ENVIRONMENTAL MANAGEMENT ASSITANCE (PTY) LTD

REPORT ON:

BCR MINERALS (PTY) LTD SPITSVALE REHABILITATION AND CLOSURE PLAN

Submitted to:

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Ltd

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VILJOEN & ASSOCIATES

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LIST OF TERMS AND ABBREVIATIONS USED

BCR	Bushveld Chrome Minerals (Pty) Ltd
EMA	Environmental Management Assistance
MPRDA	Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)
NEMA	National Environmental Management Act (Act 107 of 1998)
DMR	Department of Mineral Resources
DEA	Department of Environmental Affairs
PCLU	Post Closure Land Use
NHBRC	National Home Builders Registration Council
WUL	Water Use Licence
LOM	Life Of Mine
EMPR	Environmental Management Programme

EXECUTIVE SUMMARY

Bushveld Chrome Minerals (Pty) Ltd (BCR) has appointed Environmental Management Assistance (EMA) to manage the EIA process for mining operations at the Spitsvale Project to extract chromium and related minerals near Steelpoort in the Limpopo Province.

BCR has requested EMA to compile a rehabilitation and closure plan with a cost estimate for the new proposed Spitsvale Project mining operation in support of the mining permit application. This document is compiled in accordance with GNR 1147 published in 2015 under the National Environmental Management Act (NEMA), as well as additional relevant legislation governing mine rehabilitation, closure cost assessment (closure provision) and closure planning as described in the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA) and associated guidelines, The National Environmental Management Act (Act 107 of 1998) in its entirety, The National Environmental Management Laws Amendment Act, 2014 (Act No. 25 of 2014) and the Environmental Impact Assessment Regulations, 2014 promulgated under NEMA.

BCR currently holds an approved Prospecting Right (with the right to take a Bulk Sample) and it now proposes to mine primarily chromite (chrome ore, and all associated minerals) on the farms Kennedy's Vale 361 Portions 22 and 8, and Farm Spitskop 333 portions 24, 25, 26 and 28 within the Greater Tubatse Municipality. It is assumed that approximately 80 – 100 ha of land will be disturbed during the current exploration and planned mining operations.

The main aim in developing this rehabilitation and closure plan is to:

- Mitigate the impacts caused by exploration and mining activities.
- Restore land back to a satisfactory standard, taking the current biodiversity and future proposed land use into consideration.
- Prevent any future (not currently anticipated) risks to the environment and people by looking at knowledge gaps that will need to be addressed during operation as part of the rehabilitation, as well as upon closure.

The rehabilitation plan compiled for the proposed project has followed the above methodology and details the following:

- Legal requirements.
- Soil and overburden rehabilitation.
- Revegetation.

- Alien invasive control plan.
- Monitoring criteria.
- Costs involved.

A closure liability assessment has been conducted and forms part of Bushveld Chrome Resources Minerals' Environmental Impact Assessment and Environmental Management Programme. The purpose of this document is to supply the Department of Mineral Resources (DMR) with the requested information pertaining to closure cost at Bushveld Chrome Resources (Pty) Ltd, as required by the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and the Mineral and Petroleum Resource Development Act, (Act 28 of 20025) (MPRDA). The contents of this financial provisioning report are based on the requirements as stipulated under Government Notice Regulations 1147.

An assessment was conducted of all the infrastructure and activities taking place on site that fall within the responsibility of Bushveld Chrome Resources. The infrastructure was classified in accordance with the tariffs list and the surface areas of the infrastructure were calculated to determine the volume or surface requiring rehabilitation or demolition. A separate calculation was done to include the costs associated with Phase 1 (including laydown area 1, Klarinet Koppie opencast pit and the associated ROM stockpiles). A supplementary calculation was done to incorporate Phase 2 & 3 and a second laydown area. These extensions are planned as part of the next phases of the project and will only commence once phase 1 mining operations have ceased.

The premature quantum was calculated using the demolition and rehabilitation rates and has been calculated as **R6,140,648-41** (*including P&G, contingency and excluding VAT*) for the physical and biophysical components associated with the current activities and infrastructure on the site. This is related to Open pit 1, Laydown area 1, Ore stockpile area, ROM stockpile area and roads.

The biophysical component of rehabilitation makes for 100% of the liability cost. A focussed rehabilitation and closure strategy can minimise the liability of the biophysical component. The physical rehabilitation (demolition and removal of structures) amounts to 0% of the liability cost. For the reason that all infrastructure will either be removed off site by the mining contractor or be taken over by the community. Therefore, the biophysical component contributes solely to the calculated closure costs for premature closure.

The community have expressed an interest in some of the physical infrastructure, such as some of the laydown area buildings, the access and haul roads as well as the ROM stockpile's footprints for future use.

A cost estimate has been included for the current and future activities. The assumption made with regards to placement of waste rock in the future activities is that a starter waste rock dump will be constructed and as soon as mining allows it, the waste rock will be backfilled into the pit area. This will be done as part of operational cost. Thus no waste rock dumps will remain subsequent to mining operations ceasing.

The quantum calculated for all activities and infrastructure associated with the entire Spitsvale Project (including mining of phase 2 and 3 and the associated infrastructure) was calculated as **R8,699,326-49** (*including P&G, contingency and excluding VAT*). The increase in biophysical costs (between the current and proposed costs) can be attributed to the addition of two opencast pits, with their associated infrastructure, in the future. All physical infrastructure to be constructed in the future will also be either removed upon closure by the mining contractor or given to the community.

The costing sheets have been reviewed externally by a registered financial institution for correctness regarding the calculations. Based on the current information it is estimated that the accuracy level of the phase 1 calculation is 95% and the accuracy level of the calculation of the future mining development is 50%.

Allowance has been made for the creation of a free-draining topography, replacement of soil, re-vegetation, and for the general surface rehabilitation of the disturbed area and the liability figures will be updated on an annual basis as required by the DMR.

DECLARATION OF INDEPENDENCE

Chris J Viljoen, CEO of Viljoen Associates and Marianne Strohbach, CEO of Strohbach Associates hereby declare:

- Both specialists act as independent specialists in this investigation.
- The assessment is conducted in a scientific manner and findings will not be manipulated for a favourable outcome.
- Both specialists have no financial, personal or any other interest in this application managed by Environmental Management Assistance.
- All particulars furnished in this declaration are true and correct.

M.Sc., Pr.Sci.Nat., SACNSP: 400131/96,

Professional Indemnity Insurance: CFP Brokers Hollard Insurance: SPL/SLFG/000007248

M.Sc., Pr. Sci. Nat., SACNSP: 400079/10

DISCLAIMER

The opinions expressed in this Report have been based on the information supplied to Viljoen Associates (Pty) Ltd by Environmental Management Assistance (Pty) Ltd and BCR Minerals (Pty) Ltd. Viljoen Associates has exercised all due care in reviewing the supplied information. Whilst Viljoen Associates has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. Viljoen Associates does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of the investigation, and those reasonably foreseeable.

Expertise of compiling Specialists

The rehabilitation and closure plan was compiled by:

Name	Professional registration and short list of expertise	Signature
Marianne Strohbach	*M.Sc., Pr.Sci.Nat.* 400079/10 (Botany and Ecology) • Four years Conservation Authority (Plants, Namibia) • 23 years active research in vegetation phytosociology and -mapping, vegetation state assessment, rangeland and plant population dynamics, long-term vegetation and environmental monitoring • Advisory to International Standards for plant species with known ethnobotanical uses that are harvested for commercial purposes • Development work with marginalised rural communities using natural plant resources • Ecological assessments for developmental purposes (BAR, EIA) • Development of practical and achievable environmental mitigation measures and management plans • Completed projects in all Provinces of South Africa, as well as Zimbabwe and Namibia	
Chris J Viljoen	*M.Sc., Pr.Sci.Nat. 400131/96 (Soil Science)* Baseline soil surveys, soil impact assessments, land use assessments, ,land capability assessments, agricultural potential assessments & wetland delineations for EIA and EMPR Soil contamination assessments and formulation of cost effective remediation strategies for rehabilitation and closure purposes. Rehabilitation and closure plans. Geotechnical assessments for site selection, *e.g.* tailings dams, residential developments, etc. Twenty eight (28) years active in Soil Science	

Full CV's of the specialists are available on request.

BCR MINERALS (PTY) LTD SPITSVALE REHABILITATION AND CLOSURE PLAN

1 INTRODUCTION

BCR Minerals (Pty) Ltd has appointed *Environmental Management Assistance (Pty) Ltd* to manage the EIA process for mining operations at the Spitsvale Project to extract chromium and related minerals near Steelpoort in the Limpopo Province.

Bushveld Chrome Minerals currently holds an approved Prospecting Right (with the right to take a Bulk Sample) and it now proposes to mine primarily chromite (chrome ore, and associated minerals) within its Spitsvale Project, which is situated on the farms Kennedy's Vale 361 Portions 22 and 8, and Farm Spitskop 333 portions 24, 25, 26 and 28 within the Greater Tubatse Municipality.

It is assumed that approximately 80 – 100 ha of land will be disturbed during the current exploration and planned mining operations.

As part of the EIA process, it is required that a first approximation of the procedures and costs of rehabilitation and closure be compiled.

Upon acceptance of the EIA documentation and issuing of the mining right, this rehabilitation and closure plan will be reviewed on an annual basis and submitted to the Department of Mineral Resources (DMR).

