Cape. NCNCA prescribes restricted activities in relation to specially protected plants and animals species for which licencing is required. NCNCA furthermore prescribes prohibited acts in relation to invasive species, as well as restricted activities in relation to certain damage causing animals for which licenses are required.

A number of protected tree (i.e. *Acacia erioloba* – Camel Thorn) and faunal species have been identified to occur within the proposed Project area. To the extent that licences are required in terms of the NCNCA, these should be obtained.

National Heritage Resources Act (25 of 1999)

The protection and management of South Africa’s heritage resources is controlled by the National Heritage Resources Act (NHRA). The objective of the NHRA is to introduce an integrated system for the management of national heritage resources.

In terms of the NHRA, prior to the destruction, translocation or trade of archaeological and/or paleontological artefacts, a permit is required from the heritage authorities (Heritage Northern Cape) prior to commencement of construction. Based on the recommendations from the Archaeologist, a phase 2 archaeological mitigation plan needs to be approved by the South African Heritage Resources Agency and the mitigation implemented, prior to commencement of construction. A suitably qualified archaeologist must be appointed to undertake the Phase 2 salvage mitigation measures.

Furthermore, additional investigation into the potential massacre sites is recommended to confirm if, indeed, there is a tie with the mine site and the San people.

6.3.5 Tender Documentation

BMM shall ensure that this EMPr is included within the tender documents for all Contractors tendering to undertake any aspects of the construction phase of the project.

In the adjudication of any tenders to undertake any aspect of the construction or operation of the proposed project, BMM (or BMM agent in this regard) must ensure that the costs of compliance with the EMPr have been adequately allowed for within the winning tender.
6.3.6 Additional Pre – Construction Requirements

• Clearly delineate and cordon off all no-go areas, as identified by the ECO.

• Notify DENC, DEA, DWA and DMR prior to commencement of construction, as per the Environmental Authorisation.

• A variety of plans (as outlined below) must be developed prior to the commencement of construction, to identify and avoid work-related accidents. These plans must be aligned with the existing plans compiled by BMM and Vedanta Resources plc.

• BMM must establish a suite of policies (as outlined below) to guide the various phases of the Project. These policies must be aligned with the existing plans compiled by BMM and Vedanta Resources plc.

• A Code of Conduct must be developed for all workers (BMM and Contractors including their workers) directly related to the project. The objective of the code of conduct is to limit, where possible, social ills brought about by the construction and operation of the Project.

6.4 Design and Planning Compliance

In order to ensure compliance with environmental legislation and good practice guidelines, the following actions are applicable to the planning and design phase for the Project. The persons responsible for implementation of the actions are listed in the table below, the majority of which are the responsibility of BMM and/or associated contractors.

6.4.1 Generic design and planning requirements:

Table 6.1 below is a generic list of design and planning considerations. This is followed by Table 6.2 for waste management design consideration.
### Table 6.1  Generic list of design and planning considerations

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Objective</th>
<th>Actions to be undertaken to Mitigate Environmental Impact</th>
<th>Parameters for Monitoring</th>
<th>Responsibility</th>
<th>Frequency / Timing</th>
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<tbody>
<tr>
<td></td>
<td>Description of Aspect</td>
<td># Commitment / Actions Required / Key Controls</td>
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<tr>
<td><strong>1. Stakeholder engagement</strong></td>
<td>Notify all registered Interested and Affected Parties of Environmental Authorisation (EA).</td>
<td>1.1 Notify all registered I&amp;APs and key stakeholders, via letters of notification and advertising of the opportunity for appeal of the Environmental Authorisation.</td>
<td>Notices sent to relevant parties on the stakeholder database. List of those to whom it was sent on file.</td>
<td>ERM</td>
<td>Within the number of DENC-required days from the issuing of the Environmental Authorisation.</td>
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<tr>
<td><strong>2. Permit Requirements</strong></td>
<td>Ensure compliance with, <em>inter alia</em>, the following legal requirements:</td>
<td>2.1 Obtain all relevant permit and licences, prior to commencement of construction.</td>
<td>Proof of Permits to be kept on-site.</td>
<td>BMM</td>
<td>Prior to construction</td>
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<tr>
<td>Aspect</td>
<td>Objective</td>
<td>Actions to be undertaken to Mitigate Environmental Impact</td>
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<td>3. Finalisation of EMP'r and Contractor Compliance Standards</td>
<td>Update EMP'r with EA conditions and other requirements as set out by the Department of Mineral Resources and Water Affairs and Environment and Nature conservation.</td>
<td>3.1 Incorporate additional mitigation measures specified by the relevant authorities into the EMP'r and Contractor Compliance Standards.</td>
<td>EMP'r and Contractor Compliance Standards.</td>
<td>BMM</td>
<td>Prior to construction</td>
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<td>4. Notification to DENC: Director of Compliance Monitoring</td>
<td>Ensure that DENC, DEA, DWA and DMR are notified of commencement date.</td>
<td>4.1 Notify DENC, DMR and DEA prior to commencement of construction.</td>
<td>Proof of communication</td>
<td>BMM</td>
<td>14-days in advance of commencement of construction.</td>
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<td>Keep DENC and DMR informed of any aspects of non-compliance with EMP'r or EA.</td>
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<td>4.2 Notify DENC, DMR and DEA with reasons if any provisions of the EMP'r or EA cannot be implemented, and provide alternative.</td>
<td>Letter of notification</td>
<td>BMM</td>
<td>Prior to construction</td>
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<td>Keep all authorities informed of current contact details of applicant.</td>
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<td>4.3 Notify DENC, DEA, DMR and DWA of any change of contact details of the applicant.</td>
<td>Letter of notification</td>
<td>BMM</td>
<td>Prior to construction</td>
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<td>Keep DENC informed of</td>
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<td>4.4 Submit the name and contact details of the applicant.</td>
<td>Letter of notification</td>
<td>BMM</td>
<td>Prior to construction</td>
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</table>

Note that the license issued in terms of the National Environmental Management: Air Quality Act will only be issued, after commencement of operation.

3. Finalisation of EMP'r and Contractor Compliance Standards: Update EMP'r with EA conditions and other requirements as set out by the Department of Mineral Resources and Water Affairs and Environment and Nature conservation.

3.1 Incorporate additional mitigation measures specified by the relevant authorities into the EMP'r and Contractor Compliance Standards.

Keep DENC informed of the name and contact details of the applicant.
### Planning and Design Phase

<table>
<thead>
<tr>
<th>Aspect</th>
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<td>contact details of ECO</td>
<td>appointed ECO prior to construction</td>
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<td>5.</td>
<td>Subsidiary Plans</td>
<td>5.1 The following subsidiary plans will need to be in place prior to construction, and apply to both the construction and operational phases of the Project. Specialist input will be required for, as indicated below:</td>
<td>Copies of plans to be kept on-site.</td>
<td>BMM</td>
<td>Prior to construction</td>
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<tr>
<td></td>
<td>Develop Subsidiary Plans to minimise environmental and social risks</td>
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<td>• Biodiversity Management Plan (qualified botanist required)</td>
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<td>• Health and Safety Plan</td>
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<td>• Traffic Management Plan</td>
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<td>• HIV Policy and Awareness Plan</td>
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<td>• Rehabilitation Plan</td>
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<td>• Policy for assessing damages and losses to resources</td>
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<td>• Recruitment Policy</td>
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<td>• Procurement Policy</td>
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<td>• Code of Conduct</td>
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<td>• Grievance Mechanism</td>
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<td>• Community Engagement Plan</td>
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<td>• Waste Management Plan (Waste management specialist required)</td>
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<td>• Emergency Plan</td>
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<td>• Storm water management plan</td>
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<td>• Grievance procedure</td>
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<td>• Tailings Management Plan</td>
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<td>• Comprehensive water balance plan</td>
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<td>• Groundwater Monitoring Plan (Hydrogeologist)</td>
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<td>• Soil erosion and sediment control</td>
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## PLANNING AND DESIGN PHASE

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<td># Commitment / Actions Required / Key Controls</td>
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<td>management plan</td>
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<td>• Air quality monitoring plan, including dust suppression (air quality specialist required)</td>
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<td>• Phase 2 archaeological mitigation plan (Archaeological specialist required)</td>
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<td>• Soil contamination and management plan</td>
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<td>• Health and safety plan (include requirements in terms of the Operational, Health and Safety Act)</td>
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<td>• Groundwater monitoring plan, for implementation prior to construction.</td>
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<td>• Stakeholder Consultation and Engagement Plan</td>
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<td>• Local contractor and supplier policy</td>
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<td>These are referred to below, where relevant. These plans should be aligned with BMM and Vedanta existing Plans, which in turn demonstrates alignment with IFC requirements.</td>
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6. Procurement of Services and Tender Procedures

Ensure that procurement of local, regional and national services is maximised:

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<tbody>
<tr>
<td>6.1 Establish a procurement policy which sets reasonable targets for the procurement of goods and services from South African residents /suppliers, particularly local residents as far as possible.</td>
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<td>Procurement policy</td>
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<td>6.2 Procurement should advertise tenders in local and national newspapers.</td>
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<td>Proof of advertisements</td>
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<td>6.3 Procurement processes should identify and</td>
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<td>Proof of BIDs considered.</td>
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### PLANNING AND DESIGN PHASE

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<tbody>
<tr>
<td>6.4</td>
<td>Description of Aspect</td>
<td>invite bids from local suppliers.</td>
<td>Demonstrate robust reasons for selecting/not selecting local suppliers</td>
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<td>6.5</td>
<td>Adopt transparent adjudication process for local suppliers.</td>
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<td>Proof of conditions of contract</td>
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<td>6.6</td>
<td>The conditions of the contract between BMM and the subcontractor will include requirements for local Enterprise Development addressing the following identified opportunities:</td>
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<td>- Electrical system: there will be a requirement for the electrical contractor to make use of local electrical companies for certain elements of the installation of the electrical system. The requirement will be for a minimum of 5 percent of the subcontract value to be spent on local enterprises.</td>
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<td>Copies of contract for proof.</td>
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<td>- Security: there will be a contractual requirement for the security service contractor to subcontract the provision of local security staff to a local company. If such a company does not exist, then the requirement will be for the security service contractor to establish such a subcontractor. The requirement will be for a minimum of 25 percent of the subcontract value to be spent on local enterprises.</td>
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<td>Description of Aspect</td>
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<td>Actions to be undertaken to Mitigate Environmental Impact</td>
<td>Parameters for Monitoring</td>
<td>Responsibility</td>
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<td>6.7</td>
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<td>BMM will include requirements for local employment in the contracts that they establish with subcontractors and require that all contractors recruit in accordance with the BMM recruitment policy (as proposed above) and RFP documents.</td>
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<td>6.8</td>
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<td>BMM will work with the Local Municipality, community representatives and NGOs to identify suppliers with the appropriate level of capacity to supply goods and services over the operational lifetime of the project (specifically BBBEE companies).</td>
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<td>6.9</td>
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<td>BMM to work closely with the suppliers to provide the requisite training to the workers. The training provided will focus on Development of local skills.</td>
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<td>7.1</td>
<td>Employment &amp; Recruitment</td>
<td>Ensure that employment of local people is maximised and that societal expectations are managed in terms of</td>
<td>BMM will work closely with the relevant local authorities, community representatives and NGOs to ensure that the use of local labour is maximised. This should include:</td>
<td></td>
<td>BMM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Meeting minutes / advertisements</td>
<td></td>
</tr>
</tbody>
</table>
### PLANNING AND DESIGN PHASE

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Objective</th>
<th>Actions to be undertaken to Mitigate Environmental Impact</th>
<th>Parameters for Monitoring</th>
<th>Responsibility</th>
<th>Frequency / Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>Description of Aspect</td>
<td># Commitment / Actions Required / Key Controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.2</td>
<td>employment opportunities.</td>
<td>• sourcing and using available skills/employment databases that the local authorities may have;</td>
<td>Signed records of Health and Safety training undertaken.</td>
<td>BMM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• where no database is available, BMM to establish a database in consultation with the Khai Ma Local Municipality, community representatives and NGOs (this database will be shared with contractors); and</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• advertising employment opportunities through the Local Municipality and using local media.</td>
<td></td>
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</tr>
<tr>
<td>7.3</td>
<td></td>
<td>Ensure that the appointed project contractors and suppliers have access to Health, Safety, Environmental and Quality training as required by the project.</td>
<td>Recruitment Policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.4</td>
<td></td>
<td>BMM will establish a recruitment policy which will set reasonable targets for the employment of local residents from the IYLM. The policy will be aligned with the requirements of the DoE as stipulated in the RFP Documents and, where possible, BMM will strive to exceed these requirements.</td>
<td>Proof of compliance with the Employment Equity Act.</td>
<td></td>
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</tr>
<tr>
<td>7.5</td>
<td></td>
<td>The Recruitment Policy will also promote the employment of women to ensure that gender equality is attained as defined in the Employment Equity Act (No 55 of 1998).</td>
<td>Proof of notification</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### PLANNING AND DESIGN PHASE

<table>
<thead>
<tr>
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<th>Frequency / Timing</th>
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<tbody>
<tr>
<td>#</td>
<td>Description of Aspect</td>
<td># Commitment / Actions Required / Key Controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.6</td>
<td>BMM will notify identified representatives of the Local Municipality of the specific jobs and the skills required for the project. This will give the local population time prior to the commencement of construction to attain the relevant skills/qualifications to be employable on the project.</td>
<td>BMM will initiate training and skills Development programmes prior to the commencement of construction, as a means of ensuring that members of the local workforce are up-skilled and can be employed on the project.</td>
<td>Training material and records</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.7</td>
<td>The recruitment policy must be aligned with the existing policy for BMM and Vedanta.</td>
<td>In order meet unmet expectations of employment opportunities, BMM must implement the following measures:</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>• BMM will keep the communities regularly informed of on-going Project activities through the ward councillors and community leaders. Method and frequency to be defined in the above-mentioned stakeholder consultation and engagement plan.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• All concerns regarding jobs and other</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>
### PLANNING AND DESIGN PHASE

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Objective</th>
<th>Actions to be undertaken to Mitigate Environmental Impact</th>
<th>Parameters for Monitoring</th>
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<th>Frequency / Timing</th>
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</thead>
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<td># Commitment / Actions Required / Key Controls</td>
<td></td>
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<td></td>
<td></td>
<td>expectations will be addressed in accordance to the grievance procedure</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>– clearly advertise criteria for skills and experience needed for available jobs through local, regional and national media; and clearly advertise experience, quality and volume requirements from the supply chain.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>• Consult with local community leaders/members to ensure the Project is fulfilling commitments to participation including in training, employment, community benefits package, and monitoring activities and outcomes.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Ensure a high standard of environmental management and monitoring, including participative monitoring with community groups.</td>
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<tr>
<td></td>
<td></td>
<td>• The Project will clearly communicate information on safety standards and practices, and respond quickly to community questions as they arise.</td>
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</tbody>
</table>
### 6.4.2 Waste management and classification design and planning requirements

**Table 6.2 Waste management design and planning considerations.**

<table>
<thead>
<tr>
<th>Unit / Source</th>
<th>Description</th>
<th>Waste Type/Composition</th>
<th>Preferred Management Option(s)</th>
<th>Alternative Management Option(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Construction Phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Wastes</td>
<td>Metal Scrap</td>
<td>Steel, wood, rubber &amp; plastic &amp; tyre scrap Electrical cable scrap</td>
<td>Recycle/ Recover</td>
<td>Dispose to General Waste Landfill</td>
</tr>
<tr>
<td></td>
<td>Building Rubble</td>
<td>Cement Bags, bricks, cut-offs, hardened cement etc</td>
<td>Recycle, reuse, if possible</td>
<td>Dispose to General Waste Landfill</td>
</tr>
<tr>
<td></td>
<td>Paint</td>
<td>Waste Paint, “Empty” Containers</td>
<td>Recycle to “Collect-a-Can”</td>
<td>Dry out/Solidify and Dispose to General Waste Landfill</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fuels</td>
<td>Spillage, Contaminated Soil</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lubricating Oil and Grease</td>
<td>Used oil and grease, oil filters, oily rags, etc</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sewage Treatment</td>
<td>Activated Sludge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Health care risk waste</td>
<td>Used bandages, plasters, syringes, Sanitary Towels, and Pads etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Batteries</td>
<td>Vehicle Batteries Batteries from electrical equipment, e.g. cell phones, torches</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Mining</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste Rock</td>
<td>Residue Rock, Soil, etc.</td>
<td>Natural material from the mining area.</td>
<td>Dispose to Rock Dump in accordance to Requirements</td>
<td>Use to back fill open pit workings, if permitted</td>
</tr>
<tr>
<td>Drilling Oils</td>
<td>Soluble petroleum oils</td>
<td>Soluble oil can be considered potentially hazardous if it enters the ground and surface water</td>
<td>Temporary storage on-site followed by disposal at Vissershok, Cape Town.</td>
<td>Dispose any residual Oil and packaging to an HH Landfill</td>
</tr>
<tr>
<td>Explosives</td>
<td>Ammonium Nitrate Fuel Oil (ANFO)</td>
<td>Classed as SANS 10228/GHS 10234 Class 1 Waste, Explosive, when not de-sensitized.</td>
<td>The spilled over explosives would be collected and used in the void bore hole (stemming) just above the ANFO fill.</td>
<td>Small amounts can be treated with water and disposed to hazardous waste landfill</td>
</tr>
<tr>
<td>Crusher Dusts</td>
<td>Rock dusts</td>
<td>Spillage, Dust from extractors</td>
<td>Process in flotation plant if</td>
<td>Dispose to Tailings Dam</td>
</tr>
<tr>
<td>Unit / Source</td>
<td>Description</td>
<td>Waste Type/Composition</td>
<td>Preferred Management Option(s)</td>
<td>Alternative Management Option(s)</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------</td>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Petroleum Wastes</td>
<td>Diesel, Petrol</td>
<td>Spillage, Contaminated Soil</td>
<td>possible</td>
<td></td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>Vehicle lubricants</td>
<td>Used oil, oil filters, oily rags, empty oil cans, etc.</td>
<td>See Section Below</td>
<td></td>
</tr>
</tbody>
</table>

3. Processing – Flotation Plant

Carbon Flotation:

<table>
<thead>
<tr>
<th>Depressants</th>
<th>1. Zinc Sulphate 2. Calcium Cyanide</th>
<th>Solid Residues and dissolved Zn and Cyanide</th>
<th>The spillage will be transferred to PCD. Liquid will be recycled suitably and the solid part will be taken back into the circuit.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Frothers</td>
<td>Anionic or non-ionic Detergents</td>
<td>Waste material, spillages, empty containers and tailings</td>
<td>The spillage will be transferred to PCD. Liquid will be recycled suitably and the solid part will be taken back into the circuit.</td>
<td>See text</td>
</tr>
</tbody>
</table>

Lead Flotation

<table>
<thead>
<tr>
<th>Frother</th>
<th>Anionic or non-ionic Detergents</th>
<th>Waste material, spillages, empty containers and tailings</th>
<th>The spillage will be transferred to PCD. Liquid will be recycled suitably and the solid part will be taken back into the circuit</th>
<th>See text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector</td>
<td>Sodium ethyl xanthate</td>
<td>Waste material, spillages, empty containers and tailings</td>
<td>The spillage will be transferred to PCD. Liquid will be recycled suitably and the solid part will be taken back into the circuit</td>
<td>See text</td>
</tr>
<tr>
<td>Unit / Source</td>
<td>Description</td>
<td>Waste Type/Composition</td>
<td>Preferred Management Option(s)</td>
<td>Alternative Management Option(s)</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>----------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Zinc Flotation and Zinc Concentrate Flotation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activator</td>
<td>Copper sulphate</td>
<td>Waste material, spillages, empty containers and tailings</td>
<td>The spillage will be transferred to PCD. Liquid will be recycled suitably and the solid part will be taken back into the circuit</td>
<td>See text</td>
</tr>
<tr>
<td>pH Modifier - lime</td>
<td>Calcium oxide/hydroxide</td>
<td>Waste Lime, spillages, empty bags, etc.</td>
<td>Utilise to raise pH of tailings before discharge to dam</td>
<td>High pH wastes, pH&gt;12, should not be disposed to landfill. Can be used to neutralise acid wastes at an HH landfill.</td>
</tr>
<tr>
<td>Collector</td>
<td>Sodium ethyl xanthate</td>
<td>Waste material, spillages, empty containers and tailings</td>
<td>Oxidise xanthate using hydrogen peroxide: Effluent to tailings dam and solid residues to HH Landfill</td>
<td></td>
</tr>
<tr>
<td>Ore (in Open) and Concentrate (under Cover) Stockpile Pads</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spillage and Sweepings??</td>
<td></td>
<td>The ore and concentrate both contain heavy metals and sulphides: spillages, sweepings, etc.</td>
<td>Recover values or dispose to Tailings Dam</td>
<td></td>
</tr>
<tr>
<td>4. Flotation Plant - Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemicals</td>
<td>Redundant Chemicals, Reject Products,</td>
<td>Various – see above</td>
<td>Recycle, if possible</td>
<td>Dispose to Hazardous Waste Landfill, if permitted</td>
</tr>
<tr>
<td>Laboratory</td>
<td>Laboratory Waste</td>
<td>Waste Samples</td>
<td>Dispose to HH Landfill</td>
<td>See text</td>
</tr>
<tr>
<td>5. Maintenance including Vehicle Wash Bay</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effluent Treatment System</td>
<td>Oily Sludge</td>
<td>Oily waste from Workshops, Maintenance Yard, Sludge from Vehicle Wash Bay</td>
<td>Oil recovery – ROSE foundation. Waste to Energy: 1) Cement Kiln or</td>
<td>Treatment/Disposal to Hazardous Waste Landfill, if permitted</td>
</tr>
<tr>
<td>Unit / Source</td>
<td>Description</td>
<td>Waste Type/Composition</td>
<td>Preferred Management Option(s)</td>
<td>Alternative Management Option(s)</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Dedicated On-Site Facility</td>
<td>Oily Wastes</td>
<td>“Empty” oil cans, oily rags</td>
<td>Oily Cans to Recycling, Oily Rags to Landfill, if permitted or alternatively to Vissershok.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scrap Tyres and rubber waste</td>
<td>Scrap tyres from cars, trucks plus conveyer belt waste.</td>
<td>Utilise/Recover to manufacture rubber product Waste to Energy: 1) Cement Kiln or 2) Dedicated On-Site Facility</td>
<td>Landfill of tyres whole or quartered may be prohibited: see text.</td>
</tr>
<tr>
<td></td>
<td>Fuel Storage</td>
<td>Diesel, petrol</td>
<td>Spillage, Contaminated Soil</td>
<td>Bio-remediate in-situ or Compost</td>
</tr>
<tr>
<td>6. Tailings Dam</td>
<td>Tailings</td>
<td>Residues from flotation process.</td>
<td>Contains heavy metals, iron, cadmium, zinc, lead, copper, manganese, etc. plus high amount of sulphur as the sulphide. Classed as significant environmental risk.</td>
<td>Dispose to tailings Dam, ensure pH of 8 to 9 to minimise possibility of acid mine drainage.</td>
</tr>
<tr>
<td></td>
<td>7. Effluent Treatment System</td>
<td>Bio Sludge</td>
<td>Activated Sludge</td>
<td>Agricultural Use Compost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water Treatment Sludge</td>
<td>Mainly Inorganic Solids</td>
<td>Could be used in the manufacture of clay bricks</td>
</tr>
<tr>
<td></td>
<td>Garden waste</td>
<td>Green waste from gardens</td>
<td>Compost</td>
<td>Excess and non-compostable material, dispose to General Waste Landfill.</td>
</tr>
<tr>
<td>Unit / Source</td>
<td>Description</td>
<td>Waste Type/Composition</td>
<td>Preferred Management Option(s)</td>
<td>Alternative Management Option(s)</td>
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<tr>
<td>--------------------------------------</td>
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<td>--------------------------------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td>Empty Metal Containers</td>
<td>Soft drink cans, paint cans, empty oil cans, etc.</td>
<td>Recycle to Collect-a-Can</td>
<td>Dispose to licensed General Waste Landfill, if permitted.</td>
<td></td>
</tr>
<tr>
<td>Batteries</td>
<td>1) Lead-acid Batteries from Vehicles 2) Dry Batteries, e.g. from cell phones, torches and other equipment.</td>
<td>1) Lead-Acid Batteries recycle 2) Dry Batteries recycle if possible.</td>
<td>Treatment/Disposal of Residues to Landfill, if permitted: see text.</td>
<td></td>
</tr>
<tr>
<td>Waste Electric and Electronic Equipment (WEEE)</td>
<td>1) Lamps 2) Other, e.g. computers, Cell Phones</td>
<td>Recycle through licensed WEEE management company.</td>
<td>Incinerate</td>
<td></td>
</tr>
</tbody>
</table>

**Preferred Management Option(s)**

- Recycle to Collect-a-Can
- Dispose to licensed General Waste Landfill, if permitted.
- Treatment/Disposal of Residues to Landfill, if permitted: see text.
- Incinerate
7 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME (CEMPr)

7.1 SCOPE

This Specification covers the requirements for controlling the impact on the environment of all construction activities for the Project. All construction activities shall observe the requirements of this specification as well as any relevant environmental legislation and in so doing shall be undertaken in such a manner as to minimise impacts on the natural and social environment.

Although the construction period is expected to last for 36 - 42 months, it must be noted that construction related activities are directly linked to the production ramp up of the mine. BMM intends to construct the Gamsberg mine, with a zinc concentrate production capacity of only 0.335 million tons per annum (i.e. Phase 1 of the ramp up). Once the proposed mine achieves this production capacity, the construction phase will commence again to then achieve a zinc concentrate production capacity of only 0.67 million tons per annum (tpa) (i.e. Phase 2 of the ramp up). Note that while construction continues to achieve Phase 2 production levels, the operational phase for Phase 1 (0.335 million tpa) will commence.

Following this, the final construction phase will commence to then achieve a zinc concentrate production capacity of 1 million tpa (i.e. Phase 3 of the ramp up). Note that it will take on average, two years to achieve each phase of the ramp up of the production capacity. It is anticipated that full production (i.e. Phase 3) will take approximately 6 years to achieve, with construction activities occurring in-between.

7.2 APPLICATION

This Specification contains clauses that are generally applicable to the undertaking of civil engineering works in areas where it is necessary to impose pro-active controls on the extent to which the construction activities impact on the environment. The roles and responsibilities in terms of the application and implementation of this Specification have been outlined in Section 4.2 above.

7.3 METHOD STATEMENTS

Any Method Statement required by the Engineer or the Environmental Specification shall be produced within such reasonable time as the Engineer shall specify or as required by the Specification. The Contractor shall not commence the activity until the Method Statement has been approved and
shall, except in the case of emergency activities, allow a period of two weeks for approval of the Method Statement by the Engineer. Such approval shall not unreasonably be withheld.

The Engineer or ECO may request a Method Statement for any activity they believe may impact on the environment. The Engineer in consultation with the ECO may also require changes to a Method Statement if the proposal does not comply with the Specification or, if in the reasonable opinion of the Engineer, the proposal may result in, or carry a greater than reasonable risk of, damage to the environment in excess of that permitted by the Specifications. Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. The Contractor shall carry out the Works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his/her obligations or responsibilities in terms of the Contract.

The following Method Statements shall be provided by the Contractor and submitted to the Engineer and ECO at least 7 working days before site establishment. The content of the Method Statement must be agreed to with the ECO and site engineer, and Section 6.5 above provides an explanation of what these documents must contain.

- Logistics for the environmental awareness course for all the Contractors employees.
- Emergency procedures for fire, accidental leaks and spillages of hazardous materials including:
  - who shall be notified in the event of an emergency, including contact numbers for the relevant local authority,
  - where and how any hazardous spills will be disposed of,
  - the size of spillage which the emergency procedures could contain,
  - location of all emergency equipment and an indication of how regularly the emergency equipment will be checked to ensure that it is working properly.

- Location and layout of the construction camp in the form of a plan showing offices, stores for fuels, hazardous substances, vehicle parking, access point, equipment cleaning areas and staff toilet placement.
- Location, layout and preparation of cement / concrete batching facilities including the methods employed for the mixing of concrete and the management of runoff water for such areas. An indication shall be given of how concrete spoil will be minimised and cleared.
- Method of undertaking earthworks, including spoil management, erosion.
- Measures for the suppression of dust and noise emissions.
- Method statement for the establishment of no-go areas, specifically with regard to the manner in which sensitive ecological habitat will be avoided.
- Method of undertaking blasting during pre-stripping (if required).
• Location of stormwater management measures and visual representation of mechanisms to manage clean and dirty water separation.
• Management measures to be undertaken in instances where traffic flows may be interrupted.
• Extent of areas to be cleared, the method of clearing and the preparation for this clearing so as to ensure minimisation of exposed areas.
• Measures to be put in place during temporary closure periods, e.g. December holidays.
• Measures to be put in place to limit sediment deposition into the Kloof and waterbodies.

Note that the contractor may only commence with any activity if a Method Statement which has been approved by the ECO and site engineer is in place.

7.3.1 Environmental Awareness Training

The logistics for the environmental awareness training course, together with the subject matter, would need to be outlined into a method statement. This will include, inter alia, the number of attendees, material to be distributed and procedures to record and verify attendance.

7.3.2 Temporary Construction Camp and Site Division

The location, layout and method of establishment of the temporary contractor camp (including all buildings, offices, lay down yards, vehicle washing areas, fuel storage areas, batching areas and other infrastructure required for the construction of the project).

7.3.3 Vegetation Clearing

Method of vegetation clearing during site establishment and disposal procedure for cleared material.

7.3.4 Access/Haul Routes

Details, including a drawing, showing where and how the access points and routes will be located and managed, including traffic safety measures.

7.3.5 Fuel Storage and Use

The design, location and construction of the fuel storage area, for the filling and dispensing from storage tanks and management of drip trays.

7.3.6 Solid Waste Management

Expected solid waste types, quantities, methods of recycling to be employed, monitoring and record keeping procedures, staff responsible for the oversight
of waste management and recycling and frequency of collection and disposal of the non-recycled component, as well as location of disposal sites.

7.3.7  
Contaminated Water

Methods of minimising, controlling, collecting and disposing of contaminated water, including stormwater run-off.

7.3.8  
Hazardous Substances

Details of any hazardous substances / materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

7.3.9  
Cement and Concrete Batching

Location, layout and preparation of cement/ concrete mixing areas including the methods employed for the mixing of concrete, and particularly the containment of runoff water from such areas, as well as the method of transportation of concrete.

Batching to be undertaken on a smooth, impermeable surface and which is sloped towards a sump collection point. All wastewater generated from the batching area shall be collected and disposed of via the contaminated wastewater management system.

7.3.10  
Emergency Procedures and Equipment

Emergency procedures for fire, accidental leaks and spillages of hazardous substances (including fuel and oil). Include details of risk reduction measures to be implemented, such as fire fighting equipment, fire prevention procedures and spill kits (materials and compounds used to reduce the extent of spills and to breakdown or encapsulate hydrocarbons). The contractor will also outline the type of emergency equipment required on site, as well as the servicing requirements to ensure correctly functioning equipment.

Other Method Statements required by the Engineer and ECO during the course of construction are to be provided by the Contractor a minimum of 14 working days prior to commencement of the works or activities to which they apply (these activities may not commence on site before these Method Statements have been approved except in the case of emergency activities).

7.3.11  
Erosion and Sedimentation Control

The proposed methods of sedimentation and erosion control for bulk earthworks in particular and the remainder of the construction period, in order to ensure the prevention of sedimentation of water courses and stormwater infrastructure.
7.3.12 **Blasting**

A detailed method statement will need to be compiled for all blasting activities related to the construction phase. This method statement must reflect the timing, regularity, means of notification of surrounding receptors and proof of legislative requirements that govern blasting.

7.3.13 **Traffic management**

The contractor must compile a method statement for the transportation of abnormal loads, or transport related activities that will impact on surrounding traffic flows. The method statement must indicate timing of potential disruption/ road closures, means of notification of surrounding road users, proof of correspondence from the relevant traffic authorities and drawings of any potential changes to the existing road layout.

7.4 **SITE ESTABLISHMENT**

7.4.1 **Site Division**

The Contractor shall restrict all his activities, materials, equipment and personnel to within the area specified, and shall restrict his activities to only those areas that are necessary to undertake the works.

A Method Statement detailing the layout and method of establishment of the temporary construction camp, all buildings, offices, lay down areas, fuel storage areas, batching areas and other infrastructure required for the running of the project shall be submitted.

Disturbed areas rather than pristine or intact landscape areas should preferably be used for the temporary construction camp.

7.4.2 **Site Demarcation**

The Contractor shall erect and maintain permanent and/ or temporary fences of the type and in the locations directed by the Engineer. Such fences shall, if so specified, be erected before undertaking designated activities. The temporary construction camp, material stores and lay-down areas should be screened and sited as far away as possible from the local roads.

7.4.3 **Site Clearance**

**Topsoil**

Given the conditions on top of the Gamsberg, there is generally very little topsoil if any at all. Ideally, only about the top 30cm should be used. In some situations this generates too little to redistribute effectively afterwards, and a
little more is taken, but this has a negative effect on the recovery achieved when it is reapplied. Also, the biological activity of stored topsoil declines over time and it should not be stored for more than a few months and the benefit of putting it aside declines substantially after about 6 months. However if stored for an extended period of time no natural regeneration from the soil-stored seed bank can be expected. Due to the arid nature of the impacted environment, topsoil will not be retained for re-use during the construction phase of the Project.

7.4.4 Access Routes/ Haul Roads

The Contractor shall control the movement of all vehicles including that of his suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and that all relevant laws are complied with. In addition, such vehicles shall be so routed and operated as to minimise disruption to regular users of the routes not on the site. The vehicles of the Contractor and his suppliers shall not exceed a speed of 30 km/h on gravel or earth roads on site and within 500 m of the site.

During construction, arrangements and routes for abnormal loads (if required) must be agreed in advance with the relevant authorities and the appropriate permit must be obtained for the use of public roads. Lastly, dust suppression measures must be applied to all gravel roads, especially during period of strong winds.

7.5 General Requirements

7.5.1 Materials Handling, Use and Storage

The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the Specifications. The Contractor shall ensure that these delivery drivers are supervised during off loading, by someone with an adequate understanding of the requirements of the Specifications.

Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to, sand, stone chips, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

All manufactured and/ or imported material shall be stored within the Contractor's temporary construction camp. All lay down areas outside of the temporary construction camp shall be subject to the Engineer's approval.
All building materials should be stored at least 50 m away from aquatic ecosystems and the areas bunded appropriately such that there will be no runoff from these areas towards aquatic systems. All building materials should be removed after construction.

**7.5.2 Fuel (Petrol and Diesel) and Oils (Heavy fuel oils included)**

All fuel is to be stored within a demarcated area in the Contractor’s temporary construction camp. No refuelling of vehicles or machinery is to take place outside of this demarcated area unless authorised by the Engineer. The Engineer shall be advised of the area that the Contractor intends using for the storage of fuel.

The Contractor shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut. Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks shall be sealed and stored in an area where the ground has been protected.

Tanks containing fuels shall be situated on a smooth impermeable surface (plastic or concrete) base with a bund (if plastic, it must have sand on top to prevent perishing) to contain any possible spills and prevent infiltration of fuel into the ground. The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall make up 110 percent of the total capacity of all the storage tanks.

The floor of the bund shall be sloped towards an oil trap or sump to enable any spilled fuel to be removed. An Enretech or similar hydrocarbon absorption/remediation product approved by the ECO shall be installed in the sump to reduce the risk of pollution. Bulk fuel storage and bunded areas shall have overhead cover to prevent rain from entering the bunded area. The Contractor shall keep fuel under lock and key at all times.

If fuel is dispensed from 210 litre drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism used to dispense fuel from the drums shall be stored in a waterproof container when not in use.

During fuel tanker delivery, the tanker driver must be present at all times during offloading of product. An emergency cut-off switch must be installed to immediately stop fuel delivery should an accident occur. An anti-flash nozzle must be installed at the end of the vent pipe with a fuel dispenser equipped with an automatic cut-off switch to prevent fuel tank overfills.

No smoking shall be allowed in the vicinity of the stores. Symbolic safety signs depicting “No Smoking”, “No Naked Lights” and “Danger” are to be provided, and are to conform to the requirement of SABS 1186. The volume
capacity of the tank shall be displayed. The product contained within the tank shall be clearly identified using the emergency information system detailed in SABS 0232 Part 1. Any electrical or petrol-driven pump shall be equipped and positioned so as not to cause any danger of ignition of the product.

Areas for storage of fuels and other flammable materials shall comply with standard fire safety regulations and may require the approval of the Municipal Fire Prevention Officer.

The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores.

Where reasonably practical, vehicles and equipment shall be refuelled at a designated re-fuelling area or at the workshop as applicable. If it is not reasonably practical then the surface under the temporary refuelling area shall be protected against pollution and drip trays used to the reasonable satisfaction of the Engineer prior to any refuelling activities. The Contractor shall ensure that there is always a supply of appropriate material readily available to absorb/ breakdown and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 210 litre of hydrocarbon liquid spill. This material must be approved by the Engineer prior to any refuelling or maintenance activities.

7.5.3 *Solid Waste Management*

For the purposes of these Environmental Specifications, solid waste includes all debris and waste (e.g. litter, food waste, hardware discards, vegetation and tree stumps, building rubble, etc.), including hazardous waste (e.g. oils) resulting from any construction activities on site.

The Contractor shall be responsible for the establishment of a waste control system (Waste Management Plan) that is acceptable to the Engineer and ECO, and a method statement is required in this regard. The contractor shall keep detailed records of all waste removed from site. The waste management hierarchy (as presented below) must be adopted, when managing waste produced onsite.
The contractor must then provide proof of recycling or legal disposal at a registered landfill site (disposal certificates). No refuse or waste material will be disposed of by burying on site. The specific disposal requirements of wastes will be informed by the relevant hazard rating, as this will determine the landfill requirements.

**Refuse Control**

The Contractor shall provide labourers to clean up the Contractor's temporary construction camp and working areas on a daily basis.

Litter and waste materials (excluding rubble and hazardous waste materials) shall be disposed of into scavenger- and weather-proof bins. The Contractor shall provide sufficient bins with lids on site to store the waste produced on a daily basis. In order to facilitate recycling it is recommended that a number of bins be provided at each location, and that such bins be clearly marked according to the category of waste being recycled (e.g. paper, metals, plastics, glass, etc.) Bins shall not be allowed to become overfull and shall be emptied a minimum of once daily. The waste may be temporarily stored on site in a central waste area that is weatherproof and scavenger-proof, and which the Engineer has approved. The Contractor shall then remove the refuse collected from the Site at least once a week. Any refuse not being re-cycled must be disposed of at a registered waste disposal facility.
The Contractor shall ensure that waste and surplus food, food packaging and organic waste are not deposited by employees anywhere on the site except in refuse bins.

Empty Cement Bags

Empty cement bags must be collected from the construction area by the end of every day and before rain events and shall be stored in bins that are either placed under cover or fitted with lids. This prevents the bags getting wet and the cement powder leaching into the environment.

Hazardous Waste

Petroleum, chemicals, and other harmful and hazardous wastes are to be stored in enclosed and bunded areas. The location of these sites is to be approved by the Engineer and the ECO. These wastes shall be disposed of at a registered hazardous waste disposal site. The Contractor shall submit copies of receipts from such waste disposal sites to the Engineer and ECO as proof of proper disposal. The storage, handling and disposal of hazardous waste are also controlled through other relevant legislation which must be complied with, e.g. the Occupational Health & Safety Act.

Builders rubble

The Contractor shall provide labourers to clean up the Contractor's camp and working areas of rubble generated in the course of construction work, at least once a week.

Rubble shall be temporarily stockpiled in a waste skip or a central stockpile. Any rubble not being recycled (e.g. sent for crushing) or reused shall be removed from site and disposed of at an approved landfill site as soon as it constitutes a practical load for removal and before temporary closure of the site (e.g. over builders holidays). No plastics, shrink wrap, paint buckets or any other debris that does not constitute clean building rubble, shall be stored at such stockpile sites.

7.5.4 Ablution Facilities

Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided. Latrine and ablution facilities and first-aid services shall comply with the regulations of the local authority concerned and shall be maintained in a clean and sanitary condition to the satisfaction of the Engineer.

The Contractor shall provide suitable sanitary arrangements at the Contractor’s temporary construction camp and approved points around the designated work area to allow easy access for all employees on site. Project
staff are not permitted to commence with work on a site without suitable toilet facilities available for them.

Sanitary facilities shall be located within 100 m from any point of work, but not closer than 50 m to any water body. One chemical toilet is to be provided on site for every 15 contract personnel at each working area. These toilets must have doors and locks and shall be secured to prevent them blowing over. Toilet paper shall be provided.

The Contractor shall ensure that suitable sanitation facilities are provided for or by all his sub-contractors on site.

Toilets are to be emptied prior to builders’ holidays. The contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from site. Discharge of waste from toilets into the environment and burial of waste is strictly prohibited.

The Contractor shall keep the toilets in a clean, neat and hygienic condition. If the Contractor fails to provide and/or maintain all site sanitation facilities in a clean and hygienic condition, the Engineer may order the Contractor to suspend any or all work on the site until these requirements are met. No payment shall be made for any delays or disruption of the Works caused thereby nor shall extensions of time be granted for such delays.

7.5.5 Eating Areas

The Contractor shall designate eating areas to the approval of the Engineer, which shall be clearly demarcated. Sufficient bins, as specified in 4.5.3, shall be present in this area. Any cooking on site shall be done on well-maintained gas cookers with fire extinguishers present.

7.5.6 Drinking Water

The Contractor shall ensure that drinking water is available for all staff on site. If no potable water source is available on site, then the Contractor shall import drinking water to the site.

7.5.7 Contaminated Water

Potential pollutants of any kind and in any form shall be kept, stored, and used in such a manner that any escape can be contained and the water table not endangered. Water containing such pollutants as cements, concrete, lime, chemicals, fuels and hydrocarbons shall be contained and discharged into an impermeable storage facility for removal from the site or for recycling. This particularly applies to water emanating from concrete batching plants and concrete swills, and to runoff from fuel depots, workshops and truck washing areas.
Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. The Contractor shall notify the Engineer immediately of any pollution incidents on Site.