2 TERMS OF REFERENCE

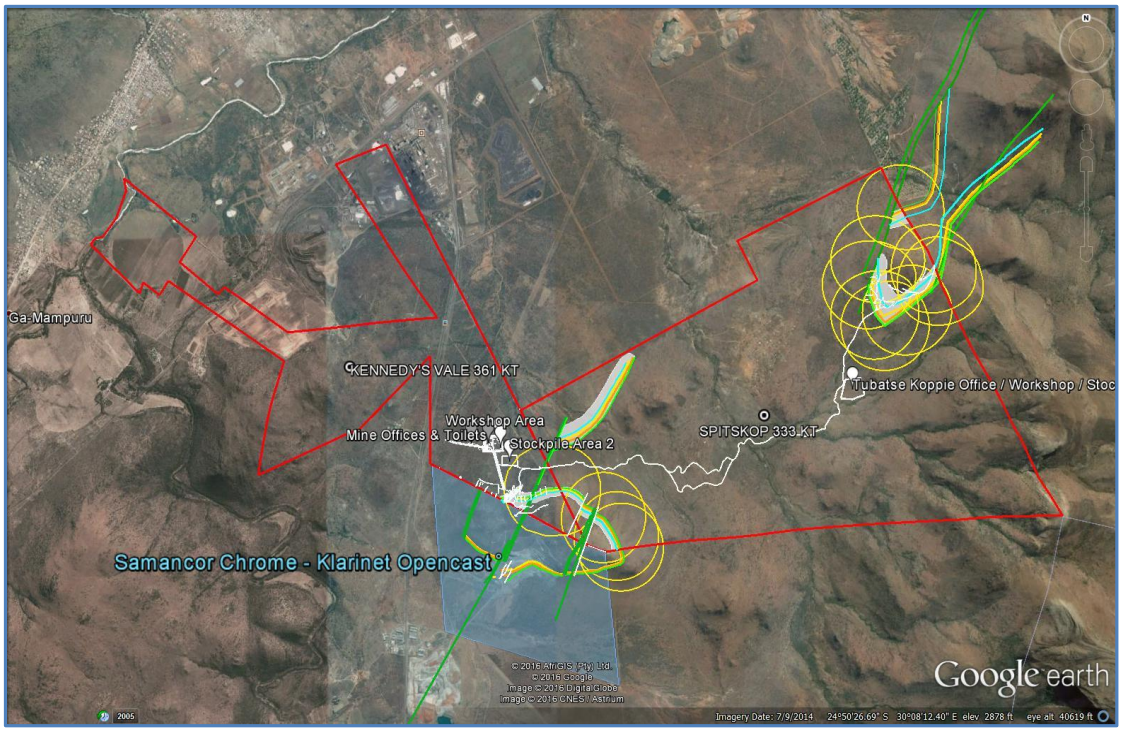


Figure 1: **Investigation Area.**

During August 2015 *Environmental Management Assistance (Pty) Ltd* requested a proposal for a rehabilitation and closure plan the new proposed BCR Minerals (Pty) Ltd chromium mine at Steelpoort.

3 INVESTIGATION OBJECTIVES

The objective of the investigation was interpreted as:

- Compile a conceptual rehabilitation and closure plan for BCR Minerals (Pty) Ltd chromium mine at Steelpoort.

4 METHOD OF INVESTIGATION

In order to meet the objective of the investigation the following scope of work was conducted:

- Meeting with *Environmental Management Assistance (Pty) Ltd* and project team to discuss the terms of reference for the project.
- Site visit on 10 and 11 February 2016 to BCR Minerals (Pty) Ltd chrome mine near Steelpoort, by M. Strohbach, C. Viljoen, S. McQuade and W. Murry.
- Review of all available information and field observations.
- Compilation, review and submission of report.

5 PROBLEM ANALYSES

5.1 Legislation and Guiding Documents

Applicable legislation in South Africa is reviewed and updated/amended on a regular basis to incorporate newly arising scenarios as well as new knowledge gained. Between the DMR and the DEA, there is a shared responsibility to mine the mineral wealth of the country sustainable and look after the natural environment, hence current legislation does overlap to some degree. Whilst the EIA and Rehabilitation and closure plan is being submitted to the DMR, specifications of current and future legislation and guidelines issued by DEA have also been perused and incorporated where deemed applicable in this document.

The legislation used as guideline for this document hence include:

- The Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA) and associated guidelines.

- The National Environmental Management Act (Act 107 of 1998) (NEMA) and all subsequent amendments, especially:

    - The National Environmental Management Laws Amendment Act, 2014 (Act 25 of 2014).

    - The Environmental Impact Assessment Regulations, 2014 promulgated under NEMA.

    - The regulations pertaining to the financial provision for prospecting, exploration, mining or production operations, promulgated Nov 2015 under NEMA

- The National Environmental Management Biodiversity Act (Act 10 of 2004) (NEMBA), including:

    - Alien and Invasive Species Lists, 2014 (GN R599 in GG 37886 of 1 August 2014)

5.2 Summary of current regulations pertaining to the financial provision for the rehabilitation, closure and post closure of prospecting and mining operations

A holder of a prospecting or mining right must make financial provision through a detailed inventory of required activities for:

(a) Rehabilitation (*annual and final*).

(b) Decommissioning and closure activities at the end of the life of mine or possible premature closure of the mine.

(c) Remediation and management of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water.

(d) An annual assessment reviewing:

(i) the annual rehabilitation plan

(ii) the final rehabilitation, decommissioning and mine closure plan

(iii) the environmental risk assessment report

(iv) the financial provisions related to the above

The above need to be reviewed on an annual basis to update necessary actions as well as costs involved.

5.3 Minimum content of a final rehabilitation, decommissioning and mine closure plan

- Details of the team that prepared the plan and the professional registrations and experience of the preparers.
- Objective of the final rehabilitation, decommissioning and closure plan.
- An overview of environmental and social context that may influence closure activities or be influenced by closure activities, including stakeholder issues, expectations on proposed final land use and comments that have informed the plan.
- Details of the closure actions that clearly indicate the measures that will be taken to mitigate and/or manage identified risks/impacts and describes the nature of residual risks/impacts that will need to be monitored and managed post closure.

- A schedule, budget, roles and responsibilities for rehabilitation, decommissioning and closure of each relevant activity or item of infrastructure.

- Identification of knowledge gaps and how these will be addressed and filled.

- Details of the full closure costs for the life of project at increasing levels of accuracy as the project develops and approaches closure.

- Future monitoring, auditing and reporting requirements, including a reassessment of the risks/impacts to determine whether after the implementation of the closure strategy the residual risk is acceptable to the mining operation and stakeholder.

- Assumptions and inputs, scope changes, the effect of a further year's inflation, new regulatory requirements and any other material developments.

5.4 Legal Obligations

There are a number of legal and regulatory frameworks with which BRC Minerals (Pty) Ltd must comply. The key relevant legislation applicable to closure includes the following:

- Constitution of the Republic of South Africa (Act 108 of 1996) (Constitution).

- Mineral and Petroleum Resources Development Act (Act 68 of 2002) (MPRDA).

- National Environmental Management Amendment Act (Act 62 of 2008) (NEMA).

    - Including Regulation No. 1147 promulgated 20 November 2015

- National Water Act (Act 36 of 1998) (NWA). The following sections provide a brief description of the legislation as it pertains to the closure of BCR Minerals (Pty) Ltd.

5.4.1 The Constitution

In terms of Section 24 of the Constitution “Everyone has the right –

- to an environment that is not harmful to their health or well-being,

- to have the environment protected, for the benefit of present and future generations”.

5.4.2 Minerals and Petroleum Resources Development Act

The legal framework for the regulation of the mining industry underwent transformation with the promulgation of the Minerals and Petroleum Resources Development Act 28 of 2002 (MPRDA), which came into effect on the 1 May 2004. Regulations in support of the MPRDA were published in April 2004 (Government Gazette 26275, Regulation 527). These requirements and a summary of other regulatory considerations are discussed below. In Section (§) 37, the MPRDA confirms that the principles set out in the National Environmental Management Act 107 of 1998 (NEMA) apply to all prospecting and mining operations and that these operations must be carried out in accordance with the generally accepted principles of sustainable development. This is further supported by the stated objective of the MPRDA being to "give effect to Section 24 of the Constitution by ensuring that the nation's mineral and petroleum resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development". §38 stipulates that the general objectives of integrated environmental management must be applied in accordance with NEMA and this will include the assessment and management of impacts identified as part of the environmental management programme (EMP) process laid out in §39. R527 specifies that the EMP must include environmental objectives and specific goals for mine closure. The applicant for a mining right must make prescribed financial provision for the rehabilitation or management of negative environmental impacts, which must be reviewed annually (§41). R527 provides principles for mine closure (§56 and §60), which state that the holder of a mining right must ensure:

- The closure of its mining operation incorporates a process which starts at the commencement of operation and continues throughout the life of mine.

- Risks pertaining to environmental impact are quantified and managed proactively, which includes gathering relevant information throughout the mine's operations.

- Safety and health requirements of the Mine Health and Safety Act (MHSA) 29 of 1996 are complied with.

    - Residual and possible latent environmental impacts are identified and quantified.

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

    - Mining operations are closed efficiently and cost effectively.

- Key objectives for mine closure to guide project design development and management of environmental impacts are included in the EMP.

- The EMP includes broad future land use objectives.