If construction areas are to be dewatered (e.g. after rains), this water must first be pumped into a settlement area, and not directly into a natural ecosystem.

A Method Statement shall be required for all wash areas where hydrocarbon and hazardous materials or other pollutants are expected to be used. This includes, but is not limited to, vehicle washing, workshop wash bays and paint equipment cleaning. Wash areas for domestic use shall ensure that the disposal of contaminated “grey” water is sanctioned by the Engineer.

7.5.8 Hazardous Substances

Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction shall be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) shall be available on Site. Procedures detailed in the MSDS shall be followed in the event of an emergency situation.

If potentially hazardous substances are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/ materials to be used, together with the storage, handling and disposal procedures of the materials.

No paint products and chemical additives and cleaners such as thinners and turpentine, may be disposed of on Site. Brush / roller washing facilities shall be established to the satisfaction of the Engineer. A Method Statement, approved by the Engineer, is required for such washing activities.

7.5.9 Site Structures

The Contractor shall supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather shall be weatherproof, adequately ventilated and provided with raised floors.

All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of the area disturbed. The type and colour of roofing and cladding materials comprising the Contractor’s temporary structures shall be selected to reduce reflection. The Contractor’s camp shall be fenced with a fence of at least 1.8 m high, and the camp area shall be screened via the attachment of shade cloth to the fence surrounding the site camp.
7.5.10 **Lights**

The Contractor shall ensure that any lighting installed on site for related activities does not interfere/impact with road traffic or cause a reasonably avoidable disturbance to the surrounding road users or community members.

7.5.11 **Workshop, Equipment Maintenance and Storage**

Where practical, all maintenance of plant on Site shall be performed in the workshop. If it is necessary to do maintenance outside of the workshop area, the Contractor shall obtain the approval of the Engineer prior to commencing activities.

The Contractor shall ensure that in his workshop and other plant maintenance facilities, including those areas where, after obtaining the Engineer’s approval, the Contractor carries out emergency plant maintenance, there is no contamination of the soil or vegetation. The workshop shall have a smooth impermeable floor either constructed of concrete or thick plastic covered with sufficient sand to protect the plastic from damage. If constructed of concrete the floor shall be bunded and sloped towards an oil trap or sump to contain any spillages of substances (e.g. oil). A Method Statement detailing the design and construction of the workshop must be submitted.

When servicing equipment, drip trays shall be used to collect the waste oil and other lubricants. Drip trays shall also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles). All wastes collected into the drip trays shall be collected in a bunded area and disposed of into a hazardous waste facility, as and when required.

All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately or be removed from the Site.

The washing of equipment shall be restricted to preventative maintenance requirements only. All washing shall be undertaken in wash bays within the workshop or maintenance areas, and these areas must be equipped with a suitable impermeable floor and sump/oil trap. The use of detergents for washing shall be restricted to low phosphate and nitrate containing and low sudsing-type detergents.

7.5.12 **Noise**

The Contractor shall limit noise levels (e.g. install and maintain silencers/mufflers on machinery). When working in any areas within audible distance of residents, the Contractor shall provide and use suitable and effective silencing devices for pneumatic tools and other plant that would
otherwise cause a noise level exceeding 85 dB(A) during excavations and other work.

Appropriate directional and intensity settings are to be maintained on all hooters and sirens.

No amplified music shall be allowed on site. The use of radios, tape recorders, compact disc players, television sets, etc., shall not be permitted unless the volume is kept sufficiently low as to avoid any intrusion on members of the public within range. The Contractor shall not use sound amplification equipment on Site unless in emergency situations.

The Contractor’s attention is drawn to the Noise Regulations as promulgated in terms of the Environment Conservation Act, relevant Local Authority bylaws and South African National Standards 10103 and Occupational Health and Safety requirements.

7.5.13 Environmental Awareness Training

Environmental awareness training sessions shall be run for all personnel on site. Two types of course shall be run, one for the Contractor’s and Subcontractor’s management and one for all site staff and labourers. Courses shall be run in the morning during normal working hours at a suitable venue provided by the Contractor. All attendees shall remain for the duration of the course and sign an attendance register on completion that clearly indicates participant’s names, a copy of which shall be handed to the Engineer.

All staff is to attend an initial presentation of approximately 45 minutes, and approximately half an hour a month thereafter for the duration of the contract shall be allowed for employees to attend any follow-up lectures, should such follow-up lectures be deemed necessary by the ECO. If staff goes on an extended period of absence, the environmental awareness training course must be undertaken, upon their return. In addition, all new staff and subcontractors as well as employees that spend more than one day a week or four days in a month, to attend the environmental education session prior to commencement of work on site. The Contractor shall supply the ECO with a monthly report indicating the number of employees that will be present on site during the following month and any changes in this number that may occur during the month.

No more than 30 people shall attend each course and the cost, venue and logistics for this/ these course/s shall be for the Developer’s responsibility. The ECO shall keep a register of all personnel attending the Environmental awareness training sessions.

Notwithstanding the specific provisions of this clause, it is incumbent upon the Contractor to convey the sentiments of the EMPr to all personnel involved
with the works. Please note Appendix 2 of the EMPr contains a template Environmental Awareness Poster.

Training for management and foremen

The environmental awareness training session for management shall include all management and foremen. The session, which will be presented by the ECO, will be of approximately one-hour duration. The initial session shall be undertaken not less than seven days prior to commencement of work on site. Subsequent sessions shall be held as and when required.

Training course for site staff and labour

The environmental awareness training session for site staff and labour shall be presented by the ECO. The course will be approximately 45 minutes long. The course shall be run not more than seven days after commencement of work on site with sufficient sessions to accommodate all available personnel. Subsequent sessions shall be held as and when required.

7.5.14 Contractor’s Environmental Officer

The Contractor shall designate a permanent onsite employee as the Environmental Officer who shall be responsible for undertaking a daily site inspection to monitor compliance with this Specification. The Contractor shall submit the name of the Contractor’s Environmental Officer to the Engineer and ECO for approval seven days prior to the date of the environmental awareness training course.

7.5.15 ”No go” Areas

The demarcated buffer areas around the heritage sites, pans on site and other identified ecological sensitive areas are to be “no go” areas. The Contractor shall ensure that, insofar as he has the authority, no person, machinery, equipment or material enters the "no go" areas at any time.

7.5.16 Construction Personnel Information Posters

The Contractor shall erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with aspects of the Specifications. Such posters shall be erected at the eating areas and any other locations specified by the Engineer. A template poster is attached in Appendix 2.

7.5.17 Fire Control

No fires may be lit on site. Any fires which occur, shall be reported to the Engineer immediately. Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include the workshop and fuel storage areas.
and any areas where the vegetation or other material is such as to make viable the rapid spread of an initial flame. In terms of the National Environmental Management: Air Quality Act (39 of 2004), burning is not permitted as a disposal method, unless authorised by the DENCC: Air Quality Directorate responsible for the implementation of the National Environmental Management: Air Quality Act. The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall forward the name of the Fire Officer to the Engineer for his approval seven days prior to the date of the environmental awareness training course.

The Contractor shall ensure that there is basic fire fighting equipment available on Site at all times.

7.5.18 **Concrete and Cement Work**

Cement powder has a high pH value. Spillage of dry cement powder and concrete slurry will affect both soil and water pH adversely. Careless handling of cement products resulting in spillage can have detrimental effects on the surrounding environment.

The location of the batching area (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the Site layout plan and approved by the ECO. A Method Statement indicating the layout and preparation of this facility is required in this regard.

Cement is to be stored in a secure weatherproof location to avoid contamination of the environment and wastage.

All runoff from batching areas shall be strictly controlled so that contaminated water does not enter storm water, or groundwater. Plastering boards and mixing trays should be used at all mixing and supply points. Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment.

Suitable screening and containment shall be in place to prevent windblown contamination associated with bulk cement silos, loading and batching. All visible remains of excess concrete shall be physically removed to an approved waste site on completion of the plaster or concrete pour section and disposed of.

7.5.19 **Emergency Procedures**

The Contractor shall submit Method Statements covering the procedures for the following emergencies:
Fire
The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. The Contractor shall ensure that his employees are aware of the procedure to be followed in the event of a fire.

Accidental leaks and spillages
The Contractor shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the Engineer and the relevant authorities. The Contractor shall ensure that the necessary materials and equipment for dealing with spills and leaks is available on Site at all times. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Engineer. In the event of a spill, the source of the spillage shall be isolated, and the spillage contained, provided it is safe to do so. The area shall be cordoned off and secured.

7.5.20 Safety

The Contractor shall at all times observe proper and adequate safety precautions on the Site. Telephone numbers of emergency services, including the local fire fighting service, shall be posted conspicuously in the Contractor’s office near the telephone. Detailed emergency procedures must be kept on-site, and all staff must be subject to the necessary training.

No unauthorised firearms are permitted on Site.

The Occupational Health and Safety Act (No 85 of 1993) and in particular the requirements of the Construction Regulations issued in July 2003, must be complied with.

7.5.21 Security

With the possible exception of any security staff who may be required to be present overnight at the Contractor’s temporary construction camp, no personnel will be permitted to live on the mine. Security staff must be provided with heating and cooking facilities (in order that they do not need to light fires), and access to toilet facilities and communication equipment.

Any security lighting at the Contractor’s temporary construction camp is to be placed in such a way as to not cause a nuisance to residents of the area and traffic on adjacent roads.

7.5.22 Community Relations

The Contractor shall erect and maintain information boards in the position, quantity, design and dimensions specified. Such boards shall include contact
details which members of the public can use to register complaints, in accordance with details provided by the Engineer.

All interactions with the surrounding community shall be undertaken in terms of the Community Engagement Plan developed by BMM in terms of Section 5.10 of this document.

The Contractor shall keep a "Complaints Register" on Site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself. All grievances raised shall be dealt with in accordance with the BMM Grievance Procedure which is to be developed in accordance with Section 5.10 of this document.

7.5.23 Protection of Natural Features

The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the Site for survey or other purposes unless agreed beforehand with the Engineer. Any features affected by the Contractor in contravention of this clause shall be restored/rehabilitated to the satisfaction of the Engineer.

The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams and open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.

7.5.24 Protection of Flora and Fauna

Except to the extent necessary for the carrying out of the Works, flora shall not be removed, damaged or disturbed nor shall any vegetation be planted. Trapping, poisoning and/or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted on the mining license area during the construction phase. Where the use of herbicides, pesticides and other poisonous substances has been specified, the Contractor shall submit a Method Statement.

7.5.25 Erosion and Sedimentation Control

The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the construction activities. Where erosion and/or sedimentation, whether on or off the Site, occurs despite the Contractor complying with the foregoing, rectification shall be carried out in accordance with details specified by the Engineer. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the Engineer.

Any runnels or erosion channels developed during the construction period or during the maintenance period shall be backfilled and compacted.
Stabilisation to prevent and control erosion of cleared areas shall be actively managed. Consideration and provision shall be made for various methods, namely, brush-cut packing, mulch or chip cover, straw stabilising (at a rate of one bale/square metre and rotorvated into the top 100 mm of the completed earthworks), watering, soil binders and anti-erosion compounds, mechanical cover or packing structures (e.g. hessian cover).

Traffic and movement over stabilised areas shall be restricted and controlled, and damage to any stabilised area shall be repaired and maintained to the satisfaction of the Engineer.

7.5.26 Aesthetics

The Contractor shall take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area. Waste facilities shall be enclosed and not visible to road users of the N14.

7.5.27 Dust Control

The Contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activities to the satisfaction of the Engineer and ECO. Dust control measures may include the stabilisation of disturbed areas via the rotorvation of straw into the soil surface. In extreme instances, the use of specific chemical dust suppressant additives such as “Dustex” may be necessary in order to limit dust generation from haul roads.

During high wind conditions, the Contractor shall comply with the Engineer’s instructions regarding dust-suppression measures. The Engineer may request the temporary cessation of all construction activities where wind speeds are unacceptably high, and until such time as wind speeds return to acceptable levels.

7.5.28 Pollution

The Contractor shall take all reasonable measures to minimise any dust nuisance, pollution of streams and inconvenience to or interference with the public (or others) as a result of the execution of the Works. A method statement may be required in this regard as determined by the Engineer and ECO.

If in emergency situations as mentioned above washing of vehicles and machinery is required on site, this should not take place within 50 m from any watercourse. All machinery should be regularly checked for leaks. No runoff shall enter any watercourse.
7.5.29 Working Hours

Working hours in terms of the planning approval shall be adhered to. If works are to take place outside of normal working hours, the ECO, Engineer and adjacent landowners are to be notified and disturbance to the surrounding residents or land users is to be prevented. The Engineer will, where required, in turn notify the Local Authority of work done outside of normal working hours.

7.5.30 Excavation and Trenching

During excavation and trenching activities, care is to be taken to ensure that the stockpiling of top material is kept separate from sub-soils. Top material thus saved is to be replaced as top material and is to be the final layer when back-filling. The Contractor shall reinstate all working areas to the satisfaction of the Engineer.

Areas opened for trenching should be restricted to the minimum required to be worked in and closed up in a working day or as dictated by technical requirements such as length of pipe or cable, in order to prevent them from posing safety hazards to people, traffic and animals and to prevent rainwater erosion. Trenches left exposed for more than one day shall be barricaded, subject to approval by the site engineer and ECO. Trenches shall be re-filled to the same level as (or slightly higher, to allow for settlement) the surrounding land surface to minimise erosion. Excess soil shall be stockpiled in an appropriate manner. No stockpiling must occur within 50 m of a water course.

In the event of material removed during trenching being excessive after backfilling or being unsuitable as overburden, the excess material must be removed from the construction site to a site agreed upon by the Engineer and, where applicable, the Local Authority.

7.5.31 Stockpiling

The engineer will identify suitable areas for stockpiling of all materials. Each stockpile may not exceed 2 m in height and cover a minimum footprint. The required precautions must be taken to prevent erosion or compaction of stockpiles. The top materials shall not be left for a period exceeding 6 months. If unavoidable, the topsoil must be analysed and if necessary, upgraded before placement.

7.5.32 Temporary Site Closure

If the Site is closed for a period exceeding one week, a checklist procedure shall be carried out by the Contractor in consultation with the ECO. Contractor’s Safety Officers (in terms of the Occupational Health and Safety Act) are to check the Site and report to the Engineer regarding the following:
Fuels / flammables / hazardous materials stores:

- Ensure fuel stores are as low in volume as possible;
- No leaks;
- Outlet secure / locked;
- Bund empty;
- Fire extinguisher serviced and accessible;
- Secure area from accidental damage, e.g. vehicle collision;
- Emergency and Management telephone numbers to be available and displayed; and
- Adequate ventilation.

Other:

- All trenches and manholes secured;
- Fencing and barriers in place per the Occupational Health and Safety Act (No 85 of 1993);
- Notice boards applicable and secured;
- Security persons briefed and have facility for contact;
- Night hazards checked, e.g. reflectors, lighting, traffic signage;
- Fire hazards identified – local authority notified of any potential threats, e.g. large brush stockpiles, fuels etc.;
- Pipe stockpile wedged / secured;
- Scaffolds secure; and
- Inspection schedule and log by security or contracts staff.

The ECO is to check and report to the Engineer regarding the following issues:

- Wind and dust mitigation in place, e.g. straw, brush packs, irrigation;
- Slopes and stockpiles at stable angle;
- Landscape areas watering schedules and supply secured;
- Fuels/hazardous substances stores secure;
- Cement and materials stores secured;
- Toilets empty and secured;
- Refuse bins empty and lids secured;
- Bunding clean and treated, e.g. Spill Sorb or Enretech #1 powder;
- Drip trays empty and secure; and
- Structures vulnerable to high winds secure.

The Contractor is to ensure that all temporary closure requirements are met before leaving the Site.
### 7.6 SITE CLEAN UP AND REHABILITATION

#### 7.6.1 Site Clean Up

The Contractor shall ensure that all temporary structures, equipment, materials, waste and facilities used for construction purposes are removed upon completion of the project. The site clean-up shall be to the satisfaction of the Engineer and the ECO.

#### 7.6.2 Rehabilitation

Where appropriate, the Contractor shall employ a suitably qualified person (a botanist with experience in the Namakwa Bushmanland Region) to suggest and implement rehabilitation measures for areas damaged by construction activities but that will not be utilised during the operational level. The Contractor shall be responsible for rehabilitating areas identified by the ECO and the Engineer, or recommended by the aforementioned botanist. The Contractor’s procedure for rehabilitation shall be approved by the ECO and the Engineer and, where required, the Local Authority’s environmental representative.

### 7.7 TOLERANCES

Environmental management is concerned not only with the final results of the Contractor’s operations to carry out the Works but also with the control of how those operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operations required to complete the Works. It is thus required that the Contractor shall comply with the environmental requirements on an ongoing basis and any failure on his part to do so will entitle the Engineer to certify the imposition of a fine subject to the details set out in the Environmental Specification.

### 7.8 MEASUREMENT AND PAYMENT

#### 7.8.1 Basic Principles

Except as noted below and as per the Scheduled Items, no separate measurement and payment will be made to cover the costs of complying with the provisions of this Specification and such costs shall be deemed to be covered by the rates tendered for the items as contained in the Schedule of Quantities, as completed by the Contractor when submitting his tender.

Some of the important cost items have been listed below to assist the Contractor in making provision for implementation of the Specifications:
a) Protection of stock piles from blowing or washing away: The spraying or covering of stockpiles, including the supply of the spray or cover material or vegetation, as required.

b) Storage of fuel and oils: The supply, construction, installation, transport, upkeep and removal of all facilities required for storage and management of fuel and oils.

c) Cement-laden water management: The supply, construction, installation, transport, upkeep and removal of all facilities required for the management of wastewater from concrete operations.

d) Contaminated water management: The supply, construction, installation, transport, upkeep and removal of all facilities required for managing contaminated water.

e) Storm water and flood management: The supply, construction, installation, transport, upkeep and removal of all facilities required for managing storm water run-off from the site and protection of works from flooding.

f) Bunding and management of run-off from workshop areas and supply of drip trays for stationary and “parked” plant: The supply, construction, installation, transport, upkeep and removal of all facilities required for bunding and managing the run-off from workshop areas as well as all drip trays required.

g) Dust management: The supply, application, transport, upkeep and removal of all materials required to ensure that dust is adequately controlled.

h) Solid waste management: The supply, application, transport, upkeep and removal of all materials required to ensure that solid waste is adequately controlled in accordance with the specification (including the recycling program).

i) Fire Control: The supply, transport, upkeep and removal of all material required for fire control.

j) Eating areas: The supply, construction, installation, transport, upkeep and removal at the end of the construction of all eating areas structures.

k) Ablutions: The supply, maintenance, regular emptying and removal of toilets.

l) Site demarcation: The supply, installation and removal at the end of the construction of all temporary fences.

m) Vegetation protection: The supply, installation and removal at the end of the construction of all vegetation protection fences.

7.8.2 Scheduled Items

a) Provision of venue and staff attendance at the environmental awareness training courses:
The provision of a venue and attendance at the environmental training courses will be measured as a lump sum. The sum shall cover all costs incurred by the Contractor in providing the venue and facilities and in ensuring the attendance of all relevant employees and sub-contractors at the training.
b) Method Statements: Additional Work:
No separate measurement and payment will be made for the provision of Method Statements where the Engineer requires a change on the basis of his opinion that the proposal may result in, or carry a greater than warranted risk of, damage to the environment, in excess of that warranted by the Specifications. In cases of additional work being required, provided it could not reasonably have been foreseen by an experienced contractor, it shall be valued in accordance with GCC 90 Clause 40.

A stated sum is provided in the Schedule of Quantities to cover payment for such additional work.

7.9 CONSTRUCTION PHASE COMPLIANCE: SUMMARY TABLES

Each individual Construction EMPr outlines proposed management strategies in accordance with proposed performance criteria for specified acceptable levels of environmental and social performance. The construction EMPr identifies:

- Project activities that result in environmental impacts;
- potential impacts on environmental and social values;
- mitigation strategies;
- relevant monitoring;
- appropriate indicators and performance criteria;
- reporting requirements;
- appropriate corrective actions should an undesirable impact or unforeseen levels of impact occur; and
- responsible person/s for corrective actions and way forward.

The structure of the construction EMPr is outlined in Error! Reference source not found.

Table 7.1 ESMP Structure

<table>
<thead>
<tr>
<th>Activity</th>
<th>The project activity that would result in an impact to an element.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Element/Issue</td>
<td>The element/issues that are to be managed (as it affects environmental and social values).</td>
</tr>
<tr>
<td>Policy/Objective</td>
<td>The policy or management objective that applies to each element.</td>
</tr>
<tr>
<td>Performance Criteria</td>
<td>Measurable performance criteria (outcomes) for each element.</td>
</tr>
<tr>
<td>Implementation Strategy</td>
<td>The strategies, tasks or action program (to nominated operational design standards) that will be implemented to achieve the performance criteria.</td>
</tr>
</tbody>
</table>
Monitoring

The monitoring requirements to measure actual performance (i.e. specified limits to pre-selected indicators of change).