- The EMP includes proposed closure costs.

The MPRDA provides for transitional arrangements to enable mines to convert their old order right into a new order mining right (Schedule II). As with NEMA and NWA, there is a provision in the MPRDA (§45) for the DMR to direct an operation to investigate, evaluate, assess and report on the impact of any pollution or environmental degradation and take such measures as may be specified within a specified time period. If the operation fails to carry out such a direction, the DMR can initiate the necessary actions and recover the costs from MM. In addition, §38 makes Directors of BCR Minerals jointly and severally liable for any unacceptable negative impact on the environment.

5.4.3 National Environmental Act

Sections 28 (1) and (3) of NEMA set out the duty of care principle, which is applicable to all types of pollution and must be taken into account in considering any aspects of potential environmental degradation.

- Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.

- The measures required in terms of subsection (1) may include measures to:

  - Investigate, assess and evaluate the impact on the environment.

  - Inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment.

  - Cease, modify or control any act, activity or process causing the pollution or degradation.

  - Contain or prevent the movement of pollutants or the causing of degradation.

  - Eliminate any source of the pollution or degradation.

  - Remedy the effects of the pollution or degradation.

5.4.4 National Water Act 36 of 1998

Section 19 of the Act sets out the principles for "an owner of land, a person in control of land or a person who occupies or uses land" to:

- Cease, modify or control any act or process causing pollution.
- Comply with any prescribed waste standard or management practice.
- Contain or prevent the movement of pollutants.
- Eliminate any source of pollution.
- Remedy the effects of the pollution.
- Remedy the effects of any disturbance to the bed and banks of a watercourse. It also describes the actions that can be taken by the catchment management agency to enforce the requirements of the Act.

5.4.5 Abbreviated Legal Register for Rehabilitation

The following summarises all the ***Acts*** focusing on human rights, protection of the environment, accountability and financial provision to be considered by BCR Minerals with the proposed mining project:

- *Mineral & Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA), the MPRD Regulations R527.*
- *Constitution of South Africa Act (Act No. 108 of 1996).*
- *National Environmental Management Act (Act No. 107 of 1998) (NEMA), Amendments to it and added Regulations.*
- *National Water Act (Act No. 36 of 1998) (NWA) (Section 36), and Amendments, with specific reference to the NWA Regulations GN704 of 1999 and use of Water for Mining and Related Activities aimed at the Protection of Water Resources.*
- *The Water Services Act (Act No. 108 of 1997).*
- *The Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA) & Amendments (Govt. Gazette Vol. 429 No. 22166 of March 2001).*
- *National Forest Act (Act No. 84 of 1998) (CARA).*

- *Spatial Planning and Land Use Management Act (Act 16of 2013).*
- *National Environmental Management Biodiversity Act (Act No of 2003.*
- *National Environmental Management Protected Areas Act (Act No. of 2003.*
- *National Veld and Forest Fire Act (Act No. 101 of 1998).*
- *National Environmental Management: Air Quality Act (Act No. 39 of 2004).*
- *National Heritage Resources Act (Act No. 25 of 1999).*
- *Promotion of Access to Information Act (Act No. 2 of 2000).*
- *National Monuments Act (Act No. 28 of 1969).*
- *Nuclear Energy Act (Act No. 46 of 1999).*
- *National Nuclear Regulatory Act (Act No. 47 of 1999).*
- *Health Act (Act No. 63 of 1997).*
- *Plant Improvement Act (Act No. 53 of 1976).*
- *Occupational Health and Safety Act (Act No. 85 of 1993);*
- *Agricultural Pests Act (Act No. 36 of 1983).*
- *Fertilisers, Farm Feeds, Agricultural remedies and Stock Remedies Act (Act No. 36 of 1947).*
- *Mine Health and Safety Act (Act No. 29 of 1996).*
- *Hazardous Substances Act (Act No. 15 of 1973).*
- *Land Survey Act (Act No. 8 of 1997).*
- *SABS 0286: 1998 Code of Practice for Mine Residue.*
- *Chamber of Mines of SA Guidelines for Environmental Protection: Engineering Design, Operation & Closure of Metalliferous, Diamond & Coal residue deposits.*
- *Guideline on the Compilation of a Mandatory Code of Practice on Mine Residue Deposits.*

- *Department of Water Affairs & Forestry Guideline on water & salt balances for TSF's.*

- *Chamber of Mines Guidelines for Vegetation of Mine Residue Deposits.*

- *Department of Water Affairs Policy and Guidelines for dealing with pollution from TFS's, and the containment and rehabilitation of abandoned TFS's, and prosecutions.*

- *Convention of Wetlands of International Importance especially as Waterfowl Habitat RAMSAR (in force in SA from 12 Dec 1975).*

- *National Waste Act 2008, revised 2012.*

- *The law on Conservation of Agricultural Resources (Act 43 of 1983) states that the degradation of the agricultural potential of soil is illegal.*

- *The Bill of Rights states that environmental rights exist primarily to ensure good health and well-being, and secondarily to protect the environment through reasonable legislation, ensuring the prevention of the degradation of resources.*

- *The Environmental right is furthered in the National Environmental Management Act (Act No. 107 of 1998) (NEMA), which prescribes three principles, namely the precautionary principle, the "polluter pays" principle and the preventive principle.*

- *It is stated in NEMA that the individual/group responsible for the degradation/pollution of natural resources is required to rehabilitate the polluted source.*

- *Soils and land capability are protected under the National Environmental Management Act (Act No. 107 of 1998) (NEMA), the) and the Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA).*

- *The National Veld and Forest Fire Act 101 (10 July 1998) and the Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947) can also be applicable in some cases.*

- *The National Environmental Management Act (Act No. 107 of 1998) NEMA requires that pollution and degradation of the environment be avoided, or, where it cannot be avoided be minimized and remedied.*

- *The MPRDA requires an EMPR, in which the soils and land capability be described.*

- *The Conservation of Agriculture Resources Act (Act No. 43 of 1983) (CARA) requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and water courses are also addressed.*

6 CLOSURE VISION

A conceptual closure plan for the existing mining licence application has been developed for BCR Minerals. The closure of the mine is guided by the closure vision that was developed for the mine's conceptual closure plan, with the closure objectives and post closure strategy developed to support the vision. As the vision covers the mine lease area, it is reasonable that the vision will extent to any new areas included in the mining licence. The closure vision is therefore: BCR Minerals (Pty) Ltd will develop a sustainable post closure environment that is not harmful to the safety and health of surrounding communities, where prospects to utilize infrastructure after closure are maximized and where final post closure land use is optimized so that there is no net negative loss of biodiversity.

At this stage, the envisaged annual progress of mining activities depends not only on the outcome of the financial determination of the closure plan, but also on prevailing market conditions for the ore. Hence annual targets for rehabilitation cannot be set, but will follow the overall objectives and procedures as detailed below. Within the Conceptual Rehabilitation Plan (section 7 below), provisional expectations of annual rehabilitation have been set, which will be reviewed and updated annually once full mining operations have commenced.

6.1 Mine Description

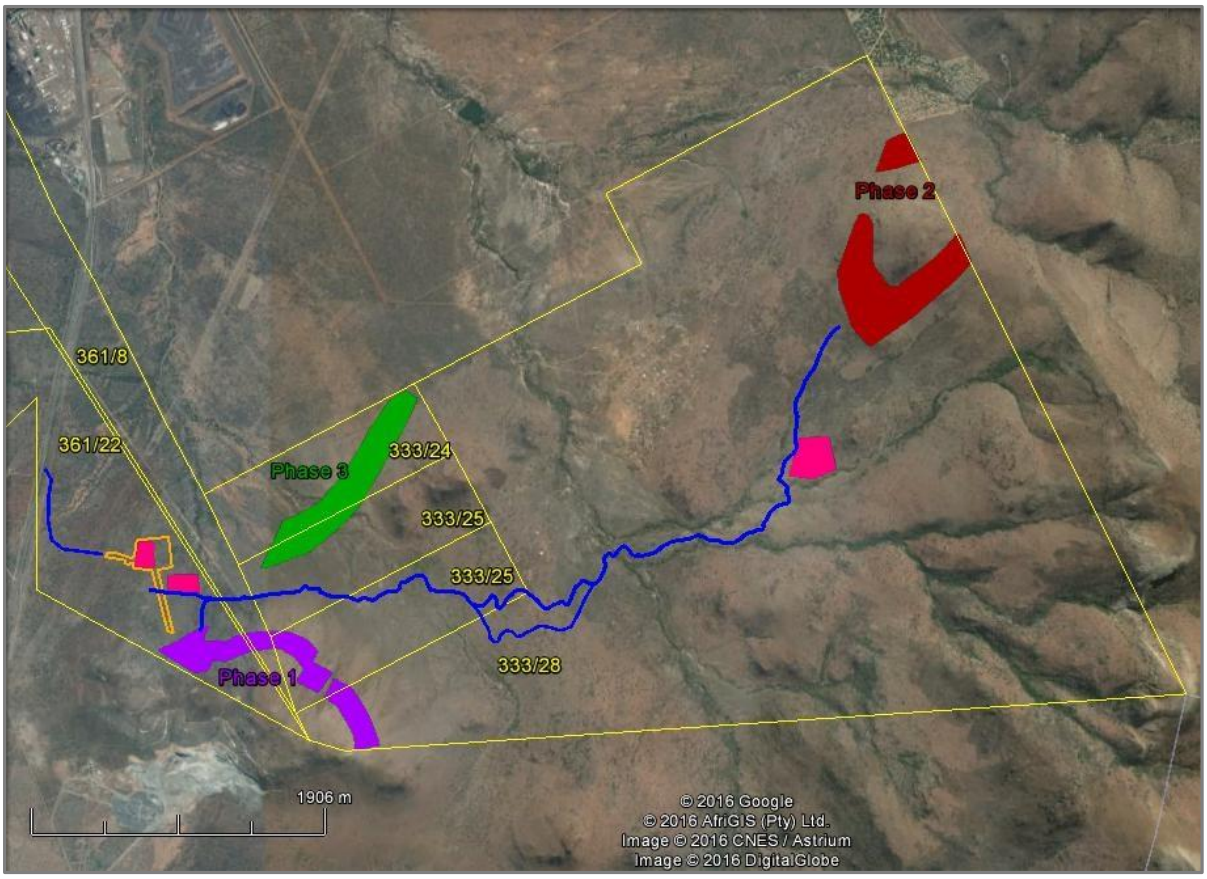


Figure 2: Google-Earth image showing the location of proposed Spitsvale Mining Phases, as well as the affected land portions and the associated infrastructure (Blue: internal roads, Magenta: ore stockpiles, Orange: offices and weighbridge).

Bushveld Chrome Minerals currently holds an approved Prospecting Right (*with the right to take a Bulk Sample*) and it now proposes to mine primarily chromite (*chrome ore, and associated minerals*) within its Spitsvale Project.

The Spitsvale Project comprises three mining phases (Figure 2):

- Phase 1: Mining on the south-western outcrops (Klarinet Koppie), and associated ore stockpiles and infrastructure on farm Kennedy's Vale 361 portions 8 and 22, in total approximately 27 – 30 ha.

- Phase 2: Mining on Tubatse Koppie and closely associated ore stockpile on farm Spitskop 333 portion 28, in total approximately 36 – 40 ha.

- Phase 3: Mining on the plains on farm Spitskop 333 portions 24, 25 and 26, with use of the stockpile areas and infrastructure of Phase 1, in total approximately 26 – 30 ha.

- Access roads between the different mining areas and infrastructure measure approximately 8.5 km at present, but may be expanded.

6.2 Locality and topography

BCR Minerals is situated on portions 24, 25, 26 and 28 of the farm Spitskop 333 KT and portions 8 and 22 of the farm Kennedy's Vale 361 KT in the Sekhukhune District, north of Tweefontein Chrome Mine and south of Spitzkop Platinum Mine. The BCR Minerals study area is located approximately 4 km south from the R555 and "Tweefontein" road intersection and approximately 17 km south west from Steelpoort. BCR Minerals lies on the north-western slopes of the foothills of the Schurinksberg and is situated in the primary catchment of the Olifants River. Locally, the site drains towards the Steelpoort River through various unnamed tributaries that originates in the surrounding mountains and hills. The relief changes by more than 600 m from the Steelpoort River (~ 750 metre above mean sea level) to the edge of the quaternary drainage (B41J) surface water divide (~ 1600 mamsl). These elevated areas slope steeply down to the flatter areas where the proposed Spitskop Mine infrastructure will be located.

6.3 Geology

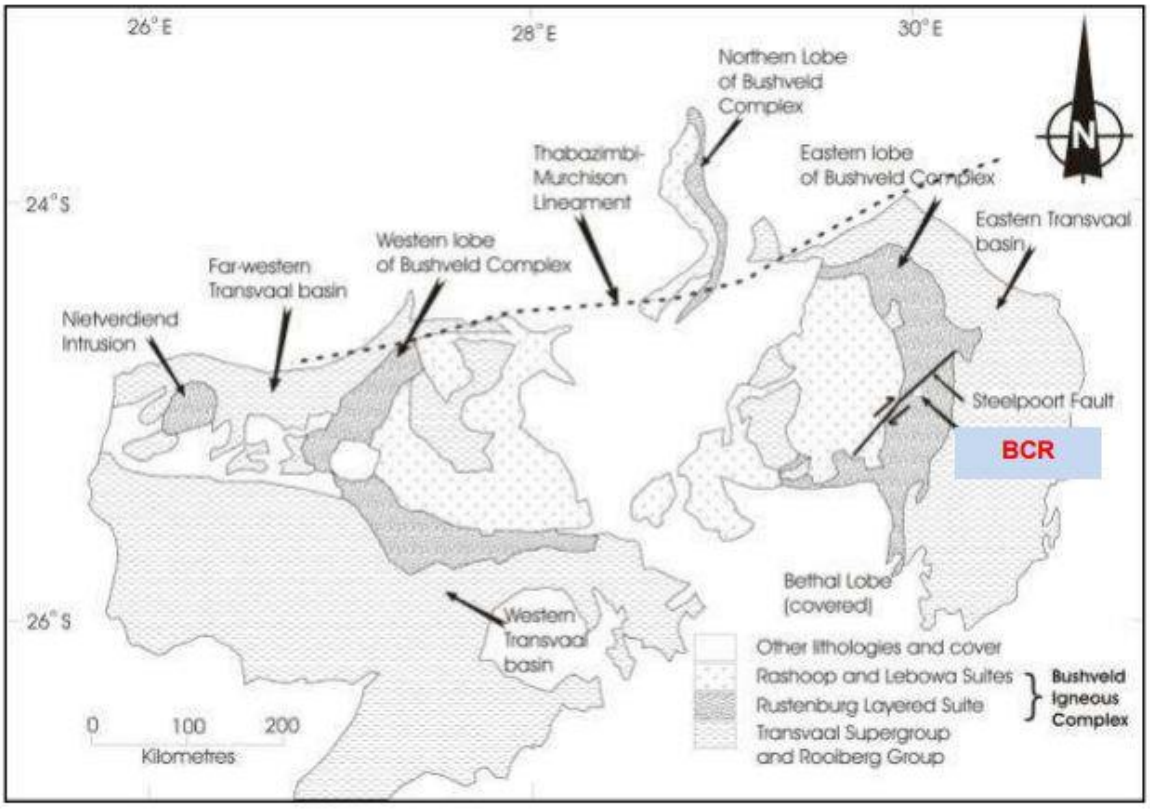


Figure 3: Location of BCR within Bushveld Complex.

The description of the geology is based on the existing knowledge and literature of the region as well as on the BCR Minerals Exploration Geology Report (McQuade, 2015). The BCR Minerals mining area is underlain by the Rustenburg Layer Suite /

Dwars River rocks of the Archaean age Bushveld Igneous Complex and lies south of the Steelpoort Fault trending in a northeast-southwest direction. The Bushveld Igneous Complex overlies the Transvaal Supergroup's Pretoria Group. Younger cover rocks (quaternary sedimentary deposits) occur throughout the area (Figure 3). The Bushveld Igneous Complex (BIC) formed as massive crustal emplacements of predominantly mafic intrusive and extrusive rocks and comprises of suites of layered mafic complexes and sills that intruded the floor rocks of the Transvaal Supergroup. The BIC is divided into the Rustenburg Layered Suite, Lebowa Granite Suite, Rashoop Granophyre Suite and Rooiberg Group. BCR Minerals is underlain by rocks of the Rustenburg Layered Suite (BIC). The Rustenburg Layered Suite comprises rock types ranging from dunite, pyroxenite, norite, gabbro and anorthosite to magnetite and appatite rich diorite, demonstrating a complete differentiation sequence for basic magma. The Rustenburg Layered Suite is subdivided into different limbs and(or) zones, *i.e.* the Eastern Limb, Western Limb and Northern Limb with each limb further sub-divided into the Upper Zone, Main Zone, Critical Zone, Lower Zone and Marginal Zone. The limbs and zones are based on geographical location and stratigraphic / lithology units respectively. The farms associated with BCR Minerals are located in the Eastern Limb with associated rock units from the Main Zone and Critical Zone.

The Main Zone consists of medium-grained norite with minor pyroxenite. The rocks contain variable amounts of quartz and biotite. The Lower Zone consists of pyroxenite and olivine bearing rocks, such as Bronzinite and Harzburgite. The Critical Zone, known for its chromite deposits, consists of layered chromite, pyroxenite, norite and anorthosite. The Main Zone is a thick succession of norite and gabbronorite with minor anorthosite and pyroxenite layers. The BCR Minerals target area is underlain by rocks of the Lower Critical and Upper Critical Zones within the BIC, consisting of chromitite, pyroxenite, norite, anorthositic notire and mottled anothosite. The local geology associated with the BCR Minerals targeting the Critical Zone dips at 8° to 14° southwest. The eastern margin of the study area is underlain by steeply dipping (floor) Pretoria Group sediments distributed around a north-south striking Steelpoort anticline. The Dwars River fragment in the southwest corner of the area is a floor inlier characterised by outcropping Steenkampsberg quartzite. The fragment probably represents a horst block of floor rocks with faulted contacts. Folding of quartzites and metamorphosed shale units occur on a variety of scales. The Transvaal Supergroup formed during the late Archaean to early Proterozoic eons and is preserved within three structural basins on the Kaapvaal Craton, one of which is the Transvaal and Griqualand West Basin. This sequence consists mostly of volcanic rocks such as lava, tuff, andesite, basalt and rhyolite and sedimentary rocks which include quartzite, sandstone, shale, conglomerate and dolomite. Diabase sills and dykes form part of the Transvaal sequence as well. The Transvaal Supergroup underlies the Bushveld Igneous Complex.