Auditing

The auditing requirements to demonstrate implementation of agreed environmental management strategies and compliance with agreed performance criteria.

Reporting

Format and timing for reporting and auditing of monitoring results.

Corrective Action

The action (options) to be implemented in case a performance requirement is not reached.

Responsible person/s

The person responsible for the corrective action (including staff authority, responsibility and management structure).

Each element/impact is separated into an individual section, with tabulated requirements for the construction phase. Each element/impact will include a description of the aforementioned criteria and related requirements.

7.10 AIR QUALITY AND DUST

Table 7.2 Air Quality and Dust

<table>
<thead>
<tr>
<th>Management of Air Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity and Element</td>
</tr>
<tr>
<td>Policy</td>
</tr>
</tbody>
</table>
| Performance Criteria      | • Remain within the applicable air quality standards (i.e. SANS 1929 residential guidelines of 600 mg/m²/day and South African National Ambient Air Quality Standards) for dust deposition, at the time of construction.  
                         | • Respond to complaints received from adjacent landowners and road users of the N14. |
| Implementation Strategy   | • Regular maintenance of vehicles to reduce emission levels.  
                         | • Consult with and advise any residents or landowners who may likely be impacted by temporary dust emissions before activities start.  
                         | • Develop a detailed dust monitoring plan specifically for construction targeting areas in the vicinity of sensitive habitats on site (with a suitably qualified ecologist), and in addition at the site boundary.  
                         | • Activity sites and access roads shall be watered or dust suppressant applied as required to minimise the potential for nuisance due to dust.  
                         | • Watering frequency will be increased during periods of high risk (e.g. high winds).  
                         | • A “no burning” policy will be implemented.  
                         | • Visual inspection will be undertaken to confirm no dust plumes over the N14 during high wind conditions or dust generating activities. Should visible dust plumes cross the N14, the Environmental Control Officer (ECO), together with the site |
### Management of Air Quality

<table>
<thead>
<tr>
<th>Monitoring and Auditing</th>
<th>Engineer must notify the Environmental Manager.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Vehicles maintenance records must be kept.</td>
<td></td>
</tr>
<tr>
<td>• Record will be kept of air quality related complaints received.</td>
<td></td>
</tr>
<tr>
<td>• Ambient dust monitoring must be undertaken at a frequency in-line with the dust monitoring plan and biodiversity monitoring plan.</td>
<td></td>
</tr>
<tr>
<td>• Based on results from dust monitoring, mitigation measures must be refined and adapted to respond to climatic conditions and complaints received. This will be reached in agreement with the ECO and site engineer. Botanical and air quality specialist input may be brought in, as and when required.</td>
<td></td>
</tr>
<tr>
<td>• The ECO must record all instances of non-compliance with on-site burning policy and record in the monthly ECO report.</td>
<td></td>
</tr>
<tr>
<td>• Any visual confirmation of dust plumes over the N14 must be recorded in the monthly ECO Report.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reporting and Corrective Action</th>
<th>Records of all monitoring and auditing activities will be kept, with results included into the Monthly ECO Report, which must be submitted to the Department of Environment and Nature Conservation (DENC).</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Recommendations and corrective actions arising from ECO inspections and reviews will be agreed to with the site engineer, before proceeding.</td>
<td></td>
</tr>
<tr>
<td>• Non-compliance and incident reports will be reviewed and closed out by the ECO and site engineer. All non-compliances to be submitted to DENC for their records.</td>
<td></td>
</tr>
</tbody>
</table>

**Responsibility**

BMM is responsible for the appointment of the ECO and requirements outlined above. These requirements must be fulfilled by the ECO, together with the site engineer and input from BMM.

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### 7.11 HYDROLOGY

**Table 7.3 Hydrology**

#### Management of Hydrology

<table>
<thead>
<tr>
<th>Activity and Element</th>
<th>The construction of Project related infrastructure would result in the diversion of water courses, changes to sediment load and potential deterioration to water quality.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>To prevent the potential impacts associated with erosion and to prevent the release of contaminants that may adversely affect surface water quality.</td>
</tr>
<tr>
<td>Performance Criteria</td>
<td>• Avoidance of release of contaminants or unacceptable sediment release to surface waters features.</td>
</tr>
<tr>
<td></td>
<td>• Any disturbances or crossings of to watercourses must be aligned with the water use license issued by the Department of Water Affairs.</td>
</tr>
<tr>
<td>Implementation Strategy</td>
<td>• Implement dust suppression plan and stormwater management plan.</td>
</tr>
<tr>
<td></td>
<td>• An Operation Manual is required for each Pollution Control Dam (PCD) and wastewater treatment works. The purpose of the manuals is to provide guidelines to the operators for the safe operation and maintenance of these facilities during its lifespan.</td>
</tr>
<tr>
<td></td>
<td>• During construction, the surface water runoff from the dirty areas must be captured, and wherever possible reused, in the construction process. Pollution control dams must be utilised...</td>
</tr>
</tbody>
</table>
Management of Hydrology

- and dirty runoff should be directed towards these dams through a well-designed system of berms and channels. The dams should be designed to avoid sediment deposition through the use of silt traps.
  - All areas where hydrocarbons, such as oils and petroleum fuels are handled or stored should be bunded and strictly controlled to minimise the risk of accidental spillages.
  - All relevant personnel trained in appropriate handling of spill materials and spill prevention.
  - The construction process must remain outside of set-aside areas as outlined by the biodiversity management plan.
  - Installation of temporary drainage works (channels and bunds) where required for sediment and erosion control and around construction sites.
  - Use of pumps to maintain dry working conditions in temporary excavations, rather than constructing temporary open channels for gravity drainage of temporary excavations where gravity channelling is not acceptable.
  - Stockpiles will not be located within the 1:100 year floodline of a watercourse.
  - In cases where traversing a watercourse is unavoidable, the clearance path will, where practical, be designed in order to limit the extent of disturbance.
  - Works in the vicinity of a watercourse or drainage line will be subject to a method statement, layout/design plan approved by the ECO and site engineer before works commence. Upon completion of construction, the bed and banks of the affected watercourse must be reinstated.
  - Keep the work area to a minimum to limit ground disturbance.
  - Where appropriate, install temporary sediment basins to capture sediment laden runoff from site.
  - Provide bunding around stockpiles to prevent the material from being washed away, where required.
  - Inspect, and if required, reinstate all existing erosion-control structures after storm/heavy rain events.

Monitoring and Auditing

- Weekly monitoring of construction activities to ensure that no watercourses are unnecessarily impacted / disturbed.
- Rehabilitated watercourses will be monitored by the ECO to ensure no erosion or sediment deposition is occurring.
- The integrity of storage facilities for hazardous substances, dangerous goods and waste holding areas will be controlled by sealed or bunded areas that will be routinely inspected by the ECO.
- Conduct weekly inspections of all erosion control structures to ensure they are operating efficiently. Additional inspections should be conducted after storm events.

Reporting and Corrective Action

- Records of all monitoring and auditing activities will be kept, with results included into the Monthly ECO Report, which is to be submitted to the DENC and Department of Water Affairs (DWA).
- Recommendations and corrective actions arising from ECO inspections and reviews will be agreed to with the site engineer, before proceeding.
- Complaints relating to water quality or quantity from downstream users will be responded to and reported to DENC and DWA, if required. This will be recorded within the monthly ECO Report.
- Non-compliance and incident reports will be reviewed and closed out by the ECO and site engineer.
### Management of Hydrology

<table>
<thead>
<tr>
<th>Activity</th>
<th>Construction activities may result in the contamination of land that may impact groundwater quality.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>To minimise impacts to groundwater quality and quantity.</td>
</tr>
</tbody>
</table>
| Performance Criteria | • To limit impacts to groundwater quality to within the mining license area.  
• To avoid negatively impacting on groundwater levels of surrounding users.  
• Remain in alignment with the water use license issued by the DWA. |
| Implementation Strategy | • Implement groundwater monitoring plan (i.e. this should be the continuation of the groundwater monitoring undertaken prior to construction, at receptor locations recommended by a hydrogeologist).  
• Develop and implement a grievance procedure to address and respond to groundwater related grievances in a timely manner so that the receptors are never without a reliable water source.  
• Ensure that the storage of all hazardous substances and dangerous good (including hydrocarbons) are stored in bunded areas, to prevent run-off and infiltration during tank failures.  
• Construction equipment is to be serviced regularly, to prevent oil spills.  
• A spill response plan must be in place, and employees must be trained accordingly.  
• All vehicle servicing must be undertaken in a bunded area. |
| Monitoring and Auditing | • Records and reports related to the implementation of the groundwater monitoring plan will be kept and findings recorded in the Monthly ECO Report, if available.  
• All complaints received must be responded to and impacts to surrounding groundwater users and corrective actions must be agreed to with the landowner and BMM. Should agreement not be reached, the matter must be referred to the DWA for consideration.  
• All conditions outlined in the water use license must be adhered to. |
| Reporting and Corrective Action | • Records of monitoring and auditing activities will be stored on-site, with results included into the Monthly ECO Report.  
• Recommendations and corrective actions arising from ECO inspections and reviews will be agreed to with the site engineer, before proceeding.  
• Complaints relating to groundwater quality or quantity from surrounding users will be responded to and further investigations carried out and reported to the DENC and DWA, if required. This will be recorded within the monthly ECO Report as well. |

Responsibility: BMM is responsible for the appointment of the ECO and requirements outlined above. These requirements must be fulfilled by the ECO, together with the site engineer and input from BMM.
Management of Hydrogeology

- Non-compliance and incident reports will be reviewed and closed out by the ECO and site engineer. All non-compliances with regard to hydrogeology to be submitted to DENC and DWA for their records.

Responsibility

BMM is responsible for the appointment of the ECO and requirements outlined above. These requirements must be fulfilled by the ECO, together with the site engineer and input from BMM.

7.13 BIODIVERSITY MANAGEMENT

Table 7.5 Biodiversity Management

<table>
<thead>
<tr>
<th>Activity</th>
<th>Establishing the mine infrastructure, particularly excavation of the pit, blasting and processing ore would result in the loss of biodiversity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>Aim of mitigation is to conserve all forms of biodiversity with an emphasis on irreplaceable habitats, threatened and rare species through reducing the residual impact. This must be aligned with Vedanta Biodiversity Policy, thus improving conservation and minimising biodiversity impacts.</td>
</tr>
<tr>
<td>Performance Criteria</td>
<td>Objectives of the mitigation are to facilitate development of a Biodiversity Management Plan (BMP) and reduce the impacts of loss and fragmentation of habitats, reduction of species diversity and spread of alien and invasive species. These mitigation measures must be implemented, in conjunction with a botanical and faunal specialist.</td>
</tr>
<tr>
<td>Implementation Strategy</td>
<td>A detailed Biodiversity Management Plan (BMP) will be developed to ensure that the proposed onsite (excluding offsets) avoidance, minimisation and rehabilitation measures associated with mine construction, operation and closure are consolidated for effective implementation and subsequent auditing. The plan will, in broad terms, include:</td>
</tr>
<tr>
<td></td>
<td>- Optimal approach to management of the mine property and mine controlled areas including setting aside a large conservation area within these areas;</td>
</tr>
<tr>
<td></td>
<td>- Approach towards implementing controlled access to the mine property and mine controlled areas;</td>
</tr>
<tr>
<td></td>
<td>- Management measures to ensure protection and appropriate management of the biodiversity features on the mine property and mine controlled areas involving:</td>
</tr>
<tr>
<td></td>
<td>- Avoidance of any forms of fire within the area;</td>
</tr>
<tr>
<td></td>
<td>- Wildlife management plan focused on management of the medium to large faunal species and their habitat requirements to avoid habitat destruction through overgrazing;</td>
</tr>
<tr>
<td></td>
<td>- Flora and fauna translocation plan from areas prior to disturbance when appropriate;</td>
</tr>
<tr>
<td></td>
<td>- An ecological rehabilitation programme for impacted areas;</td>
</tr>
<tr>
<td></td>
<td>- Independent monitoring and ongoing inventory development of...</td>
</tr>
<tr>
<td>Biodiversity Management Plan</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td></td>
</tr>
<tr>
<td>the mine property’s biological and physical environments to inform adaptive management measures and/or corrective action as required;</td>
<td></td>
</tr>
<tr>
<td>o Alien and invasive species control program;</td>
<td></td>
</tr>
<tr>
<td>o General awareness training will be done as part of the mine induction to inform all staff and contractors of the sensitivities of the biodiversity aspects of the mine and surrounds and appropriate environmental work-place etiquette;</td>
<td></td>
</tr>
<tr>
<td>o The BMP will consider means of avoiding and mitigating “foot print” creep.</td>
<td></td>
</tr>
<tr>
<td>o Measures to manage emergency, accident or upset conditions where biodiversity may be adversely affected.</td>
<td></td>
</tr>
<tr>
<td>• The following activities will be prohibited by staff and contractors:</td>
<td></td>
</tr>
<tr>
<td>o Hunting of wildlife within the mine property or mine controlled areas;</td>
<td></td>
</tr>
<tr>
<td>o Purchase, sale or transport of any wildlife products from local communities or passing traders;</td>
<td></td>
</tr>
<tr>
<td>o Collection of any plants or animals or products thereof for consumption, medicinal use, cultivation or keeping as pets;</td>
<td></td>
</tr>
<tr>
<td>o Keeping pets within the Gamsberg mine property, either domestic animals such as cats or dogs, or native wildlife;</td>
<td></td>
</tr>
<tr>
<td>o Intentional killing of any animals including snakes, lizards, birds or other animals;</td>
<td></td>
</tr>
<tr>
<td>o All forms of off-road driving.</td>
<td></td>
</tr>
<tr>
<td>• There will be no grazing of livestock within the set aside conservation area.</td>
<td></td>
</tr>
<tr>
<td>• Occasional patrolling of the mine property and mine controlled areas will be conducted by the mine security to watch for evidence of prohibited activities.</td>
<td></td>
</tr>
<tr>
<td>• Collaboration will be considered between the mine security and DENC for sharing of skills for patrolling the natural areas of the mine property and mine controlled areas.</td>
<td></td>
</tr>
</tbody>
</table>

Mine Footprint related measures

• Clearly demarcate areas of high conservation with appropriate barriers and signage to ensure no unnecessary encroachment occurs.
• Any infringements or encroachment will be reported and appropriate penalties are to be enforced on the staff member or contractor.
• The footprint of short-duration activities during construction, operation and decommissioning phases of the mine and the projects outside of the BMM mine concession will be minimised.
• Linear infrastructure (e.g. roads, powerlines and pipelines) should be grouped where possible to follow the same route adjacent to one
another.

- Design and construct the southern approach road within the available flat surface, cutting of the slope should be limited to areas where the available surface does not allow for the required surface width. Berms should be constructed with materials cut from the slope and rocks rolling down the slope are to be kept to a minimum.

- No access of personnel to areas outside the disturbed areas, unless prior approval gained from the relevant manager or ECO.

**Groundwater drawdown related measures**

The following approaches will be implemented:

- Artificial drinking water in appropriate areas within the inselberg basin throughout the year for wildlife that is currently dependent on current water of the Kloof. The methods of water provision can be varied, but needs to be accessible to a range of medium to large wildlife species. Water can be provided in a similar manner to that used for livestock in the greater area, will a ball valve maintaining a large container in a medium to full state at all times. Use of the water by wildlife can easily be monitored using camera traps at the water provision sites. This must be done once natural water sources have disappeared as a result of the predicted groundwater drawdown to determine the necessity and use of the service to local wildlife.

- Seasonal provision of water in natural pools in appropriate wetland habitat locations for frog species and aquatic fauna to complete their breeding cycles. Surface water flows through the kloof during the rainy season may be sufficient, however if not, then a quantity of water, approximately equal to the volume of a large bowser truck used for dust suppression should be released at intervals to maintain some pools of water in the upper part of the kloof. Small pools should be maintained for a period of approximately four to six weeks during the normal rainy season. The required frequency of water delivery would depend on the prevailing weather, the extent to which water infiltrates into the soil and use by wildlife and vegetation. Optimal points of delivery will need to be found where a lasting presence is achieved, and an adaptive management approach followed towards determining the required frequency of delivery. The success of water provision to stimulate frog breeding and maintaining aquatic fauna must be shown through monitoring to justify future water provisioning programmes.

**Habitat fragmentation related measures**

- Small areas of natural vegetation will be maintained wherever possible as islands for the refuge of species within the mine footprint to facilitate the movement of species through disturbed areas.

- Fencing of the set aside conservation area will be maintained in a good state in the form of livestock fences that allow unrestricted movement of small and medium-sized wildlife.

- Gates will be locked gates and no entry signs prominently displayed.

- Locally indigenous plant species will be used in landscaping projects around offices and mine facilities.
### Biodiversity Management Plan

**Recommendations for protecting or enhancing species diversity**

- Trenches and pits that are excavated for pipelines, cabling etc will be backfilled as soon as practically possible to avoid acting as a trap for small fauna.
- Artificial barriers to species movements will be minimized and avoided where possible, and measures taken to reduce their fragmentation impacts.
- Night lighting for the plant and security purposes will be kept to a minimum and both inward and downward facing to minimise the disturbance to the movement of nocturnal species.
- It is recommended that low pressure sodium vapour lights/or LED lights should be used with wavelengths of limited attractiveness to insects.
- Escape routes for fauna will be provided within pitfall features and concreted drainage lines, and potentially dangerous situations inspected regularly to save trapped species.
- Check trenches for trapped fauna before backfilling.
- All new power line infrastructure will be bird-friendly in configuration and adequately insulated to minimise the loss of raptors and other large birds.
- Speed restrictions as per applicable standards will be enforced on all roads within the mine properties and mine controlled areas to minimise the incidence of faunal road kills.
- Driver training will be provided to sensitise them to the importance of avoiding faunal road kills and the mine site, within the mine properties and on public roads.
- Trained mine personnel with capacity to safely capture and translocate dangerous snakes will be available at all times.
- Efforts will be supported to promote an appreciation of biodiversity features of the mine property and mine controlled areas among staff, contractors and their dependents.

**Alien control measures**

- Only approved indigenous species will be used for all workplace landscaping projects.
- The introduction of foreign plant species onto the mine site and associated projects will be controlled.
- Presence of alien fauna, such as feral dogs and cats that threaten the local ecology will be monitored. Ethical control measures will be implemented if an increase in their presence is detected.
- Routine monitoring conducted to identify any new incidence of weed infestation.
- Provision of information for personnel on the identification of declared weeds.
- Stockpile areas and haul roads required will be clearly defined, so that weed establishment and the potential spread of plant diseases may be contained. Stockpiles will be developed in previously cleared areas, with adequate open-spaces buffers, where possible.

**Monitoring, Auditing and further studies**

**Monitoring of ecological dust impacts**

- Dust monitoring of sensitive habitat must be undertaken in alignment with the air quality monitoring requirements, outlined above.
- Monitoring of sensitive ecological receptors (particularly in response to dust) will be implemented and include the following considerations:
Biodiversity Management Plan

- A competent botanist will be contracted to oversee the monitoring programme;
- Monitoring will be conducted monthly.
- Permanent monitoring plots will be established within sensitive habitats at high risk of loss of important plant species from dust deposition;
- Threshold levels of loss of individual plants will be determined and actions to be followed in the event of exceeding these levels.
- Monitoring will be undertaken in line with the BMP.

Reporting and Corrective Action

**General**
- Records of all monitoring and auditing activities will be kept, with results included into the Monthly ECO Report, which is to be submitted to the DENC.
- Recommendations and corrective actions arising from ECO inspections and reviews will be agreed to with the site engineer, before proceeding.
- Biodiversity related complaints from surrounding users will be responded to with further investigations carried out and reporting to the DENC and DWA, as required. This will be recorded within the monthly ECO Report as well.
- Non-compliance and incident reports will be reviewed and closed out by the ECO and site engineer. All non-compliances with regard to hydrogeology to be submitted to DENC and DWA for their records.

Responsibility

BMM is responsible for the appointment of the ECO and requirements outlined above. These requirements must be fulfilled by the ECO, together with the site engineer and input from BMM.

7.14 NOISE AND VIBRATION

**Table 7.6 Noise and Vibration**

<table>
<thead>
<tr>
<th>Noise and Vibration Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity</strong></td>
</tr>
<tr>
<td><strong>Policy</strong></td>
</tr>
</tbody>
</table>
| **Performance Criteria** | • No exceedence of SAN 10103 of noise at sensitive receptors.  
• Respond to noise and vibration related complaints received from residents and landholders and implement mitigation measures.  
• Consultation with potentially affected sensitive receptors, prior to commencement of construction.  
• Respond to all complaints. |
| **Implementation Strategy** | • Implement environmental noise and vibration monitoring along site boundaries and at four selected locations within farm houses closest to the mine and the Loop 10 road on an annual basis with more frequent targeted monitoring at sensitive receptors, if required. |
## Noise and Vibration Management Plan

**Ensure all noise complaints are responded to and recorded by the ECO.**
- Ensure that all machinery and equipment is well maintained in good working order.
- Regular maintenance of vehicle servicing is required. The intervals will vary based on the vehicle and approved by the site engineer.

### Monitoring and Auditing

**ECO to review vehicle servicing records.**
- Public or neighbours’ complaints relating to noise and vibration will be recorded and responded to.
- Record noise and vibration monitoring results.