The Steelpoort Valley is occupied by a large-scale NE-SW to NNE-SSW striking fault zone, known as the Steelpoort Fault, with up to 10 km of apparent right-handed

faulting has occurred. The Steelpoort fault running the length of the Steelpoort Valley is found approximately 7 km north of BCR Minerals. The fault formed a fault zone ranging from 200- 250 m in width and is likely to affect groundwater flow in the region. The presence of Steelpoort Fault splays have been interpreted from exploration boreholes, and show that the faults generally strike NE, NW and NNE, which may reflect imposed shear. The Spitskop and Kennedy's Vale farms are intruded by several dolerite dykes, expected to be of several ages from the Waterberg and the Karoo Supergroup. These dykes are generally steeply dipping and have varying thickness but do not seem to exceed 20 metres in thickness.

6.4 Stakeholder Engagement

The farm Spitskop 333 (all portions), belongs to the Dithamaga community. In 2006 they established a small settlement west of Tubatse Koppie after a successful land claim. It is administered by the Dithamaga Trust. Representatives of the trust and community were invited for discussions on their current and future proposed land use of the affected areas, as well as challenges they currently have with rangeland management and its possible risk to future liabilities of the mine. A compilation of these discussions, together with an attendance register, is presented in Appendix A.

The main desirables and challenges coming out of these discussions are:

- The settlement is made up of Trust Beneficiaries as well as Tenants, of which all currently have the right to own livestock and harvest natural resources – especially wood.

- Although the Trust knows the approximate number of cattle on the land, there is no grazing regime, no means of providing sufficient watering points to help with a grazing regime and also no fencing that would enable the Trust to restrict livestock (cattle) to those of the community only, whilst grazing as such is very limited.

- The same applies to the harvesting of wood: it is seen as an opportunity of generating an income, but it is not controlled and wood will be cut irrespective of species (including nationally protected species), where ever there is sufficient access to the community.

- The community was made aware of the presence of Category 1b invasives (as listed by NEMBA), which is their responsibility to eradicate and/or control. Several invasives are present outside the envisage footprint area of the proposed prospecting and mining operations, but they pose a high risk of invading rehabilitated areas of the mine, leading to possible future degradation of rehabilitated areas.

6.5 Closure Objectives

The closure objectives which will drive the closure criteria and which have been developed to support the closure vision are:

- Adhere to all statutory and other legal requirements.
- To develop landforms supporting stable and functioning ecosystems, are aesthetically acceptable on closure and will gradually sustain the desired land-uses post closure.
- Ensure safety & health of all stakeholders during closure and post closure and that communities using the site after closure are not exposed to unacceptable risks.
- Ensure that closure supports productive uses considering pre-mining conditions and are in agreement with commitments to stakeholders.
- Physically and chemically stabilise remaining structures to minimise residual risks.
- Promote bio-diversity and biological sustainability to the maximum extent practicable.
- Utilize closure strategies that promote a self-sustaining condition with little or no need for ongoing care and maintenance.
- To achieve agreed quality targets set by the Catchment Management Authority (CMA) and the Department of Water and Sanitation (DWS) as far as practical relative to impacts and reasonability to achieve.

6.6 Post Closure Land Use

Post closure land use (PCLU) is normally determined in consultation with stakeholders, *i.e.* the Dithamaga Tribe so that the PCLU meets the requirements of the stakeholders, within the context of the closure plan. This activity is normally undertaken for the whole mine lease area affected by mining activities and integrates stakeholder requirements with risk mitigation. Given the extent of the disturbance within the lease area, a worst-case scenario would be the majority of the disturbance remaining post closure in the form of mine residues (tailings and waste rock) and various open pits, in which post closure land use is unlikely to contain alternatives that could be utilised sustainably by the community. In the case of the BCR Chrome Mine there will be no tailings or waste rock dumps, infrastructure is to be removed and the excavations are to be rehabilitated. However, should infrastructure not be demolished, there are opportunities that these portions of the footprints could be

made available for sustainable post closure uses, providing that care should be given to ensure the structures adhere to minimum requirements of the NHBRC regulations. The overall post closure land use for the mine has been determined to be:

- Landforms, that sustain indigenous vegetation which limits water and wind erosion and provides sustainable grazing whilst enabling the gradual re-establishment of a more diverse natural species composition

- Mosaic of nodes where existing infrastructure is utilised by stakeholders for a variety of post closure activities surrounded by areas rehabilitated back to a land capability possible of supporting indigenous vegetation as well as land capable of supporting the various community initiatives in which the mine is involved.

6.7 Closure Assumptions

The assumptions for the project were as follows:

- The areas and components included in the current assessment were supplied to EMA by BCR and the EIA specialist reports at the time of this report. These areas were assumed to be all that BCR will be liable for and no investigation was conducted to determine whether BCR is responsible for any additional areas.

- In the absence of exact measurements of infrastructure and proposed mining activity footprints, these were determined roughly from Google-Earth imagery.

    - For future annual reviews, all infrastructure and mining footprint drawings will be updated to reflect the current on-site situation, as well as reference all infrastructure and photograph where deemed necessary by the reviewers to be able to provide more detailed reference maps and compilations of a bill of quantities.

- It is assumed that upon a premature closure of the mine, the same liability will arise as at Life of Mine Closure, but at that stage total area affected and hence cost may be reduced.

- Life of Mine Closure operations also include the necessary monitoring and mitigation of possible residual and/or latent impacts post mining closure operations.

- The Rehabilitation and Closure Plan is considered a ‘living document’ that will be reviewed and updated annually to ensure that all new insights and developments are adequately covered.

- Closure commences once the final stages of ore extractions commence.

- BCR Minerals will ensure final revegetation will take place on all exposed disturbed areas.

- Security will be required during the closure period to limit access of unauthorized people. Once the closure activities are complete and the operation enters the care, maintenance and monitoring period, security will be withdrawn from the site.

- Water management will be required to limit sediment load releases until such time as the vegetation is established and limits erosion potential on the disturbed rehabilitated areas.

- Water management infrastructure will be retained until such time as contact water can be released to the environment to prevent soil erosion.

- Prior to closure the leachate and runoff from the surface of the rehabilitated areas will be monitored to determine if the quality will meet the WUL requirements for discharge or requires management on site.

- The sediments in the various rehabilitated areas are not likely to be classified as hazardous.

- Salvageable equipment will be removed and transported offsite prior to the commencement of demolition.

- The water and power reticulation and associated infrastructure will be retained until such time as water and power are no longer needed on site.

- At closure all temporary portable ablution facilities and a conservancy tank will be removed on completion of the construction phase. All waste generated during the construction phase will be stored at existing storage facilities and disposed of appropriately, as per the mine's current waste management procedures.

- BCR Minerals (Pty) Ltd assume that the effluent released from the ablution facilities during the operational period will not have had a significant impact on the soils and groundwater. Therefore no remedial measures for soil and groundwater contamination are considered in this plan. It is important that the validity of these assumptions is re-visited with each revision of the closure plan to ensure that the final decommissioning and closure plan is based on a sound baseline description.

6.8 Vegetation Establishment

Successful re-vegetation will help control erosion of valuable soil resources, maintain soil productivity and reduce sediment runoff. As part of biodiversity management for the entire mine site, re-vegetation will enhance the resulting biodiversity opportunities by utilizing non-invasive plants that fit the criteria of the habitat (*e.g. soils, water availability, slope and other appropriate environmental factors*). Invasive species will be avoided and the area will be managed to control the spread of these species.

The Vegetation Associations identified and delineated during the EIA specialist study (Map of vegetation types attached in Appendix B) are as follows, also indicating sensitivity:

1: *Themeda triandra – Diheteropogon amplectens* Grasslands:

These are primarily grass-dominated slopes, with either a relatively sparse shrub cover or only small clumps of higher vegetation. It is anticipated that all slopes and outcrops impacted by the mining excavations will, if rehabilitation is successful, eventually progress to a form of this vegetation type, with elements of Association 4 below.

Sensitivity: HIGH

2: *Cyperus sexangularis – Flueggea virosa* Ephemeral Drainage Lines:

These include small rivers on more level areas as well as rocky washes and ravines higher into the mountains.

Sensitivity: No Go Area – only suitable crossings permissible

3: *Acacia tortilis – Dichrostachys cinerea* Dry Mixed Bushveld:

The natural extent of this association is relatively limited, found on more level areas and has been variously degraded, often leading to a diminished herb-layer and a heavily encroached shrub layer. On plains that have historically been transformed by agricultural or other activities, this is the vegetation type that establishes and persists, albeit in a less diverse form.

Sensitivity: Medium-Low

4: *Kirkia wilmsii – Terminalia prunioides* variable Bushveld:

This is found mostly on the lower footslopes of mountains and as an ecotone to the plains below, but also on rocky mountain scarps as well as undulating rocky flats.

Sensitivity: Medium-High

5: *Hippobromus pauciflorus – Rhoicissus tridentata* Rock Outcrops:

This vegetation is highly variable, with no two outcrops with the same vegetation. Generally it is found between large boulders – either on mountain plateaus or on mountain slopes. The high niche diversity accounts for a very high biodiversity of these pockets of vegetation.

Sensitivity: HIGH - Treat as No Go Area as far as possible

6: *Combretum hereroense - Euclea sekhukhuniensis* low bushveld:

Very variable, this vegetation type is found on more level areas between slopes or on the plains and extensive donga systems within the study area, where *Euclea sekhukhuniensis* can form relatively dense stands. The latter species is a narrow endemic – although currently abundant, its limited distribution makes its populations highly vulnerable to the impacts of open-cast mining and other transformative developments.

Sensitivity: No Go, only limited access roads permissible

6.9 Health and Safety Hazards

The closure health and safety hazards are likely to be similar to those encountered during operations. Typical hazards associated with operations such as vehicle traffic, electrical, chemical, air quality and water hazards may also exist during the closure and post-closure periods because many of the same activities will continue after operations. The operational health and safety program may require modification to identify these hazards and train closure site staff accordingly.

6.10 Rehabilitation Action Plan

The strategy will be to undertake closure activities that will result in a stable landform, capable of supporting a vegetation community analogous with surrounding grasslands, where the generation of contact water and sediment laden runoff is limited by the incorporation of appropriate covers in the closure design. Historical information indicates that opportunistic vegetation is limited, implying that a form of growth media is required. During operations, trials will be conducted to determine whether there is a blend of saprolite and topsoil that can be formed to sustain vegetation, without the blend being dispersive and subject to slumping and erosional influences. The initial cover placement strategy will be as described below, with this potentially being refined as field trials are undertaken and information is gathered from rehabilitation undertaken on the cut and filled rehabilitated areas:

- Trial plots will be established on the cut and fill areas to establish vegetation in the weathered saprolite without the application of topsoil, organic material and fertiliser.

- Trial plots will be established with non-dispersive topsoil, organic material and ameliorants to determine whether saprolite with appropriate ameliorants will support a vegetation population on the surfaces.

TABLE 1. REHABILITATION ACTION PLAN

Primary Objective	• Physical and chemical stabilisation. • Minimise stakeholder exposure and residual risks. • Promote biological sustainability.
Post closure land use	• Indigenous grasslands.
Closure data gaps	• Undertake necessary investigations to close data gaps: o Closure water balance. o Slope water management. o Stability and seepage analyses. o Closure material characterisation. o Vegetation trails on blended growth media.
Closure methodologies	• Reshape mined areas through cut and fill to minimise erosion. • Reshape haul roads to meet final profile requirements. • Placement of growth medium for vegetation establishment.
Closure criteria	• Water quality requirements. • Physical and chemical stability requirements. • Vegetation requirements. • Post mining land use criteria.
Monitoring and auditing requirements	• Ground water quality. • Seepage quality and quantity. • Vegetation cover and diversity. • Erosional losses. • Progress and success of rehabilitation relative to annual targets set once full mining operation has commenced • Annual re-assessment and evaluation of: o Effectiveness and specifications of annual rehabilitation plan o Risks of mining operations and external factors on success of annual and final rehabilitation o Final closure and rehabilitation plan, including financial estimates o Submittal of these reports to the relevant authorities

Mine roads that are not needed for closure and post-closure uses at the site (*e.g.* security and monitoring) will be closed. Where possible the larger roads that are retained will be resized for post-closure use by regrading and ripping to a width that is appropriate for anticipated post-closure traffic. Closure actions for the buildings will include the following:

- Removal of all signage, fencing, traffic barriers, *etc*.

- All 'hard top' surfaces to be ripped and bitumen removed along with any culverts and concrete structures.

- Where possible preserve existing vegetation – native trees and plants that may currently be incorporated in parking areas.

- All concrete lined drainage channels and sumps to be broken up and removed.

- All potentially contaminated soils are to be identified and demarcated for later remediation.

- All haul routes that have been treated with dust suppression water need to be sampled to determine whether they need to be treated as "sealed" roads with the upper surface ripped and removed to designated contaminant disposal areas.

6.11 Relinquishment Criteria

Following the implementation of the Action Plan (AP) described in the previous section, it is necessary to have measurable criteria against which to assess the effectiveness of the plan and its implementation. These criteria will assist BCR Minerals in identifying when the standard of closure achieved is sufficient to relinquish responsibility for a specific area. The site specific relinquishment criteria for the *mining* site are documented in Table 2. These criteria relate mainly to the biophysical environment. Also included in the table are the indicators required to demonstrate achievement with the relinquishment criteria and the reporting requirements. The reporting requirements are those that are expected to fulfil the monitoring requirements set out by legislation.

TABLE 2. RELINGUISHMENT CRITERIA

Category	Criteria	Indicators	Reporting Requirements
Safety and stability.	The site is safe for use by humans and animals.	Geotechnical and hydrological studies of existing structures.	Evidence in rehabilitation report that appropriate risk assessment has been undertaken and control measures are in place that will continue to meet agreed requirements.
		Past records of any slope failures.	Evidence in rehabilitation report that appropriate control measures are in place to prevent recurrence.
	Chemical and physical stability of cut and fill areas.	Vegetation Establishment.	As per design report and drawings (should be noted intruder access, both human and domestic animals may impact on cover stability and establishment of vegetation cover.
		Seepage and runoff.	
		Appropriate growth medium placement.	
		Risk assessment.	

Category	Criteria	Indicators	Reporting Requirements
	Decommissioning all structures and roads.	Roads should be removed and sloped to blend in with natural landscape. Concrete pads should be buried and no visible man made structure should remain.	Photographic evidence that infrastructure has been removed.
Ground & Surface Water.	Compliance with standards as per WUL.	Downstream water quality monitoring.	Monitoring report.
Erosion.	Implementation of construction and control measures.	Engineered structures and control water flow.	Evidence in rehabilitation report that required structures are in place and functioning.
		Establishment of vegetation.	See vegetation below.
	Decommissioning of all buildings, structures and roads.	All buildings and infrastructure to be removed from site. Roads should be removed and sloped to blend in with natural landscape. Concrete pads should be buried and no visible man-made structures should remain.	Photographic evidence that buildings and infrastructure has been removed.
Vegetation.	Establish self-sustaining vegetation population which stabilises soils, evapotranspires water and not invasive to region.	Biodiversity monitoring.	Monitoring report.
	Vegetation density the same as analogous areas.		
Land productivity.	Land capability and productivity similar to what existed prior to mining.	Land capability and productivity.	Comparison to analogue areas and pre-mining aerial photographs.

6.12 Post Closure Monitoring and Maintenance

The objective of the monitoring program will be to document the recovery of the site towards the closure land use goals, in accordance with the overall closure objectives and ultimately collect sufficient data to establish that the relinquishment criteria have been achieved. The monitoring that will be required during the post-closure period is summarized below:

- Air Quality: The operational monitoring network will be rationalized to monitor potential post closure impacts with dust samples being collected routinely from strategic positions.

- Surface water quality: Strategic water sample position will be identified and samples collected on a monthly basis. Analyses to include both chemical as well as suspended load measurements.

- Groundwater: Groundwater levels in boreholes will be recorded quarterly. Groundwater samples will be collected and analysed for a suite of chemical parameters.

- Vegetation: Quarterly visual inspections to be undertaken in re-vegetated areas to assess vegetation establishment and provide early detection of erosion. Suitable plots within the rehabilitated areas will be identified where quantitative ecological monitoring can be undertaken to determine whether re-established vegetation is sustainable and free of invasive species.

- General: Routine patrols to be carried out to determine the effectiveness of access control measures.

The monitoring requirements for the rehabilitated areas during the closure period are as summarised in Table 3.

TABLE 3. MONITORING REQUIREMENTS

Category	Monitoring Requirements	
Environmental quality.	Surface water.	
	Groundwater.	Shallow
		Deep
	Air quality	
	Vegetation	Diversity
		Cover
		Metal intake
	Land productivity	
Geotechnical	Erosion	
	Stability	

It is likely that more extensive monitoring in terms of both frequency and sampling location will be undertaken during the closure period. Once closure activities are completed and the operation enters the post-closure phase, it is likely that the monitoring requirements will be revised to include only the key components where further data is required to establish that relinquishment objectives have been achieved. Annual reports will be prepared to document the results of the monitoring during the closure and post-closure phases. These reports will provide important information required to manage the ongoing closure activities, with the data and reports being used to:

- Provide recommendations for measures to be taken to address any indications that relinquishment criteria may not be met; activities
- Indicate where reclamation and closure activities have not been successful, requiring a potential change in design criteria.
- Provide information where care and maintenance is required during the post-closure period.
- Indicate if relinquishment criteria have been achieved.

7 CONCEPTUAL REHABILITATION PLAN

7.1 Approach to Rehabilitation Requirements and Cost Determination

The approach followed for the determination of rehabilitation requirements and associated closure costs can be summarised as follows:

- Review of available information from the EIA specialist reports
- Identification of infrastructure and mining-related activities that would need to be decommissioned at closure
- A dedicated 2 day visit to the Spitsvale Project to discuss mining operations, envisaged rehabilitation procedures and possible risks to the success of rehabilitation with the BCR management as well as the Dithamaga Trust
- Cost determination through assessing environmental liabilities for rehabilitation and closure.