### Reporting and Corrective Action

- Complaints relating to noise will be addressed promptly, with further investigations and reporting to the ECO and site engineer, if required.
- Routine work reports with maintenance records will be recorded and reviewed by each supervisor or manager.
- All works that deviate from normal operating conditions will be reported and action initiated (including reporting to relevant agencies where this is warranted/required) to prevent a recurrence of the incident.
- Non-compliance and incident reports will be reviewed and closed out by senior management.
- Regular reviews, recommendations and corrective actions shall be implemented.

### Responsibility

BMM is responsible for the appointment of the ECO and requirements outlined above. These requirements must be fulfilled by the ECO, together with the site engineer and input from BMM.

### 7.15 SOCIAL

#### Table 7.7 Social (mitigation measures)

<table>
<thead>
<tr>
<th>Social Mitigation and Enhancement Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity</strong></td>
</tr>
<tr>
<td>Construction of the Project would result in increase in demand to municipal services, result in an influx of in-migrants, social ills and communicable diseases. The Project will also result in an increase in training and skills development, procurement and employment opportunities.</td>
</tr>
<tr>
<td><strong>Policy</strong></td>
</tr>
<tr>
<td>To construct in a manner that promotes sustainable development in line with Vedanta’s Social Policy.</td>
</tr>
<tr>
<td><strong>Performance Criteria</strong></td>
</tr>
<tr>
<td>Objectives of the mitigation and enhancement measures are to limit social impacts and enhance benefits associated with the construction of the Project, respectively.</td>
</tr>
<tr>
<td><strong>Implementation Strategy</strong></td>
</tr>
<tr>
<td><strong>General</strong></td>
</tr>
<tr>
<td>• Adjacent landowners will be notified of construction, two weeks prior to commencement.</td>
</tr>
<tr>
<td>• BMM will implement a grievance procedure that is easily accessible to stakeholders, through which complaints related to contractor or employee road use infringements (e.g. speeding, accidents) can be lodged and responded to. Key steps of the grievance mechanism include:</td>
</tr>
<tr>
<td>o Circulation of contact details of ‘grievance officer’ or other key contact;</td>
</tr>
</tbody>
</table>
Social Mitigation and Enhancement Measures

- Awareness raising among local communities (including all directly affected and neighbouring farmers) regarding the grievance procedure and how it works; and

- Establishment of a grievance register to be updated by BMM, including all responses.

- BMM, in partnership with the local municipality, local education and training NGOs and Community Based Organisations, will develop a Training Plan that enhances skills in the area in line with the Project’s Social and Labour Plan. The Plan should:
  - Identify the skills gaps (between existing skills and Project needs) and initiate mechanisms to train local people to meet the Project’s needs;
  - Identify the particular needs of the youth and women, based on feedback from stakeholders; and
  - Prioritise the youth and women for training programs.

- BMM will develop and implement a detailed Stakeholder Consultation and Engagement Plan (SCEP), prior to commencement of construction, which identifies all stakeholders, defines methods and frequency for engagement and defines responsibility for these activities. This plan should be updated on an annual basis.

- BMM and its appointed contractors are to develop an induction programme and a Code of Conduct for all workers directly or indirectly employed by the Project. The Code of Conduct is to form part of induction of all employees related to the Project and it is to be signed by each employee, prior to construction. All employees and sub-contractors will adhere to the Code of Conduct. If workers are found to be in contravention of the Code of Conduct, which they have signed, they will face disciplinary procedures. If the breach of the code of conduct warrants a dismissal, the dismissal must comply with the South African labour legislation. The Code of Conduct should be available in all relevant languages and at a minimum, English, Afrikaans and Setswana. The Code of Conduct should address the following aspects as a minimum:
  - respect for local residents;
  - respect for farm infrastructure and agricultural activities;
  - no unauthorised taking of natural resources;
  - respect for the natural environment and no littering or illegal dumping;
  - zero tolerance of illegal activities by Project related employees including: soliciting prostitutes; illegal sale and purchase of alcohol; sale, purchase or consume drugs; illegal gambling or fighting; and engaging in sexual acts with minors;
  - compliance with the traffic regulations on site and all road traffic regulations; and
  - description of disciplinary measures for infringement of the Code of Conduct and company rules.

- Implement mitigation measures stipulated to enhance the levels of
Social Mitigation and Enhancement Measures

employment, skills development and procurement in the Local Municipality (LM) and Namakwa District Municipality (NDM) giving priority to vulnerable groups such as women, and ensuring that the youth are empowered to maximise these opportunities.

Employment

- Implement provisions set out in terms of the prescribed recruitment and human resources management policy for the Project.
- BMM will partner with the NDM and Local Municipality to establish a labour centre. The centre will focus on the following services:
  - Posting of employment opportunities;
  - Compilation of a database of the local and regional labour force (skilled, semi-skilled and skilled); and
  - Providing basic training (including labour laws and financial management training). The training course will be targeted mainly to people from the NDM and LM.
- All contractors will be required to recruit and manage personnel in terms of BMM’s recruitment and human resources management policy.
- BMM will provide all its local workers with induction/orientation. As part of the orientation process, brochures will be provided on financial management and the country’s labour laws. The brochure must be in the local languages spoken by employees, simple and easy to understand.

Training and Skills Development

- BMM will implement a skills and development training programme;
- All capacity building and skills development initiatives and commitments for core and non-core mining skills (including sustainable alternative livelihoods) will be defined as commitments in the Mine’s Social and Labour Plan (SLP).
- BMM will support the development of literacy enhancement programmes for the local community, in coordination with the local authorities, as part of the community development plans.
- BMM will provide local and national scholarships throughout the life of the project to recognised public and private universities for courses that are related to both core and non-core mining skills.
- BMM will implement a bursary scheme aimed at members from the local community.
- On-the-job performance and training will be monitored through performance reviews. Training needs will be identified and provided on an on-going basis to foster continuous learning during the construction phase, which can feed into the operational phase.

Procurement and Services

- BMM will assist with building supplier capability in line with their SLP. This may entail the following:
  - Audit of suppliers in the LM and NDM;
  - Undertake skills survey to identify skills gaps and development needs;
  - Develop a supplier training programme; and
  - Target vulnerable groups to benefit from the supplier training initiative.
Social Mitigation and Enhancement Measures

- As part of the tendering process, BMM will encourage large companies to demonstrate how they will partner with local or regional companies to jointly supply a service if it is not possible to split a contract.
- Through a tendering process, the Project will invite recognised national and international organisations, institutions or NGOs to prepare and implement a programme for training, promoting and supporting entrepreneurship and small business development.

Economic Diversification

- BMM will assist relevant authorities to update their local economic development plans for the LM and NDM.
- BMM will support the relevant authorities as far as possible in implementing selected components of the local economic development plans.

Unmet Expectations and Associated Social Unrest

- BMM will keep the communities regularly informed of on-going Project activities through the ward councillors and community leaders. Method and frequency of communications to be defined in the above-mentioned SCEP.
- Concerns regarding jobs and other expectations will be addressed in accordance with the grievance procedure.
- Maximise local employment and procurement.
- Clearly advertise criteria for skills and experience needed for available jobs through local, regional and national media; and clearly advertise experience, quality and volume requirements from the supply chain.

Health

- Support the Provincial Department of Health in their awareness raising campaigns related to communicable diseases.
- All contractors and BMM employees will adhere to the Code of Conduct, which will include a zero tolerance of illegal activities by personnel including: prostitution; illegal sale or purchase of alcohol; sale, purchase or consumption of drugs; illegal gambling and/ or fighting. Any employee or contractor found in violation of the Code shall face a disciplinary hearing which may result in dismissal.
- BMM will roll out the HIV/AIDS and TB programmes.
  - Initiatives shall address the symptoms as well as behaviour change issues around the transmission and infection of HIV/AIDS as well as other sexually transmitted infections.
  - Programs will need to be developed and carried out in partnership with health services (at various levels) and will not be the sole responsibility of BMM, but of the local government and NGOs operating in the area.

Relations between Locals and In-migrants

- BMM will assist government in developing the following documentation in order to better manage migration into the area, prior to commencement of the construction phase:
  - A Migration Situation Analysis Report: this report will show the migration trend of the Local and District municipalities as well as the Province over the past five
### Social Mitigation and Enhancement Measures

<table>
<thead>
<tr>
<th>Years</th>
<th>This report is to be updated every five years.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• A Regional Migration Plan: this plan will outline strategies, programmes and measures to be implemented in order to better manage the levels of migration into the LM and NDM.</td>
</tr>
<tr>
<td></td>
<td>• A Migration Monitoring Programme: this program will outline steps needed to effectively monitor the migration trends.</td>
</tr>
<tr>
<td></td>
<td>• BMM will communicate with the local communities on all aspects where the community stand to benefit from the Project.</td>
</tr>
<tr>
<td></td>
<td>• When tensions over a specific issue reach a point where social unrest between the local community and the migrants is imminent, BMM will work with relevant stakeholders and proactively intervene to avoid social unrest.</td>
</tr>
</tbody>
</table>

#### Social Pathologies

- BMM to support SAPS through working with Provincial structures to ensure that the appropriate number of police are deployed to the area in line with the expected increase in the population size.
- BMM will ensure that their security personnel work in close collaboration with the police to monitor any illegal activity.
- The movement of workers on and off the site should be closely managed and monitored by BMM/contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis.
- BMM/contractor will make necessary arrangements to enable workers from outside the area to return home over weekends and or on a regular basis during their respective employment contracts. Contractors will also make the necessary arrangements to ensure that all non-local workers are transported back to their place of residence once their phase is completed.

#### Sense of Place

- Mitigation measures linked to impacts on air quality, noise and vibration, botanical and visual impacts will be implemented to limit the change to the sense of place.
- BMM will ensure that locals are given priority in terms of employment opportunities (where possible) during the construction phase and are offered training which will make them more employable.
- BMM will invest in and promote sustainable projects, training and education to help communities to develop alternative livelihoods and to ensure that economic dependence on the Project is limited in line with the SLP.
- BMM to facilitate cultural or sporting events to encourage interaction between employees and communities including migrants and locals.

#### Infrastructure and Services

- BMM will identify appropriate Local Economic Development (LED) projects in accordance with their Social and Labour Plan (SLP). It is envisaged that these projects will incorporate the following categories:
  - Infrastructure development;
  - Poverty alleviation; and
### Social Mitigation and Enhancement Measures

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Skills development</strong></td>
<td>• Proof of notification and grievance procedure to be kept on-site, during construction.</td>
</tr>
<tr>
<td></td>
<td>• Code of Conduct to be kept on-site.</td>
</tr>
<tr>
<td></td>
<td>• Signed records of all training and skills development courses completed, on the job training and induction training will be provided to the ECO, for inclusion into the Monthly Audit Report.</td>
</tr>
<tr>
<td></td>
<td>• Proof of advertisement of employment opportunities.</td>
</tr>
<tr>
<td></td>
<td>• Proof of implementation of HIV/AIDS and TB programmes.</td>
</tr>
<tr>
<td></td>
<td>• Incidences of social unrest must be monitored, and if required, recorded into the Monthly ECO Report.</td>
</tr>
<tr>
<td></td>
<td>• Proof of cultural or sporting events, and sustainable projects, training and education to help communities to develop alternative livelihoods must be provided to the ECO and then DENC and DMR during the operational phase.</td>
</tr>
</tbody>
</table>

### Reporting and Corrective Action

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</thead>
<tbody>
<tr>
<td></td>
<td>• Records of all monitoring and auditing activities will be kept, with results reported by the ECO to the DENC, on a quarterly basis.</td>
</tr>
<tr>
<td></td>
<td>• Recommendations and corrective actions arising from monthly ECO audits, inspections and reviews will be implemented in conjunction with the site engineer.</td>
</tr>
<tr>
<td></td>
<td>• Non-compliance and incident reports will be reviewed and closed out by the Environmental Manager.</td>
</tr>
</tbody>
</table>

### Responsibility

BMM is responsible for the appointment of the ECO and requirements outlined above. These requirements must be fulfilled by the ECO, together with the site engineer and input from BMM.

### 7.16 Economic

#### Table 7.8 Economic mitigation and enhancement measures

<table>
<thead>
<tr>
<th>Economic Mitigation and Enhancement Measures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity</strong></td>
<td>The construction phase of the project will result in increased expenditure/investment, net foreign exchange and tax earnings outflows while negative impacts resulting from the Project may be associated with tourism potential, impact adjacent land values and increase strain on municipal services.</td>
</tr>
<tr>
<td><strong>Policy</strong></td>
<td>The aim is to minimise the negative impacts on tourism potential of the area, reduce impacts associated with reduction in adjacent land values and reduce demand/dependency on municipal services while enhancing the economic benefits associated with the Project.</td>
</tr>
<tr>
<td><strong>Performance Criteria</strong></td>
<td>• To enhance potential employment opportunities in the local communities associated with the construction phase of the Project.</td>
</tr>
<tr>
<td></td>
<td>• Increase the potential for the use of local contractors and suppliers.</td>
</tr>
<tr>
<td></td>
<td>• Ensure that local and district municipal costs are not increased, resulting from increased demand on municipal services.</td>
</tr>
<tr>
<td></td>
<td>• To reduce the impacts of dust, lighting, visibility of project infrastructure and loss of conservation worthy vegetation.</td>
</tr>
<tr>
<td></td>
<td>• Reduce demand (from Project employees) on municipal services.</td>
</tr>
<tr>
<td><strong>Implementation Strategy</strong></td>
<td>• Early notification to surrounding landowners and the nearby communities of Aggeneys, Pella and Pofadder of the commencement of construction.</td>
</tr>
</tbody>
</table>
**Economic Mitigation and Enhancement Measures**

- Implement employment equity plan, recruitment and procurement policy and local contractor and supplier policy.
- Provide training prior to construction, to maximise employees from local communities.
- Work in collaboration with Local and District Municipality to align local economic development initiatives and mine opportunities, as well as reduce increased demand on municipal services through joint efforts to meet the requirements of the mine and associated employees.
- Early notification to surrounding landowners and the nearby communities of Aggeneys, Pella and Pofadder of the commencement of construction.

**Monitoring and Auditing**

- Copy of employment equity plan, recruitment and procurement policy and local contractor and supplier policy to be kept on-site.
- Contractual documents will be used to verify level of local employment.
- Proof of notifications to stakeholders to be kept on-site.

**Reporting and Corrective Action**

- BMM must submit verification of the use of local employees, suppliers and contractors (including if targets have been met) to DMR. If targets have not been met, a detailed motivation must be provided.
- Proof of notification and on the job training must be included into the monthly ECO Report.
- BMM must distribute minutes of meeting of the employment forum, once every three months.

**Responsibility**

BMM is responsible for the appointment of the ECO and requirements outlined above. These requirements must be fulfilled by the ECO, together with the site engineer and input from BMM.

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**7.17 HERITAGE, ARCHAEOLOGY AND PALEONTOLOGY**

**Table 7.9 Heritage, Archaeology and Palaeontology**

<table>
<thead>
<tr>
<th>Heritage, Archaeology and Palaeontology Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity</strong></td>
</tr>
<tr>
<td>Construction activities related to excavation and utilisation of heavy duty equipment will result in the destruction of artefacts of heritage, archaeological and paleontological value. Areas of sensitivity are contained below.</td>
</tr>
<tr>
<td><strong>Policy</strong></td>
</tr>
<tr>
<td>Avoid or mitigate impacts on indigenous cultural/heritage values, or artefacts of archaeological and palaeontological value.</td>
</tr>
<tr>
<td><strong>Performance Criteria</strong></td>
</tr>
<tr>
<td>Preventing the loss of artefacts of importance.</td>
</tr>
<tr>
<td>Implementing effective mitigation for the salvage of artefacts of importance.</td>
</tr>
<tr>
<td>Compliance with policies and procedures set out in the Record of Decision issued by the South African Heritage Resources Agency.</td>
</tr>
<tr>
<td><strong>Implementation Strategy</strong></td>
</tr>
<tr>
<td>Minimise the development footprint to only what is actually needed.</td>
</tr>
<tr>
<td>The sites SG1, SG4 and SG7 are to be considered as “no-go” areas, and are to be cordoned off to avoid any direct impacts. A suitably qualified archaeologist must be appointed to assist with delineating the sensitive areas to ensure avoidance. A Map of the SG sites is contained below, for ease of reference.</td>
</tr>
<tr>
<td>Restrict all construction activities to designated working areas with</td>
</tr>
</tbody>
</table>
### Heritage, Archaeology and Palaeontology Management Plan

- All work areas and access areas clearly marked and signposted.
- Immediately report any heritage trace that may come to light during the construction phase.
- The suspected gravesite, located to the south west of the inselberg adjacent to Loop 10 gravel road, is to be defined as a No-Go area during the construction phase.
- Physical salvage of sites would need to take place before commencement of the construction phases.
- Further investigation of the possible massacre site SG7 and possibly associated archaeological sites SG3 and SG4 (not expected to be impacted) on the south side of Gamsberg is recommended in order to ensure adequate protection of this sensitive zone.

### Monitoring and Auditing

- During construction phase, all excavated areas must be monitored for presence of any artefacts of cultural/heritage, archaeological or paleontological value.
- The ECO must inspect newly opened trenches for potential presence of artefacts.
- Weekly visual inspections required to ensure that sites SG1, 4 and 7 are not impacted during construction.

### Reporting and Corrective Action

- The ECO must record all instances of artefacts of importance identified in the monthly audit report.
- If any traces of heritage, archaeological or paleontological value are revealed, SAHRA must be notified, a suitably qualified archaeologist must be appointed. All construction work around the area in question must cease, until approved by SAHRA to proceed.
- If significant fossils are found, an appropriately qualified palaeontologist will investigate, and if required, a permit will be obtained to recover and preserve the paleontological resources for scientific purposes before work can be commenced again.

### Responsibility

- BMM is responsible for the appointment of the ECO and requirements outlined above. These requirements must be fulfilled by the ECO, together with the site engineer and input from BMM.
Figure 7.2  Location of no-go areas during construction

Figure 7.3  Location of site subject to Phase 2 Archaeological Mitigation
### Visual amenity and lighting

<table>
<thead>
<tr>
<th>Activity</th>
<th>The construction phase will result in a change to the visual landscape, through the generation of dust, physical activities, project infrastructure and lighting.</th>
</tr>
</thead>
</table>
| Policy   | • To minimise impacts on visual impacts associated with the Project and associated infrastructure.  
• To reduce as much as practicable lighting impacts on sensitive receptors, including adjacent landowners and N14 and Loop 10 road users. |
| Performance Criteria | • Respond to all complaints regarding visual amenity and lighting and, where feasible, implement mitigation measures.  
• Consultation with potentially affected sensitive receptors, prior to construction.  
• Dust suppression measures will be implemented in line with the air quality recommendations. |
| Implementation Strategy | Construction of plant and associated infrastructure |
|                      | • It is proposed that as little vegetation as possible be removed from building and infrastructure areas.  
• Paint buildings and structures with colours that reflect and compliment the natural colours of the surrounding landscape.  
• To further reduce the potential of glare, the external surfaces of buildings and structures should be articulated or textured to create an interplay of light and shade.  
• Minimise amount of vegetation and topsoil should be removed from the Project area.  
• Ensure that conveyor belts are designed to follow the natural contours of the land to avoid extensive cut or fill areas, as far as possible. |

The negative effect of night lighting, glare and spotlight effects can be mitigated using the following methods, as far as technical safe:

• Install light fixtures that provide precisely directed illumination to reduce light ‘spillage’ beyond the immediate surrounds of the project structures and activities.  
• Avoid high pole top flood and security lighting around the support infrastructure and areas of activity e.g. roads.  
• To reduce the amount of glare, external surfaces of buildings and other structures should be articulated or textured to increase the interplay of light and shade.  

**Landscaping**

• Natural vegetation should be retained as far as possible, keeping clearing of vegetation as close as possible to the footprint of structures and activities.  
• An ecological approach to landscaping is recommended.  