7.2 Rehabilitation Objectives

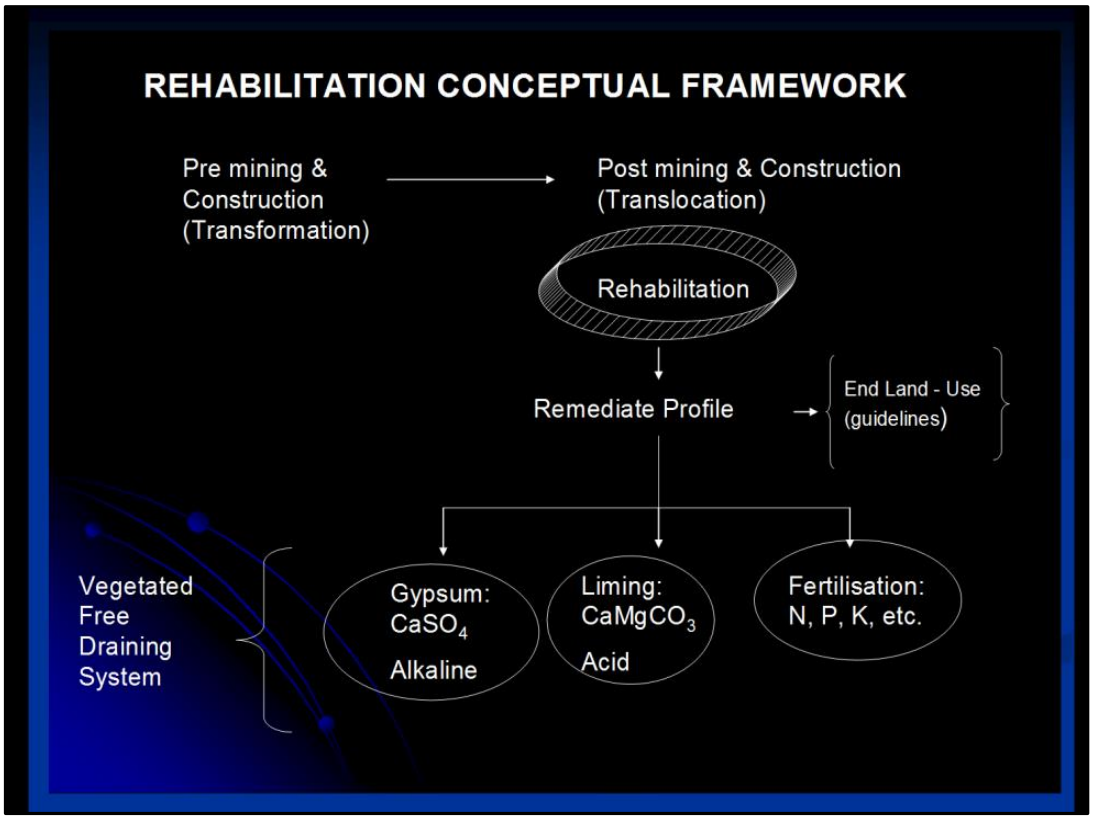


Figure 4: Conceptual Rehabilitation Plan.

The main aims in developing this rehabilitation plan (Figure 4) is to:

- Mitigate the impacts caused by mining activities.

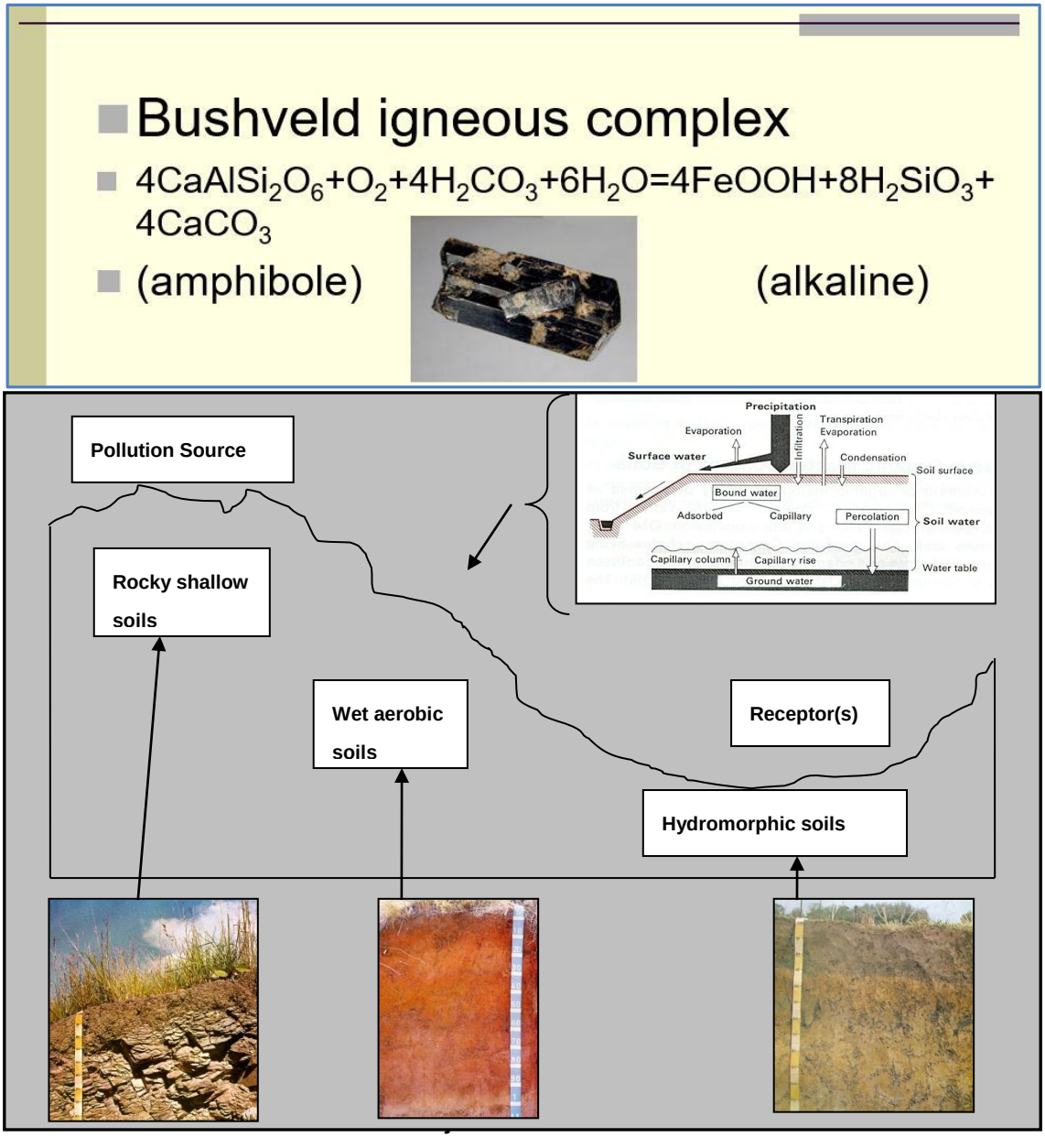
Figure 5: Conceptual model and hypothetical seepage pathways.

- Rehabilitate affected land back to a satisfactory standard which will be ecologically functional and able to attain a stable state with as much of the original (structural) diversity present as the newly created habitats will allow, but also aiming to create a sustainable grazing potential of the rehabilitated areas. Rehabilitation of the surface disturbances caused by prospecting and mining operations utilising available material (*minimum borrowing and import of material*) to ensure a vegetated free drainage system.

- Establish a geotechnical regime adhering to primary pre-requisites for basic foundation indicators and slope stability.

- Adhering to the biodiversity criteria as recommended for the local regional environment.

- Ensure that from a ***Pollution Source Seepage Pathway Receptor*** continuum (**Figure 5**) the prospecting and mining areas does not ***before***, ***during*** and ***after construction*** contribute to organic and inorganic



contamination to the catchment. (*Weathering of the geology at the BCR Mining operations results in alkaline low salinity saprolite with no potential acid mine drainage*).

- Ensure sufficient environmental baseline evidence is quantified to ensure increasing, static and/or decreasing environmental anomalies are data based and monitored to safeguard BCR Mining (Pty) Ltd from any claims due to surrounding environmental incidents contaminating and impacting the catchment.

Rehabilitation and closure objectives need to be tailored to the project and be aligned with the Environmental Management Program (EMPR). The overall rehabilitation objectives for this project are as follows:

- Maintain and minimise impacts to the ecosystem within the project area.
- Re-establishment of the pre-development land capability to allow for a desirable post mining land use.
- Prevent excessive losses of soil resources, including soil seed banks, by adequately managing stormwater and accelerated erosion.
- Prevent soil, surface water and groundwater contamination.
- Comply with the relevant local and national regulatory requirements.
- Maintain and monitor the rehabilitated areas until they have reached a stable state in which a gradual natural succession to an optimal natural species composition can progress.

In accordance with applicable legislative requirements for mine closure, BCR must ensure that:

- The closure of the mining operations incorporates a process which must start at the commencement of the operation and continue throughout the life of the operation.
- Risks pertaining to environmental impacts must be quantified and managed proactively, which includes the gathering of relevant information throughout the life of the prospecting and/or mining operation.
- Residual and possible latent environmental impacts are identified and quantified.

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

- Prospecting or mining operations are closed efficiently and cost effectively.

7.3 BCR Closure Components

The following components were identified during the EIA and dedicated site visit and form part of the Closure plan and liability:

1. Office complex, including amongst others administrative buildings and container-offices, workshops and weight bridge – to be removed.