**Access and Haul Roads**

• Where paved surfaces are required, paving materials with a colour
Visual amenity and lighting

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting will be monitored to ensure that it meets the aim of reducing excessive leakage.</td>
<td></td>
</tr>
<tr>
<td>Review of the complaints received.</td>
<td></td>
</tr>
<tr>
<td>Monitoring dust generation and cleanliness of site.</td>
<td></td>
</tr>
</tbody>
</table>

Monitoring and Auditing

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>All complaints received will be addressed.</td>
<td></td>
</tr>
<tr>
<td>Any complaints received, together with the suggested mitigation measures must be recorded in the ECO monthly audit report.</td>
<td></td>
</tr>
</tbody>
</table>

Reporting and Corrective Action

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMM is responsible for the appointment of the ECO and requirements outlined above. These requirements must be fulfilled by the ECO, together with the site engineer and input from BMM.</td>
<td></td>
</tr>
</tbody>
</table>

Responsibility

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
</table>
| | 7.19 TRAFFIC AND TRANSPORT

Table 7.11 Traffic and Transport

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic and Transport Management Plan</td>
<td>The construction phase would result in the generation of traffic on the N7, N14 and access road to the town of Aggeneys.</td>
</tr>
</tbody>
</table>

Policy

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>To reduce traffic impacts to surrounding landowners and road users, during the construction phase.</td>
<td></td>
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</tbody>
</table>

Performance Criteria

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal traffic-related complaints and incidents.</td>
<td></td>
</tr>
<tr>
<td>To minimise impacts on road pavements, or where this is not practicable, to negotiate appropriate contributions or upgrades to road pavement impacts with relevant authorities.</td>
<td></td>
</tr>
</tbody>
</table>

Implementation Strategy

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtain relevant approval/s from SANRAL prior to commencement of construction.</td>
<td></td>
</tr>
<tr>
<td>Implement traffic management plan.</td>
<td></td>
</tr>
<tr>
<td>Prepare the intersection of the N14 and the access to the site with the appropriate construction warning signs and road markings.</td>
<td></td>
</tr>
<tr>
<td>Restrict all construction activities to designated working areas with all work areas and access areas clearly marked and signposted.</td>
<td></td>
</tr>
<tr>
<td>Car pooling and bus services will be implemented where possible to minimise worker journeys.</td>
<td></td>
</tr>
<tr>
<td>Dangerous goods will be transported along preferred routes in accordance with relevant legislation.</td>
<td></td>
</tr>
<tr>
<td>The transport of oversize loads will be restricted to non-peak periods, in line with traffic authority requirements.</td>
<td></td>
</tr>
<tr>
<td>Clear signs and signals will be installed on-site and at all entrance/exit points to the mine to guide traffic movement and increase traffic safety.</td>
<td></td>
</tr>
<tr>
<td>Vehicles will observe on-site traffic regulations.</td>
<td></td>
</tr>
<tr>
<td>Impacts and subsequent rehabilitation requirements on road pavements will be negotiated with the relevant authorities.</td>
<td></td>
</tr>
<tr>
<td>Where necessary, and in consultation with the relevant authorities, road sections (e.g. intersections) may be upgraded.</td>
<td></td>
</tr>
<tr>
<td>Construction in road reserves will be planned to minimise disruption and maximise safety of road users.</td>
<td></td>
</tr>
</tbody>
</table>

Monitoring and Auditing

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of incidents or complaints received in relation to project traffic will be monitored.</td>
<td></td>
</tr>
<tr>
<td>Visual inspection of road quality at the entrance to the Gamsberg mine and N14, as well as at the N14 and access road to Aggeneys.</td>
<td></td>
</tr>
<tr>
<td>Traffic and Transport Management Plan</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Reporting and Corrective Action</td>
<td></td>
</tr>
<tr>
<td>• The occurrence of any traffic incidents or complaints will be recorded by the relevant ECO monthly audit report and reported to the site engineer.</td>
<td></td>
</tr>
<tr>
<td>• All traffic incidents involving Project personnel will be reported to the ECO and site engineer and must be thoroughly investigated.</td>
<td></td>
</tr>
<tr>
<td>• In the event of a complaint/incident or failure to comply with requirements, relevant corrective action will be taken.</td>
<td></td>
</tr>
<tr>
<td>Responsibility</td>
<td></td>
</tr>
<tr>
<td>• BMM is responsible for the appointment of the ECO and requirements outlined above. These requirements must be fulfilled by the ECO, together with the site engineer and input from BMM.</td>
<td></td>
</tr>
</tbody>
</table>
8 OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME (OEMPr)

8.1 SCOPE

This Specification covers the requirements for controlling the impact on the environment of operational activities.

8.2 AIM AND PURPOSE OF THE OEMPr

This Operational EMPr aims to provide BMM with the necessary tools to ensure that the potential impacts on the environment during the operation of the Project are minimised. Moreover, it aims to ensure that the infrastructure is operated and maintained according to Good Practice. The Operational EMPr is a working document that may be amended to enhance its effectiveness for environmental control.

8.3 APPLICATION

The application and implementation of the Operational EMPr shall be the responsibility of BMM. BMM is to appoint an Environmental Site Manager (ESM) to ensure that relevant requirements of the EMPr document are implemented, and that the site is suitably managed. BMM may appoint a suitably qualified and experienced person from within the existing staff to fulfil the role of ESM. BMM may also form an Environmental Liaison Committee (ELC) to facilitate the implementation of the Operational EMPr. If the ELC is formed, many of the responsibilities of BMM may be delegated to the ELC. The ELC should consist of at the very least the following:

- Representative of BMM;
- Representative of NGO’s;
- Representative of DENC and DMR;
- Environmental Site Manager; and
- Representative of the local and authority.

Other members may include an independent environmental control officer or representatives from community based organisations or environmental groups.

Should BMM sub-contract the running of the Project to a third party, the Operational EMPr must be part of the contract and must be binding.
The roles and responsibilities of each of the above-mentioned environmental management bodies have been detailed below:

8.3.1 *Environmental Liaison Committee (ELC)*

Prior to the Operational Phase, BMM must establish an Environmental Liaison Committee (ELC). The ELC would serve to provide strategic oversight on the Project, during the Operational Phase. The ELC, will play an advisory role, and provide a forum for democratic decisions regarding EMPr implementation, as well as periodicaly reviewing the EMPr in terms of its applicability to management requirements on site. They are to meet quarterly (i.e. every 3 months) to receive a report back on environmental management at an operational level. This frequency may need to be reviewed following the first year of operation, but should not be less than twice a year.

All members of the ELC will be expected to attend the meetings, and are to provide the chairperson of the committee with a written apology if unable to attend. In such a case, the member will receive minutes of the meeting, and may be expected to respond to certain issues.

The ELC must be comprised of, but not limited to, representatives from Non-Government Organisation, Farmers Union, DENC, DWA, DMR and BMM. BMM will be responsible for the compilation and distribution of the meeting agenda and ELC Progress Report, two weeks prior to the meeting date. The Progress Report must provide detailed feedback on, *inter alia*, on-going monitoring efforts (i.e. air quality, groundwater quality and quantity), and incidences of non-compliance and complaints received together with the agreed resolution.

8.3.2 *Black Mountain Mining*

The implementation of the EMPr, as well as the adherence to any conditions within the Environmental Authorization relating to the operational phase of the Development, is the responsibility of BMM. BMM will appoint an Environmental Site Manager and various specialists as required to ensure that the specifications of this document as they relate to general site management and maintenance, as well as environmental audits, are suitably implemented on site.

8.3.3 *Environmental Site Manager (ESM)*

A suitably qualified and trained individual appointed by BMM prior to the operation of the mine, will fulfil the role of the Environmental Site Manager. The primary roles and responsibilities of the ESM will be:

- to oversee the implementation of the EMPr on site;
• to visit the site on a monthly basis and advise on areas of environmental management, or compliance with the EMPr, requiring attention;

• to visit the site more regularly during the first three months of operation, during which more frequent monitoring may be required for the establishment of certain programmes or aspects of environmental management;

• to be called to site in the case of any emergency situation which may impact on the local environment;

• to liaise with various specialists and the local authorities if required, regarding issues relating to environmental management;

• to report on compliance with the EMPr specifications to the ELC/BMM;

• to facilitate environmental audits and ensure that they are undertaken, as required;

• to keep a comprehensive record of environmental management, issues of non-compliance and minutes of ELC meetings for audit purposes; and

• to undertake any other tasks outlined in this document, on the behalf of BMM.

It is recommended that the ECO appointment, extend three months into operation, to ensure an effective transfer of environmental management responsibilities to the BMM Operational Environmental Manager.

8.3.4 Independent Environmental Auditor

Since provision has been made for the Environmental Manager to be an internal BMM appointment, BMM must contract an independent Environmental Auditor with a post graduate degree in environmental studies and a minimum of five years relevant experience to act as the independent environmental auditor for the site. The auditor is to be contracted upon completion of the first year of operation, and is to perform an annual formal audit on the management plan, and its implementation by the relevant parties for the duration for the operational phase of the project. The findings of these yearly audits must be submitted to the ELC, for review and consideration.

8.4 Financing for Environmental Management

The budget for the implementation of the EMPr shall come out of BMM’s operational budget. BMM must review the EMPr and allocate the requisite funds to facilitate compliance. Since many of the items addressed in the EMPr
relate to required preventative maintenance, operator legal compliance, and responsible environmental management, the costs have been accounted for.

8.5  

**DETAILED OPERATIONAL ENVIRONMENTAL SPECIFICATIONS**

8.5.1  

**Litter and Waste Management**

A litter and waste management system must be established by BMM. Litter and waste management should address the following:

**Recycling**

It is recommended that a recycling program be established for the site as a whole, but specifically for the administration and maintenance buildings and all site residences. This may be achieved via an agreement with the waste management contractor for the site. BMM must make adequate staff resources available to implement and manage the recycling program. Waste separation is best conducted at source, and the recycling waste storage area must as a minimum separate waste into the following categories:

- Paper products;
- Cardboard;
- Glass;
- Plastics; and
- Metals.

Recycling will involve greater effort, but offers the reward of environmentally sustainable practices and potential employment opportunities. The BMM should establish what recycling facilities are available within the broader area and determine a recycling program that can support any community efforts already underway.

**Solid waste**

A distinction should be made between dry solid waste and wet solid waste. These should be separated and collected in different containers for storage at a central waste depot before removal to a registered waste facility.

All waste storage areas are to be kept in a clean and hygienic condition to prevent odours, spreading of litter, and scavengers.

The frequency of collection must be determined and specified by the ELC/BMM in this EMPr.
Refuse and litter management is to be monitored visually by the ESM. Findings are to inform changes in the waste management procedures to eliminate litter problems.

_Hazardous Waste_

Hazardous waste generated by the Project, must be disposed of at a registered hazardous waste facility and any health and safety requirements for the storage, transport and disposal of hazardous waste must be adhered to.

**8.5.2 Maintenance of Development**

This section refers to both on-site and off-site maintenance of the operation.

- BMM must notify the ESM of any external maintenance to be undertaken. Any significant structural maintenance should require compliance with the CEMP r.
- The ESM must specify any additional environmental procedures necessary to prevent contamination of the environment.
- BMM is responsible for notifying the maintenance contractor of the conditions under which maintenance is to be done.

**8.5.3 Emergency Procedures**

An appropriate and timeous response to emergency situations will ensure that the environmental consequences of such situations are managed and curtailed.

_Emergency contact details_

A list of emergency services contact numbers shall be posted on site. As a minimum, the following emergency services shall be included on the list:

- Environmental Department: 053 807 7470
- Fire Department: 10111
- Disaster Management: 107
- Ambulance Services: 10177
- South African Police Services: 10111
8.5.4 Operational EMPr Review and Audit

Operational EMPr Review

A schedule for the review of the EMPr should be established by the ELC/BMM. It is recommended that the effectiveness of the EMPr be reviewed on an annual basis, and possibly bi-annually in the first year of operation.

Any proposed changes are to be submitted by the ESM to DENC for approval prior to implementation. Amendments or additions made to the document (with the approval of the relevant authorities) are to be included as annexures, distributed to all relevant parties, and should be considered as EMPr specifications to which all relevant parties are bound.

Results of environmental audits (see section 5.6.5.2) are to inform the ELC/BMM of changes required to the EMPr documentation.

Operational EMPr Audit

Audits of the EMPr implementation in the Development should be undertaken on a regular basis. Internal audits (by the ESM) should be done on a quarterly basis with an external audit conducted by an independent consultant undertaken as specified below.

An independent environmental auditor is to be employed after the first year of operation, and annually thereafter, to perform a formal audit on the management plan, and its implementation by the relevant parties. Each audit is to be based on site visits by the auditor as well as a review of any records of environmental management to be kept by the ESM. The audit must also determine whether the EMPr is adequately dealing with the range of environmental impacts on the site, i.e. whether the plan is still appropriate, or whether it needs to be extended.

The audit report is to include recommendations of changes required to the EMPr document and management practices to improve environmental management of the site. The results of this audit are to be submitted to the district and local environmental authority, and to DENC.

8.6 Summary of Operational Environmental Specifications

In this section of the document, specifications for environmental management on site have been summarised, to facilitate easy reference and implementation.

This section clearly lays out the management requirements, who is responsible for undertaking the required actions, time frames within which they are required, as well as requirements for monitoring, or where applicable,
approval of the required action. Relevant references to these details have been provided in the tables below.

Where BMM has been identified as the responsible party, this should be read as BMM, or a suitable individual/organisation employed by them to undertake such task. Where another party has been identified as responsible for undertaking a management action, they are to fulfil this requirement, although BMM will ultimately be held responsible for any requirements or specifications of this document which are not fulfilled.

8.7 **AIR QUALITY AND DUST**

**Table 8.1 Air Quality and Dust**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mining operations including drilling, blasting, hauling, crushing and ore processing as well as material handling and stockpiles.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>To operate in a manner that minimises dust impacts on sensitive habitat and sensitive receptors.</td>
</tr>
<tr>
<td>Performance Criteria</td>
<td>• No exceedance of applicable air quality standards at sensitive human receptors.</td>
</tr>
<tr>
<td></td>
<td>• Respond to complaints on air quality.</td>
</tr>
<tr>
<td>Implementation Strategy</td>
<td>• Develop a detailed dust monitoring plan targeting areas in the vicinity of sensitive habitats on site (with a suitably qualified ecologist), and in addition at the site boundary and at least two locations along the Loop 10 road.</td>
</tr>
<tr>
<td></td>
<td>• Regular maintenance of vehicles to reduce exhaust emissions.</td>
</tr>
<tr>
<td></td>
<td>• Wet suppression or chemical dust suppressants will be used at the crusher, on haul roads, during blasting, at materials handling and stockpile areas to reduce dust emission at source, as required.</td>
</tr>
<tr>
<td></td>
<td>• Watering frequency will be increased during periods of high risk (e.g. high winds).</td>
</tr>
<tr>
<td></td>
<td>• Adherence to speed limits on public (80km/hr along Loop 10) and internal roads.</td>
</tr>
<tr>
<td></td>
<td>• Blasting during periods of high wind velocity (&gt;8m/s) will require approval by the Environmental Manager and these instances will be recorded in the annual environmental audit report.</td>
</tr>
</tbody>
</table>

| Monitoring and Auditing                       | Record all air quality related complaints received.                                                                          |
|                                               | Monitor dust deposition in line with the dust monitoring plan.                                                              |
|                                               | Record dust monitoring results monthly, findings to be included in the annual environmental audit report.                   |

| Reporting and Corrective Action               | Records of all monitoring and auditing activities will be kept, with results reported by the Environmental Manager to DENC, annually. |
|                                               | Recommendations and corrective actions arising from audits, inspections and reviews will be implemented.                     |
|                                               | All activities that deviate from normal operating conditions will be reported and corrective action initiated (including reporting to DENC or delegated authority where this is warranted/required) to |


Air Quality and Dust Management Plan

| | prevent a recurrence of the incident. |
| | • Complaints relating to air and dust emissions will be addressed promptly, with further investigations carried out and reporting to the Environmental Manager, if required. |
| | • Non-compliance and incident reports will be reviewed and closed out by the Environmental Manager. |

Responsibility Environmental Manager

8.8 HYDROLOGY

Table 8.2 Hydrology

Management of Hydrology

<table>
<thead>
<tr>
<th>Activity</th>
<th>The operation of the Project will result in changes to sediment load and potential deterioration to surface water quality.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>To prevent the potential impacts associated with erosion and to prevent the release of contaminants that may adversely affect downstream surface water quality.</td>
</tr>
</tbody>
</table>

Performance Criteria

| • No release of contaminants to surface waters outside the boundary of the mining license area. |
| • No failures of sediment and erosion control techniques leading to unacceptable sediment release. |
| • Avoid unnecessary diversion of watercourses on-site. |

Implementation Strategy

| • Develop a comprehensive Storm Water Management Plan (SWMP). |
| • Adhere to inspection procedures stipulated in the SWMP and keep records. |
| • Fine residue deposit (FRD) penstocks and outlets will be inspected on a monthly basis and cleared of blockages or residue deposits. |
| • Seepage through sub-surface drains at mine residue deposits will be monitored monthly. The Operations Manual should describe procedures in the event that flows or levels fall outside expected values. These could include the installation of piezometers to determine the phreatic surface, inclinometers to monitor slope movements, or slope buttresses. |
| • Water quality and flows will be monitored once a month in accordance with the SWMP. Values obtained should be incorporated in the water and salt balance for the mine and could serve as early warning indicators of potential malfunctions or mismanagement. |
| • Regular water management training will be provided by the mine. |
| • Surface water runoff from the dirty areas (eg process plant, waste rock dump tailings storage facility) will be captured via berms and channeled to a pollution control dam and reused in the mining process. |
| • All areas where dangerous goods and hazardous substances, such as oils and petroleum fuels are handled (ie workshops and fuel storage facilities) will be bunded and strictly controlled to minimise the risk of accidental spillages. |
| • All relevant personnel trained in appropriate handling of spill materials and spill prevention. |
| • Place erosion control structures such as diversion drains, rock-check dams and silt fences or traps at key locations (swales,
Management of Hydrology

| Activity | stormwater pit inlets, around stockpiles) to capture the suspended sediment.  
| - Provide bunding around stockpiles to prevent the material from being washed away. The height of the bund depends on the site location, the volume and type of material being stockpiled, as well as the topography. |

Wastewater Treatment Works

- A thorough, regular inspection and maintenance regime should be implemented by the operator of the proposed Waste Water Treatment Works (WWTW).
- Pump stations should be inspected, serviced and cleaned on a monthly basis, and manholes and underground pipes inspected and cleaned every six months.
- An emergency response unit should be established to undertake urgent maintenance and repair work after hours.

Monitoring and Auditing

- Annual audit of controls to minimise impacts on surface water at all facilities and infrastructure.
- Samples will be taken at watercourses during the wet season and analysed for water quality. Given the arid climate, samples will be taken when practicable (i.e. when watercourses flow).

Reporting and Corrective Action

- Records of all monitoring and auditing activities will be kept, with results reported by the Environmental Manager to DWA and DENC, annually.
- Recommendations and corrective actions arising from audits, inspections and reviews will be implemented.
- Non-compliance and incident reports will be reviewed and closed out by the Environmental Manager.

Responsibility: Environmental Manager

8.9 Hydrogeology

Table 8.3 Hydrogeology

Management of Hydrogeology

| Activity | The Project will generate contaminated leachate from the tailings storage facility (TSF) and waste rock dumps (WRDs), potential spillages from mining equipment, fuel and chemical storage facilities and potential contamination through residuals of explosives used in the mining process. |
| Policy | To minimise impacts to groundwater quality and quantity and avoid risk to human health and ecological receptors in line with Vedanta’s Corporate Standards. |
| Performance Criteria | - Groundwater plume to be confined to the mine lease area.  
- Groundwater users not to be impacted by drawdown or impacts associated with deterioration of groundwater quality. |
| Implementation Strategy | - Implement the groundwater monitoring plan which will include monitoring of strategically located and correctly installed boreholes/monitoring wells (on- and off-site). |
Management of Hydrogeology

- Develop and implement a grievance procedure to address and respond to water related grievances in a timely manner.
- Should monitoring confirm that any of the private boreholes are affected by lowering the groundwater table or impact by contamination as a result of mining activity, rendering boreholes unusable (i.e., loss of water supply source), the client will compensate affected farmers for their loss, replacing the lost water supply source. This can be achieved for example by drilling new boreholes for the affected farmers outside of the drawdown cone or contaminant zone, by increasing the depth of the existing boreholes or by providing an alternative good quality water source.
- Validate and update the groundwater model using the monitoring data such that transport model predictions can be updated (i.e., plume extent, modelled concentrations). This will be used as a management tool throughout the operational phase (i.e., update predicted impacts in order to be proactive) and for planning of the post-closure phase.
- Inspect and ensure toe drains (interception trenches) along the base of the TSF and WRD are in working order and conveying water to pollution control dams for recycling and re-use and ensure maintenance activities are undertaken as and when required.

TSF
- Short deposition cycles will be followed by regularly covering fresh tailings soon after deposition, to prevent them oxidising on placement.
- Cladding TSF side slopes with inert waste rock, concurrently with deposition, to minimise oxygen ingress and side-slope erosion.

Handling of Dangerous Goods
- Ensure storage of all hazardous substances and dangerous good (including hydrocarbons) in bunded areas, to prevent run-off and infiltration during tank failures.
- Construction equipment is to be serviced regularly, to prevent oil spills.
- A spill response plan must be in place, and employees must be trained accordingly.
- All vehicle servicing must be undertaken in a bunded area.

Monitoring and Auditing
- Record all groundwater quality related complaints received.
- Routinely monitor groundwater monitoring wells and boreholes for water level and contaminants in accordance with the groundwater monitoring plan.
- Record monitoring results, findings to be included in the annual environmental audit report.

Reporting and Corrective Action
- Records of all monitoring and auditing activities will be kept, with results reported by the Environmental Manager to DWA and DENC, annually.
- Recommendations and corrective actions arising from audits, inspections and reviews will be implemented.
- Complaints relating groundwater issues will be attended to promptly, with further investigations carried out and reporting to the Environmental Manager, if required.

Responsibility

| Environmental Management |
8.10 **CLIMATE CHANGE**

**Table 8.4 Climate extremes and climate change**

<table>
<thead>
<tr>
<th>Groundwater level and flow directions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
</tr>
<tr>
<td>Policy</td>
</tr>
<tr>
<td>Performance Criteria</td>
</tr>
</tbody>
</table>
| Implementation Strategy | • The following adaptation measures should be considered as part of the Project to mitigate risks associated with predicted climate change projections:  
  o Reduce, reuse and recycle water on-site.  
  o Introduce innovative water recycling measures.  
• Undertake regular drain maintenance activities to reduce flooding risks.  
• Ensure that all personnel are aware of and have rehearsed emergency response measures in the event of flooding and fire. |
| Monitoring and Auditing | • Record all instances of failure of Project infrastructure caused by climatic extremes. |
| Reporting and Corrective Action | • Activities impacted by extreme weather will be re-assessed in the light of any failures resulting in environmental impacts.  
• Damage to structures as a result of climate extremes or climate change will be recorded and any actions to remediate sites will be recorded. |
| Responsibility | Environmental Manager |

8.11 **GREEN HOUSE GAS EMISSIONS**

**Table 8.5 Greenhouse Gas Emissions**

<table>
<thead>
<tr>
<th>Reduction in GHG emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
</tr>
<tr>
<td>Policy</td>
</tr>
<tr>
<td>Performance Criteria</td>
</tr>
</tbody>
</table>
| Implementation Strategy | • Develop an Energy and Carbon Management Plan (ECMP) which amongst others outlines actions and initiatives to monitor and reduce energy and carbon emissions.  
• Training and implementation of effective driving and vehicle use to optimise transport as well as heavy (mining) vehicle use.  
• Minimising business travel and optimising transport logistics.  
• Ensure, through training and induction, that all personnel are aware of greenhouse gases, their role in global warming, and potential sources of emission and management strategies to reduce emissions.  
• A waste management system should be established to minimise waste. Considerations should include reducing all types of waste. |
Reduction in GHG emissions and recycling/reusing waste.

<table>
<thead>
<tr>
<th>Monitoring and Auditing</th>
<th>Monitor performance in managing energy and carbon emissions using the Global Reporting Initiative (GRI) Mining and Metals Sector Supplement.</th>
</tr>
</thead>
</table>
| Reporting and Corrective Action | • Review and report on carbon footprint and GHG emissions annually.  
• Identify areas for improvement and implement strategies to achieve improved performance. |
| Responsibility | Environmental Manager |

8.12 **Biodiversity Management**

Table 8.6 **Biodiversity Management**

<table>
<thead>
<tr>
<th>Biodiversity Management Plan</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity</strong></td>
<td>Operation of mine infrastructure, particularly excavation of the pit, blasting and crushing of ore.</td>
</tr>
<tr>
<td><strong>Policy</strong></td>
<td>Aim of mitigation is to conserve biodiversity with an emphasis on irreplaceable habitats, threatened and rare species through reducing the residual impact.</td>
</tr>
<tr>
<td><strong>Performance Criteria</strong></td>
<td>Objectives of the mitigation are to facilitate development of a BMP and reduce the impacts of loss and fragmentation of habitats, reduction of species diversity and spread of alien and invasive species</td>
</tr>
<tr>
<td><strong>Implementation Strategy</strong></td>
<td>A Biodiversity Management Plan will be implemented cross-cutting all mine activities as appropriate, in line with Vedanta Corporate Standards.</td>
</tr>
</tbody>
</table>

**Mine Footprint related measures**

• Clearly demarcate areas of high conservation importance with appropriate barriers and signage to ensure no unnecessary encroachment occurs.  
• No access of personnel to areas outside the disturbed areas, unless prior approval gained from the relevant manager.

**Groundwater drawdown related measures**

• Water will be provided artificially beyond the life of mine, and continued by the responsible management authorities post mine closure. The following approaches will be implemented:

  o Artificial drinking water in appropriate areas within the inselberg basin throughout the year for wildlife that is currently dependent on current water of the Kloof. The methods of water provision can be varied, but needs to be accessible to a range of medium to large wildlife species. Water can be provided in a similar manner to that used for livestock in the greater area, will a ball valve maintaining a large container in a medium to full state at all times. Use of the water by wildlife can easily be monitored using camera traps at the water provision sites. This must be done once natural water sources have disappeared as a result of the predicted groundwater drawdown to determine the necessity and use of the service to local wildlife.
**Biodiversity Management Plan**

- Seasonal provision of water in natural pools in appropriate wetland habitat locations for frog species and aquatic fauna to complete their breeding cycles. Surface water flows through the kloof during the rainy season may be sufficient, however if not, then a quantity of water, approximately equal to the volume of a large bowser truck used for dust suppression should be released at intervals to maintain some pools of water in the upper part of the kloof. Small pools should be maintained for a period of approximately four to six weeks during the normal rainy season. The required frequency of water delivery would depend on the prevailing weather, the extent to which water infiltrates into the soil and use by wildlife and vegetation. Optimal points of delivery will need to be found where a lasting presence is achieved, and an adaptive management approach followed towards determining the required frequency of delivery. The success of water provision to stimulate frog breeding and maintaining aquatic fauna must be shown through monitoring to justify future water provisioning programmes.

- Cultivate the Needle-bush shrub (*Azima tetracantha*) from seeds or genetic material collected within the Gamsberg, and used in landscaping projects around the mine offices and other facilities.

**Habitat fragmentation related measures**

- Fencing of the set aside conservation area will be maintained in a good state in the form of livestock fences that allow unrestricted movement of small and medium-sized wildlife.
- Gates will be locked gates and no entry signs prominently displayed.
- Locally indigenous plant species will be used in landscaping projects around offices and mine facilities.

**Measures for protecting or enhancing species diversity**

- Speed restrictions will be enforced on all roads within the mine properties and mine controlled areas to minimise the incidence of faunal road kills.
- Driver training will be provided to sensitise employees to the importance of avoiding faunal road kills and the mine site, within the mine properties and on public roads.
- Trained mine personnel with capacity to safely capture and translocate dangerous snakes will be available at all times.
- Efforts will be supported to promote an appreciation of biodiversity features of the mine property and mine controlled areas among staff, contractors and their dependents.

**Alien control measures**

- Controls will be implemented to reduce introduction of foreign plant species onto the mine site and associated projects.
- Presence of alien fauna, such as feral dogs and cats that threaten the local ecology will be monitored. Ethical control measures will be implemented if an increase in their presence is detected.
- Routine monitoring conducted to identify any new incidences of
### Biodiversity Management Plan

<table>
<thead>
<tr>
<th>Monitoring and Auditing</th>
<th>Monitoring of ecological dust impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>weed infestation.</td>
<td>Monitoring of sensitive ecological receptors (particularly in response to dust) will be implemented and include the following considerations:</td>
</tr>
<tr>
<td>• Provision of information for personnel on the identification of declared weeds. This will facilitate alien removal at the site.</td>
<td>o A competent botanist will be contracted to oversee the monitoring programme;</td>
</tr>
<tr>
<td>• Stockpile areas and haul roads required will be clearly defined, so that weed establishment and the potential spread of plant diseases may be contained. Stockpiles will be developed in previously cleared areas, with adequate open-space buffers, where possible.</td>
<td>o Monitoring will be conducted on an annual basis during the flowering season of the majority of the sensitive plant species, as determined by the botanist.</td>
</tr>
<tr>
<td></td>
<td>o Permanent monitoring plots will be established within sensitive habitats at high risk of loss of important plant species from dust deposition;</td>
</tr>
<tr>
<td></td>
<td>o Threshold levels of loss of individual plants will be determined and actions to be followed in the event of exceeding these levels.</td>
</tr>
</tbody>
</table>

### Monitoring of faunal presence and loss

- Routine monthly inspections of undisturbed areas by the ECO to identify any evidence of habitat disturbance or feral pests.
- Road kills will be monitored daily in areas of irreplaceable and constrained habitats and response strategies (e.g. reduced speed zones) will be developed where required.
  - Records will be maintained of fauna casualties including species, date, location and cause.

### Monitoring of vegetation clearing and habitat loss

- The ECO will monitor site clearing whenever this occurs to ensure that:
  - Vegetation areas and flora species to be cleared are well defined.
  - There is no unauthorised disturbance of the surrounding habitat area.

### Weed and pest monitoring

- The ECO will monitor occurrence of alien plant (weed) species on a monthly basis.
- Regular surveys, through visual inspections or other means, of potential weeds and pest species will be conducted by qualified personnel.
- Monitor disturbed areas for signs of pest invasions.
- Regular inspections and weed hygiene logs will be maintained for vehicles and machinery.
<table>
<thead>
<tr>
<th>Biodiversity Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Further studies</strong></td>
</tr>
<tr>
<td>• BMM will collaborate with competent NGOs or academic institutions to conduct ongoing development of an inventory of species diversity within the mine sites.</td>
</tr>
<tr>
<td>• BMM will strive to improve knowledge gaps through detailed regional studies of key fauna and better inform both offset requirements and opportunities.</td>
</tr>
<tr>
<td><strong>Reporting and Corrective Action</strong></td>
</tr>
<tr>
<td><strong>Results from monitoring of ecological dust impacts</strong></td>
</tr>
<tr>
<td>• The appointed botanist will compile an annual report following each survey which shall be submitted to the ECO and the DENC.</td>
</tr>
<tr>
<td>• Corrective actions to be taken if pre-determined thresholds are exceeded:</td>
</tr>
<tr>
<td>o Additional measures to minimise dust will be implemented;</td>
</tr>
<tr>
<td>o Corresponding increases in terms of the Offset metrics will need to be implemented by the mine, and reported to the competent authority.</td>
</tr>
<tr>
<td><strong>Results from monitoring of faunal presence and loss, vegetation clearing and habitat loss</strong></td>
</tr>
<tr>
<td>• Results of monitoring will be reported by the ECO on a monthly basis proposing adaptive management measures to improve mitigation where appropriate, and success from implementation of previous actions.</td>
</tr>
<tr>
<td>• Results of monitoring and recommendations will be reviewed by a competent ecologist on a six monthly basis, or more frequently as appropriate.</td>
</tr>
<tr>
<td><strong>Results from monitoring of weed and pest presence</strong></td>
</tr>
<tr>
<td>• Results of monitoring will be reported by the ECO on a monthly basis proposing adaptive management measures to improve mitigation where appropriate, and success from implementation of previous actions.</td>
</tr>
<tr>
<td>• Priority areas for alien control and required actions, resources and safety procedures will be determined in advance.</td>
</tr>
<tr>
<td>• Results of monitoring and recommendations will be reviewed by a competent botanist on a six monthly basis, or more frequently as appropriate.</td>
</tr>
<tr>
<td><strong>Results from further studies</strong></td>
</tr>
<tr>
<td>• Organisations contracted to conduct further studies will present reports on an annual basis to the ECO and DENC.</td>
</tr>
<tr>
<td>• Assessment of knowledge gaps and suggestions for addressing these gaps will be included in the report.</td>
</tr>
<tr>
<td><strong>General</strong></td>
</tr>
<tr>
<td>• Records of all monitoring and auditing activities will be kept, with results included into the annual auditing report, which is to be submitted to the DENC.</td>
</tr>
<tr>
<td>• Recommendations and corrective actions arising from ECO inspections and reviews will be agreed to with the site engineer,</td>
</tr>
</tbody>
</table>
### Biodiversity Management Plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mining operations, including drilling, blasting, hauling, crushing and ore processing will generate noise and vibration.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>To operate in a manner that minimises the impact of noise and vibrations on sensitive receptors.</td>
</tr>
</tbody>
</table>
| Performance Criteria | • No exceedance of noise guideline levels at sensitive receptors.  
• Record and respond to noise-related complaints.  
• Consultation with potentially affected sensitive receptors. |
| Implementation Strategy | • Undertake equipment noise audits at commissioning to construct reference database which can be used to check equipment performance, detect noise level increases and deterioration. Ongoing monitoring will be required against noise specifications contained in the relevant brochures.  
• Implement environmental noise and vibration monitoring along site boundaries and at four selected locations within farm houses closest to the mine and the Loop 10 road on an annual basis with more frequent targeted monitoring at sensitive receptors, if required.  
• Ensure all noise complaints are recorded and addressed.  
• Ensure that all machinery and equipment is well maintained in good working order. |
| Monitoring and Auditing | • Complaints relating to noise and vibration will be recorded and closed out by the Environmental Manager or delegate. |
| Reporting and Corrective Action | • Complaints relating to noise will be addressed promptly, with further investigations and reporting to the Environmental Manager and site manager, if required.  
• Routine work reports with maintenance records will be recorded and reviewed by each supervisor or manager.  
• All works that deviate from normal operating conditions will be reported and action initiated (including reporting to relevant agencies where this is warranted/required) to prevent a recurrence of the incident.  
• Non-compliance and incident reports will be reviewed and closed out by senior management.  
• Regular reviews, recommendations and corrective actions shall be implemented. |
| Responsibility | Environmental Manager |

### 8.13 Noise and Vibration

#### Table 8.7 Noise and Vibration Management Plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Noise and Vibration Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>To operate in a manner that minimises the impact of noise and vibrations on sensitive receptors.</td>
</tr>
</tbody>
</table>
| Performance Criteria | • No exceedance of noise guideline levels at sensitive receptors.  
• Record and respond to noise-related complaints.  
• Consultation with potentially affected sensitive receptors. |
| Implementation Strategy | • Undertake equipment noise audits at commissioning to construct reference database which can be used to check equipment performance, detect noise level increases and deterioration. Ongoing monitoring will be required against noise specifications contained in the relevant brochures.  
• Implement environmental noise and vibration monitoring along site boundaries and at four selected locations within farm houses closest to the mine and the Loop 10 road on an annual basis with more frequent targeted monitoring at sensitive receptors, if required.  
• Ensure all noise complaints are recorded and addressed.  
• Ensure that all machinery and equipment is well maintained in good working order. |
| Monitoring and Auditing | • Complaints relating to noise and vibration will be recorded and closed out by the Environmental Manager or delegate. |
| Reporting and Corrective Action | • Complaints relating to noise will be addressed promptly, with further investigations and reporting to the Environmental Manager and site manager, if required.  
• Routine work reports with maintenance records will be recorded and reviewed by each supervisor or manager.  
• All works that deviate from normal operating conditions will be reported and action initiated (including reporting to relevant agencies where this is warranted/required) to prevent a recurrence of the incident.  
• Non-compliance and incident reports will be reviewed and closed out by senior management.  
• Regular reviews, recommendations and corrective actions shall be implemented. |
| Responsibility | Environmental Manager |
### Table 8.8 Social Mitigation and Enhancement Measures

<table>
<thead>
<tr>
<th>Activity</th>
<th>Operation of the mine infrastructure, particularly human resource development and local economic development.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>To operate in a manner that promotes sustainable development in line with Vedanta’s Social Policy.</td>
</tr>
<tr>
<td>Performance Criteria</td>
<td>Objectives of the mitigation and enhancement measures are to limit socio-economic impacts and enhance benefits associated with the operation of the Project.</td>
</tr>
</tbody>
</table>
| Implementation Strategy | • BMM will implement a grievance procedure that is easily accessible to stakeholders, through which complaints related to contractor or employee road use infringements (e.g. speeding, accidents) can be lodged and responded to. BMM will respond to all such complaints. Key steps of the grievance mechanism include:  
  • Circulation of contact details of ‘grievance officer’ or other key contact;  
  • Awareness raising among local communities (including all directly affected and neighbouring farmers) regarding the grievance procedure and how it works; and  
  • Establishment of a grievance register to be updated by BMM, including all responses and response times.  
  • BMM, in partnership with the local municipality, local education and training NGOs and community based organisation, will develop a Training Plan that enhances skills in the area in line with the Project’s Social and Labour Plan. The Plan should:  
    • Identify the skills gaps (between existing skills and Project needs) and initiate mechanisms to train local people to meet the Project’s needs;  
    • Identify the particular needs of the youth and women, based on feedback from stakeholders; and  
    • Prioritise the youth and women for training programs.  
  • BMM will develop and implement a detailed Stakeholder Consultation and Engagement Plan (SCEP) that identifies all stakeholders, defines methods and frequency for engagement and defines responsibility for these activities. This plan should be updated on an annual basis.  
  • BMM and its appointed contractors are to develop an induction programme and a Code of Conduct for all workers directly or indirectly employed by the Project. The Code of Conduct is to form part of induction of all employees related to the Project. All employees and sub-contractors will adhere to the Code of Conduct. If workers are found to be in contravention of the Code of Conduct, which they have signed, they will face disciplinary procedures. If the breach of the code of conduct warrants a dismissal, the dismissal must comply with the South African labour legislation. The Code of Conduct should be available in all relevant languages and at a minimum, English, Afrikaans and Setswana. The Code of Conduct should address the following aspects, as a minimum:  
    • respect for local residents; |
Social Mitigation and Enhancement Measures

- respect for farm infrastructure and agricultural activities;
- no unauthorised taking of natural resources;
- respect for the natural environment and no littering or illegal dumping;
- zero tolerance of illegal activities by Project related employees including: soliciting prostitutes; illegal sale and purchase of alcohol; sale, purchase or consume drugs; illegal gambling or fighting; and engaging in sexual acts with minors;
- compliance with the traffic regulations on site and all road traffic regulations; and
- description of disciplinary measures for infringement of the Code of Conduct and company rules.

- Implement all mitigation measures stipulated to enhance the levels of employment, skills development and procurement in the LM and NDM, giving priority to vulnerable groups such as women, and ensuring that the youth are empowered to maximise these opportunities.

**Employment**

- Implement provisions set out in terms of the prescribed recruitment and human resources management policy for the Project.
- BMM will partner with the Namakwa District Municipality and Local Municipality to establish a labour centre. The centre will focus on the following services:
  - Posting of employment opportunities;
  - Compilation of a database of the local and regional labour force (skilled, semi-skilled and skilled); and
  - Providing basic training (including labour laws and financial management training). The training course will be targeted mainly to people from the NDM and LM.
- BMM will endeavour to ensure that contractor’s recruitment and human resources management policies are in alignment with BMM’s policies.
- BMM will provide all its local workers with induction/orientation.

**Training and Skills Development**

- BMM will implement a skills and development training programme;
- All capacity building and skills development initiatives and commitments for core and non-core mining skills (including sustainable alternative livelihoods) will be defined as commitments in the Mine’s Social and Labour Plan (SLP).
- BMM will support the development of literacy enhancement programmes for the local community, in coordination with the local authorities, as part of the community development plans.
- BMM will provide local and national scholarships throughout the life of the project to recognised public and private universities for courses that are related to both core and non-core mining skills.
- BMM will implement a bursary scheme aimed at members from the local community.
- On-the-job performance and training will be monitored through performance reviews. Training needs will be identified and provided on an on-going basis to foster continuous learning during
## Social Mitigation and Enhancement Measures

### Procurement and Services
- BMM will assist with building supplier capability in line with either commitments in their SLP. This will entail the following:
  - Audit of suppliers in the LM and NDM;
  - Identify skills gaps and development needs;
  - Develop a supplier training programme; and
  - Target vulnerable groups to benefit from the supplier training initiative.
- As part of the tendering process, BMM will encourage large companies to demonstrate how they will partner with local or regional companies to jointly supply a service if it is not possible to split a contract.
- Through a tendering process, the Project will invite recognised national and international organisations, institutions or NGOs to prepare and implement a programme for training, promoting and supporting entrepreneurship and small business development.

### Economic Diversification
- BMM will assist relevant authorities to update their local economic development plans for the LM and NDM.
- BMM will support the relevant authorities as far as possible in implementing selected components of the local economic development plans.

### Unmet Expectations and Associated Social Unrest
- BMM will keep the communities regularly informed of on-going Project activities through the ward councillors and community leaders. Method and frequency of communications to be defined in the above-mentioned SCEP.
- Concerns regarding jobs and other expectations will be addressed in accordance with the grievance procedure.
- Maximise local employment and procurement.
- Along with the measures undertaken to address the employment and procurement impacts, the following measures should be implemented to manage the impact of unmet expectations.
  - Clearly advertise criteria for skills and experience needed for available jobs through local, regional and national media; and clearly advertise experience, quality and volume requirements from the supply chain.

### Health
- Support the Provincial Department of Health in their awareness raising campaigns related to communicable diseases.
- All contractors and BMM employees will adhere to the Code of Conduct, which will include a zero tolerance of illegal activities by personnel including: prostitution; illegal sale or purchase of alcohol; sale, purchase or consumption of drugs; illegal gambling and/ or fighting. Any employee or contractor found in violation of the Code shall face a disciplinary hearing which may result in dismissal.
- BMM will continue to roll out the HIV/AIDS and TB programmes initiated in the construction phase.
  - Initiatives shall address the symptoms as well as
### Social Mitigation and Enhancement Measures

- **behaviour change issues around the transmission and infection of HIV/AIDS as well as other sexually transmitted infections.**
  - Programs will need to be developed and carried out in partnership with health services (at various levels) and will not be the sole responsibility of BMM, but of the local government and NGOs operating in the area.

#### Relations between Locals and In-migrants

- BMM will assist government in developing the following documentation in order to better manage migration into the area:
  - A Migration Situation Analysis Report: this report will show the migration trend of the Local and District municipalities as well as the Province over the past five years. This report is to be updated every five years.
  - A Regional Migration Plan: this plan will outline strategies, programmes and measures to be implemented in order to better manage the levels of migration into the LM and NDM.
  - A Migration Monitoring Programme: this program will outline steps needed to effectively monitor the migration trends.
- BMM will communicate with the local communities on all aspects where the community stand to benefit from the project.
- When tensions over a specific issue reach a point where social unrest between the local community and the migrants is imminent, BMM will work with relevant stakeholders and proactively intervene to avoid social unrest.

#### Social Pathologies

- BMM to support SAPS through working with Provincial structures to ensure that the appropriate number of police are deployed to the area in line with the expected increase in the population size.
- BMM will ensure that their security personnel work in close collaboration with the police to monitor any illegal activity.
- The movement of workers on and off the site should be closely managed and monitored by BMM/contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis.
- BMM/contractor will make necessary arrangements to enable workers from outside the area to return home over weekends and or on a regular basis during their respective employment contracts. Contractors will also make the necessary arrangements to ensure that all non-local workers are transported back to their place of residence once their phase is completed.

#### Sense of Place

- Mitigation measures linked to impacts on air quality, noise and vibration as well as visual impacts will be implemented to limit the change to the sense of place.
- BMM will ensure that locals are given priority in terms of employment opportunities (where possible) and are offered training which will make them more employable.
- BMM will invest in and promote sustainable projects, training and
### Social Mitigation and Enhancement Measures

<table>
<thead>
<tr>
<th>Education</th>
<th>Education to help communities to develop alternative livelihoods and to ensure that economic dependence on the Project is limited in line with the SLP.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMM</td>
<td>BMM to facilitate cultural or sporting events to encourage interaction between employees and communities including migrants and locals.</td>
</tr>
</tbody>
</table>

**Infrastructure and Services**

- BMM will identify appropriate Local Economic Development (LED) projects in accordance with their Social and Labour Plan (SLP). It is envisaged that these projects will incorporate the following categories:
  - Infrastructure development;
  - Poverty alleviation;
  - Skills development.

### Monitoring and Auditing

- Monitoring to ensure operational activities adhere to conditions set out in the Environmental Authorisation and Social Labour Plan.

### Reporting and Corrective Action

- Records of all monitoring and auditing activities will be kept, with results reported by the Environmental Manager to the DENC, annually.
- Recommendations and corrective actions arising from audits, inspections and reviews will be implemented.
- Non-compliance and incident reports will be reviewed and closed out by the Environmental Manager.

### Responsibility

Environmental Manager

### Economic Mitigation and Enhancement Measures

#### Table 8.9 Economic Mitigation and Enhancement Measures

<table>
<thead>
<tr>
<th>Economic Mitigation and Enhancement Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity</strong></td>
</tr>
<tr>
<td><strong>Policy</strong></td>
</tr>
<tr>
<td><strong>Performance Criteria</strong></td>
</tr>
<tr>
<td><strong>Implementation Strategy</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
**Economic Mitigation and Enhancement Measures**

<table>
<thead>
<tr>
<th>Monitoring and Auditing</th>
<th>Review signed copies of proof of on the job training.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Copy of employment equity plan, recruitment and procurement policy and local contractor and supplier policy to be kept on-site.</td>
</tr>
<tr>
<td></td>
<td>Contractual documents will be used to verify level of local employment.</td>
</tr>
<tr>
<td></td>
<td>Records of the appointment of local suppliers and contractors must be made available for review.</td>
</tr>
<tr>
<td></td>
<td>Review of minutes of meetings with local and district municipality’s to explore measures to encourage local economic developments.</td>
</tr>
<tr>
<td>Reporting and Corrective Action</td>
<td>Records of all monitoring and auditing activities will be kept, with results reported by the Environmental Manager to the DENC and DMR, annually.</td>
</tr>
<tr>
<td></td>
<td>Recommendations and corrective actions arising from audits, inspections and reviews will be implemented.</td>
</tr>
<tr>
<td></td>
<td>Non-compliance and incident reports will be reviewed and closed out by the Environmental Manager.</td>
</tr>
</tbody>
</table>

**Responsibility** Environmental Manager

### 8.16 CULTURAL HERITAGE, ARCHAEOLOGY AND PALAEOONTOLOGY

#### Table 8.10 Cultural Heritage

<table>
<thead>
<tr>
<th>Activity</th>
<th>Loss of heritage resources through landscape/site disturbance. Management of heritage resources relative to operation of the mine and associated infrastructure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>Avoid or mitigate impacts on archaeological, paleontological or cultural heritage resources.</td>
</tr>
<tr>
<td>Performance Criteria</td>
<td>Compliance with conditions set out in the Record of Decision from SAHRA and the relevant heritage resources permits obtained</td>
</tr>
<tr>
<td>Implementation Strategy</td>
<td><strong>Cultural Heritage</strong></td>
</tr>
<tr>
<td></td>
<td>• Minimise the development footprint to only what is actually needed.</td>
</tr>
<tr>
<td></td>
<td>• Restrict all construction activities to designated working areas with all work areas and access areas clearly marked and signposted.</td>
</tr>
<tr>
<td></td>
<td>• Immediately report any cultural heritage trace that may come to light during the operational phase.</td>
</tr>
<tr>
<td></td>
<td>• Physical salvage of sites would need to take place before commencement of the construction and operational phases.</td>
</tr>
<tr>
<td></td>
<td>• Further investigation of the possible massacre site SG7 and possibly associated archaeological sites SG3 and SG4 (not expected to be impacted) on the south side of Gamsberg is recommended in order to ensure adequate protection of this sensitive zone.</td>
</tr>
<tr>
<td></td>
<td>• Restrict operational activities to designated working areas with all</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL RESOURCES MANAGEMENT  GAMSBERG ZINC: MINE EMFR

DATE: APRIL 2013  REV 1.0

143
Cultural heritage Management Plan

- Work areas and access areas clearly marked and signposted.
- Immediately report any cultural heritage trace that may come to light during the operation phase.

Archaeology
- Minimise the development footprint to only what is actually needed.
- Physical salvage of sites would need to take place before commencement of the construction and operational phases. Detailed recommendations and proposals for mitigation need to be made.
- Restrict operational activities to designated working areas with all work areas and access areas clearly marked and signposted.

Palaeontology
- The environmental manager responsible for the development must remain aware that all sedimentary deposits have the potential to contain fossils and he/she should thus monitor all substantial excavations into sedimentary bedrock for fossil remains. If any fossils are found during construction and operation, HNC and SAHRA should be notified immediately.
- If significant fossils are found, an appropriately qualified palaeontologist will investigate, and if required, a permit will be obtained to recover and preserve the paleontological resources for scientific purposes before work can be commenced again.

<table>
<thead>
<tr>
<th>Monitoring and Auditing</th>
<th>Monitoring to ensure operational activities adhere to conditions set out in the permits obtained from SAHRA and HNC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting and Corrective Action</td>
<td>Records of all monitoring and auditing activities will be kept, with results reported by the Environmental Manager to the heritage authorities and DENC, annually.</td>
</tr>
<tr>
<td></td>
<td>Recommendations and corrective actions arising from audits, inspections and reviews will be implemented.</td>
</tr>
<tr>
<td></td>
<td>Non-compliance and incident reports will be reviewed and closed out by the Environmental Manager.</td>
</tr>
</tbody>
</table>

Responsibility: Environmental Manager

8.17 TRAFFIC AND TRANSPORT

Table 8.11 Road infrastructure and transport network

<table>
<thead>
<tr>
<th>Activity</th>
<th>The operational phase will result in the generation of additional traffic on the road to Loop 10 as well as on the N7, N14 and the access road to the town of Aggeneys.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>To reduce traffic impacts on surrounding landowners and road users, during the operational phase.</td>
</tr>
<tr>
<td>Performance Criteria</td>
<td>Minimal traffic-related complaints and incidents.</td>
</tr>
<tr>
<td>Implementation Strategy</td>
<td>Ensure that a traffic and transportation management plan is in place for the operational phase of the project.</td>
</tr>
</tbody>
</table>
### Road infrastructure and transport network

- The transport of fuels on public roads is governed by the National Road Traffic Act and as such vehicles and drivers must meet stringent safety controls.
- Bulk road tankers must undergo regular maintenance/servicing inspections to ensure that they remain in good working condition.
- Adequate road signage and warning lights indicating working and turning areas should be provided at and near the site.
- Public transport facilities will be provided (bus stops and mini-bus taxi stops within the site) for contractors and employees, to promote public transport use.
- Sidewalks to the site should be provided and made wide enough to safely accommodate cyclists and pedestrians. Furthermore, the use of non-motorised modes of transport (i.e. bicycles and walking) should be promoted. In this regard, employees living in close proximity to the site should be encouraged to use non-motorised transport instead of using private vehicles.
- All company vehicles will be regularly checked and maintained, including tyre wear.
- Contact details will be displayed on project vehicles to allow other road users to report bad driving at any time.
- All project drivers will be sensitised about potential accident risks to local users and will be periodically checked for alcohol consumption.
- BMM will ensure that vehicles are correctly and safely loaded to avoid accidents, and all loads are secured and covered where they pose a risk of windblown dust or material spillage.
- BMM will work in conjunction with SANRAL to erect appropriate road traffic signage and road markings at the intersections of the Loop 10 road and the Aggeneys access road with the N14.
- A speed limit of 80km/hr will be maintained on the Loop 10 road.
- Movement of heavy vehicles through or close to residential areas in Aggeneys will be avoided or minimised to reduce potential impact on local residents, specifically children.
- BMM to monitor the impact on the road quality and upgrade roads periodically including the Loop 10 road and roads within the Project area.

### Monitoring and Auditing

- The number of incidents or complaints received in relation to project traffic will be monitored.
- Visual inspection of road quality at the entrance to the Gamsberg mine and N14, the Loop 10 road as well as along the section of the N14 between the Project site and the access road to Aggeneys.

### Reporting and Corrective Action

- The occurrence of any traffic incidents or complaints will be reported to the Environmental Manager.
- All traffic incidents involving Project personnel will be reported to the Environmental Manager and/or site manager and must be thoroughly investigated.
- In the event of a complaint/incident or failure to comply with requirements, relevant corrective action will be taken.

### Responsibility

Environmental Manager
### Visual amenity and lighting

<table>
<thead>
<tr>
<th>Activity</th>
<th>The Project will result in a change to the visual landscape, through the generation of dust, physical activities, project infrastructure and lighting.</th>
</tr>
</thead>
</table>
| Policy   | • To minimise impacts on visual impacts associated with the Project and associated infrastructure.  
           • To reduce as much as practicable lighting impacts on sensitive receptors, including adjacent landowners and N14 and Loop 10 road users. |
| Performance Criteria | • Respond to all complaints regarding visual amenity and lighting and, where feasible, implement mitigation measures.  
           • Dust suppression measures will be implemented in line with the air quality recommendations. |
| Implementation Strategy | Lighting  
          - The negative effect of night lighting, glare and spotlight effects can be mitigated using the following methods:  
            • Install light fixtures that provide precisely directed illumination to reduce light ‘spillage’ beyond the immediate surrounds of the project structures and activities.  
            • Avoid high pole top flood and security lighting around the support infrastructure and areas of activity e.g. roads.  
          - Waste Rock Dumps  
            • Steep engineered slopes should be avoided as these could impose an additional impact on the landscape by contrasting with the form of the existing topography.  
            • Final shaping and dumping should be implemented in such a way that the final horizon of the dumps simulates the existing profile of the Gamsberg and that the sides of the dumps are articulated in a fashion which resembles the existing topography.  
          - Landscaping  
            • Natural vegetation should be retained as far as possible, keeping clearing of vegetation as close as possible to the footprint of structures and activities.  
            • An ecological approach to landscaping is recommended. Should plants be introduced into the project site, plant selection should be guided by ecological rather than horticultural principles. (i.e. ecological communities of plants provide more bio-diversity and habitat opportunities and would blend with the natural vegetation).  
          - Access and Haul Roads  
            • Access roads and haul roads will require an effective dust suppression management programme, such as the application of non-polluting dust suppressing agents or water. |
### Visual amenity and lighting

<table>
<thead>
<tr>
<th>Monitoring and Auditing</th>
<th>• Where paved surfaces are required, use paving materials with a colour that would complement the natural colours (black or brown) and textures of the area.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Lighting will be monitored to ensure that it meets the aim of reducing excessive leakage.</td>
</tr>
<tr>
<td></td>
<td>• Review of the complaints received.</td>
</tr>
<tr>
<td></td>
<td>• Monitoring dust generation and cleanliness of site.</td>
</tr>
<tr>
<td>Reporting and Corrective Action</td>
<td>• All complaints will be responded to and recorded.</td>
</tr>
<tr>
<td>Responsibility</td>
<td>Environmental Manager</td>
</tr>
</tbody>
</table>
9 DECOMMISSIONING, POST CLOSURE AND REHABILITATION

9.1 SCOPE

This Specification covers the requirements for controlling the impact on the environment of decommissioning activities. The Project is expected to have a total duration of 19 years. However, it is anticipated that the production levels will slow down during the last year of operation and therefore decommissioning phase will commence. Note that although this EMPr provides a summary of the proposed decommission and post closure process, a detailed report outlining the decommissioning and closure is attached Annex A.

The planning for closure and rehabilitation is an on-going process, which will be adapted and updated during the operational phase of the Project. Based on the current level of engineering design available and understanding of DMR requirements, a Draft Conceptual Closure Plan has been developed (Annex D) together with a Draft Social and Labour Plan. During the operational phase, the closure criteria will need to be refined further, together with the associated costing to develop a preliminary closure and rehabilitation plan.

As the Project approaches the end of the life of mine, a final closure and rehabilitation plan will need to be compiled, based on further refinements of the above iterations, and submitted to the DMR for final approval. The final closure plan will include an updated financial breakdown and allocation for closure, as well as approved suggestions for post mining landuse (based on further engagement with surrounding landowners and key stakeholders).

9.2 CLOSURE AIM AND OBJECTIVES

The aim of the Conceptual Closure Plan for the Gamsberg Project is to ensure that the area transformed by mining, processing and other operational activities is either returned to as natural a state as possible or facilities remaining at the end of the life of BMM are utilised for other economically viable and sustainable activities. Four key objectives are identified:

1. To make sure that the following commitments will be achieved as a minimum:
   • The site will be made safe for both humans and animals,
   • The site will be rehabilitated to be physically, chemically and biologically stable,
   • The residual impacts will be managed to acceptable levels and will not deteriorate over time, and
   • Closure will be achieved with minimal socio-economic upheaval.
2. To ensure that the biodiversity and environment on the site is protected.

3. To secure the effective and sustainable transfer of the municipal services of the town, Aggeneys, and the Pella-drift Water Board to the Khai Ma municipality.

4. To provide sufficient funds by the end of life of mine, to properly implement the closure plan, and also to make provision for possible premature closure, and post closure monitoring requirements.

9.3 PROPOSED DECOMMISSIONING METHODS AND MANAGEMENT STRATEGIES

Decommissioning of the various areas and elements of the Project will be carried out in accordance with the associated legal requirements and international standards. The Conceptual Mine Closure Plan identified a number of decommissioning strategies for the following mine infrastructure components:

- Shafts
- Tailings Storage Facility
- Waste Rock Dump
- Open Pit
- Evaporation Ponds
- Concentrator Plant
- Workshops / Offices / Stores / Salvage Yard
- Concentrate and Ore Pads
- Conveyor Belts
- Explosives Magazines
- Fencing
- Gravel Roads
- Rehabilitation of Open Surfaces
- Residential Areas
- Construction Camp
- Landfill Sites

Post-Closure monitoring and management is also accounted for and it is recommended that this involve:

- Vegetation succession monitoring and management
- Erosion monitoring and management
- Groundwater quality monitoring
- Surface run-off monitoring
• Monitoring and management of pollution control facilities, i.e. the tailings dam seepage collection pond and associated evaporation ponds, cut-off trenches etc.

The costs associated with the decommissioning strategies and the monitoring and management programme up to a period of five years post-closure have been included in the closure cost estimate presented in Table 9.1 below. The Draft Social and Labour Plan also makes provision for various mechanisms to manage post closure social issues. The following mechanisms are recommended:

• Establishment of a Future Forum;
• Mechanisms to Save Jobs and avoid Job Losses and a Decline in Employment;
• Mechanisms to Provide Alternative Solutions and Procedures for Creating Job Security where Job Losses cannot be avoided; and
• Mechanisms to Ameliorate the Social and Economic Impact on Individuals, Regions and Economies where Retrenchment or Closure of the Mine is certain.

At this stage, no financial provision is made for the above mentioned mechanisms and BMM will ensure that sufficient provision is made for the management of these issues within in the Social and Labour Plan and Mine Closure Plans.

9.4 FINANCIAL PROVISION

In terms of Section 41 read with Regulations 51(b)(v) and 54 of the MPRDA, BMM must make financial provision for the rehabilitation of the negative environmental impacts. BMM is further required to determine the quantum of the financial provision, which must include cost for pre-mature closure, decommissioning and final closure and post closure management of the residual and latent environmental impacts.

More specifically, Regulation 37(1) promulgated under the MPRDA requires that the quantum of the financial provision must be based on the requirements of the approved EMPr and shall include a detailed itemisation of all actual costs required for:

• the rehabilitation of the surface of the area;
• the prevention and management of pollution to the atmosphere;
• the prevention and management of pollution of water and the soil;
• decommissioning and final closure of the operation; and
• post-closure management of residual and latent environmental impacts.
In view of the above and for the purpose of this EMPR, BMM has determined the quantum of the financial provision for the entire mining area as shown in Table 9.1 below. The detailed costing is included in Conceptual Closure Plan included in the EMPR (Annex A).

Table 9.1  
Gamsberg Draft Closure Quantum – April 2013

<table>
<thead>
<tr>
<th>Ref</th>
<th>Item</th>
<th>R (2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tailings Dam and Environs</td>
<td>R 9 014 850</td>
</tr>
<tr>
<td>2</td>
<td>Waste Rock Dump</td>
<td>R 757 339</td>
</tr>
<tr>
<td>3</td>
<td>Broken Hill Decline Portal</td>
<td>R 241 900</td>
</tr>
<tr>
<td>4</td>
<td>Evaporation Ponds</td>
<td>R 2 776 248</td>
</tr>
<tr>
<td>5</td>
<td>Concentrator Plant</td>
<td>R 28 600 745</td>
</tr>
<tr>
<td>6</td>
<td>Workshops, Stores, Lab, Offices, Storeyard</td>
<td>R 13 261 851</td>
</tr>
<tr>
<td>7</td>
<td>Concentrate Pads</td>
<td>R 1 972 349</td>
</tr>
<tr>
<td>8</td>
<td>Conveyor Belts</td>
<td>R 1 348 207</td>
</tr>
<tr>
<td>9</td>
<td>Explosives Magazines and Area</td>
<td>R 453 880</td>
</tr>
<tr>
<td>10</td>
<td>Fencing</td>
<td>R 120 750</td>
</tr>
<tr>
<td>11</td>
<td>Gravel Roads</td>
<td>R 2 528 600</td>
</tr>
<tr>
<td>12</td>
<td>Open Surface Areas</td>
<td>R 9 418 835</td>
</tr>
<tr>
<td>13</td>
<td>Construction Camp</td>
<td>R 378 075</td>
</tr>
<tr>
<td>14</td>
<td>Landfill Sites</td>
<td>R 742 486</td>
</tr>
<tr>
<td>15</td>
<td>Post Closure Monitoring / Maintenance</td>
<td>R 7 302 558</td>
</tr>
</tbody>
</table>

TOTAL  
R 78 918 673  R (2011)

QUANTUM TOTAL (2011)  
R 78 918 673  R (2011)

QUANTUM TOTAL (2013)  
R 85 511 873  R (2013)

DMR Weighting Factor 2 for Remote Location: 1.1  
R 94 063 060  R (2013)

Preliminary and General of 6%  
R 5 643 784  R (2013)

Contingencies of 10%  
R 9 406 306  R (2013)

SUB-TOTAL  
R 109 113 150  R (2013)

Vat 14%  
R 15 275 841  R (2013)

GRAND TOTAL  
R 124 388 991  R (2013)

Note: Items excluded from this assessment, covered within Black Mountain Mine Closure Quantum; Gamsberg Underground Mine; Gamsberg Existing Evaporation Pond for pumped minewater; Railtrack and sidings (Loop 10 and Saldanha); Aggeneys township.

9.5  
SUGGESTIONS FOR POST MINING LANDUSE

The potential post mining landuses will continue to be discussed with the DMR and DENC, the Namakwa District and Khai-Ma municipalities and
other key stakeholders. Future landuses will need to be identified, based on
the manner in which the Project impacts civil infrastructure, agreements
reached with surrounding landowners and local authorities, closer to the time
of decommissioning. In terms of post mining land use it is recommended that
the biodiversity sensitivity of the remaining sensitive habitat on the site and
the local Spatial Development Plans and Integrated Development Plan be
considered.
ANNEX A: DRAFT DECOMMISSIONING AND CLOSURE PLAN (INCLUDING PRELIMINARY FINANCIAL BREAKDOWN)
ANNEX B: VEDANTA POLICIES

- Biodiversity Policy
- Energy and Carbon Policy
- HIV/AIDS Policy
- Health, Safety and Environment Policy
- Human Rights Policy
- Social Policy
- Water Management Policy