2. Storage facilities, including storage of chemicals, explosives, fuel and lubricants – to be removed.

3. Ore stockpiles – to be removed.

4. Access roads – to be rehabilitated or repaired in consultation with the landowner.

5. Fencing - to be removed in consultation with the landowner.

6. Waste rock dumps – to be removed and re-landscaped.

7. Open pit excavations and associated safety benches – to be filled in, re-landscaped and revegetated.

8. Exploration excavations and boreholes - to be filled in, re-landscaped and revegetated or removed in consultation with the landowner.

9. High surface erosion risk and need for adequate stormwater control – to be addressed from commencement of mining operations.

10. Presence of alien invasive plants within the footprint area as well as on the affected land portions (latter the responsibility of the land-owners) – to be eradicated on footprint with expert advice communicated to land-owners on eradication and control programs.

7.4 Available Material

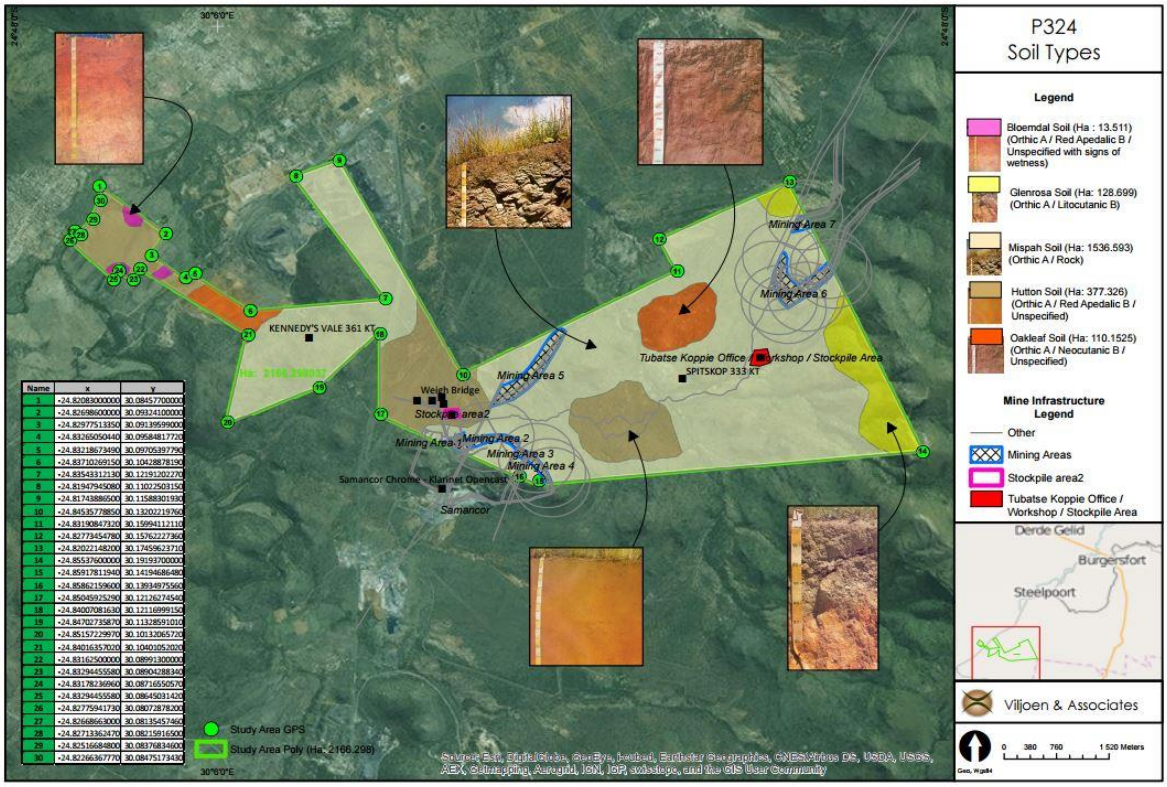


Figure 6: Soil types.

The different mining areas (Figures 2 and 6 above) will be reshaped through cut & fill and blasting of waste rock to ensure an acceptable slope angle and topography to establish sustainable vegetation.

The following section indicates for each of the mining areas:

1. Volume waste rock required for cut and fill.

2. Surface area after cut and fill to be vegetated.

3. How much waste rock will be left exposed on the side slopes after cut and fill.

<u>Areas 1/2/3/4</u>

- Volume (m^3) required for cut and fill = **9,602,000m^3**
- Surface area (ha) after cut and fill to be vegetated = **18,24ha**
- Estimate of how much waste rock will (**m^3+ha**) will be left exposed on sides lopes after cut & fill = **0.912ha @ 480,100m^3**

Area 5

- Volume (m^3) required for cut and fill = **8,312,666m^3**
- Surface area (ha) after cut and fill to be vegetated = **25,40ha**
- Estimate of how much waste rock will (**m^3+ha**) will be left exposed on sides lopes after cut & fill = **1.27ha (void due to no mountain slope)** @ **415,633m^3**

Area 6/7

- Volume (m^3) required for cut and fill = **7,676,222 m^3**
- Surface area (ha) after cut and fill to be vegetated = **29.33ha**
- Estimate of how much waste rock will (**m^3+ha**) will be left exposed on sides lopes after cut & fill = **0.733 ha @ 1,919,905 m^3**

Operational procedures should be put in place during prospecting and mining activities not to decant waste rock over the berm from the mining area to prevent potential losses of the required m^3 waste rock for the cut & fill landscaping during rehabilitation and vegetation establishment. Surface water control measures should be maintained to prevent erosion and sediment loss, *i.e.* weathered saprolite will be the essential fraction required for vegetation establishment during rehabilitation.

The total surface area from the different mining areas 1 to 7 (Figure 6) where rehabilitation would be required is 72.97ha. If this surface area needs to be covered 300mm @ bulk density of 1,275kg/m^3 a total volume of 225,000m3 topsoil would be required. This equates to a borrowing surface area of 75ha if the topsoil is to be striped 0-300mm or 150ha with a stripping depth of 150mm. Care should be taken as far as practical possible prior to any prospecting and/or mining activity to strip all available topsoil to conserve for later use during rehabilitation.

A conservative estimate of available topsoil to be stripped is summarised in **Table 4**.

TABLE 4: AVAILABLE TOPSOIL FOR REHABILITATION PURPOSES

Soil Type & Average Effective Depth (mm)	**Size (ha)**	**Available Volume (m^3)**
Hutton (1,200)	377	4,524,000
Oakleaf (1,200)	110	1,320,000
Bloemdal (1,200)	14	168,000
Glenrosa (300)	129	387,000
Mispah (300)	1,537	4,611,000
TOTAL		**11,010,000m^3 @ BD: 1,275kg/m^3**

An estimated total 3,303ha could potentially be covered 300mm thick at a bulk density of 1,275kgm^3 during rehabilitation taking into consideration a 10% loss of the available 11,010,000m^3 topsoil due to handling, compaction *etc*.

However, it is recommended to keep topsoil stripping for rehabilitation purposes to the minimum. The area is characterised by erosion and needs to be minimised as far as possible. BCR Mining (Pty) Ltd could through cost effective surface water control minimise the natural erosion taking place through surface water control measures contributing to minimise sediment loss in the close proximity to the mining area and the catchment as a whole.

Fortunately the exchangeable sodium percentage (*1N NH4Ac – extract, pH7*) is below 15% of the cation exchange capacity (*1N NH4Ac – extract, pH7*) of the fraction <0,002mm (1:1 layer silicates, i.e. kaolinite and oxides of Fe and Mn), rendering the soils free of dispersive anomalies due to the hydration of sodium.

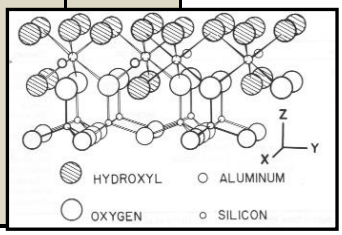
During rehabilitation a series of calibration trails will be conducted to assess optimum algorithm for the minimum soil mixed with saprolite required to establish and sustain vegetation.

7.5 Geotechnical Properties of Fill Material

Table 5 summarises the different site classes based on the character of waste material and expected range of movement.

TABLE 5. RESIDENTIAL SITE CLASS DESIGNATION (SAICE, 1995)

Typical Foundation Material	Character of founding material	Expected range of soil movement (mm)	Site Class
Rock (excluding mud rocks which exhibit swelling to some depth)	Stable	Neglible	R
Fine-grained soils with moderate to very high plasticity (clays, silty clays, clayey silts and sandy clays)	Expansive Soils	<7,5 7,5-15 15-30 >30	H H1 H2 H3
Silty sands, sands, sandy and gravelly soils	Compressible and potentially collapsible soils	<5,0 5,0-10 >10	C C1 C2
Fine-grained soils (clayey silts and clayey sands of low plasticity), sands, sandy and gravelly soils	Compressible Soil	<10 10 to 20 >20	S S1 S2
Contaminated soils Controlled fill Dolomitic areas Land Fill Marshy areas Mine waste fill Mining subsidence Reclaimed areas Very soft silt/silty clays Uncontrolled fill	Variable	Variable	P



Due to the presence of predominantly 1:1 layer silicates (*particles <0,002mm*) in the different layers of the Hutton (*Orthic A/ Red Apedalic B – Horizon/Unspecified*) and Oakleaf (*Orthic A/ Neocutanic B – Horison/Unspecified*) soils it is anticipated after the cut and fill civil landscaping of the 72ha from a geotechnical perspective the sites class designation would classify as a H1C1. This site class would be stable for rehabilitation purposes with proper water control measures. The site classification needs to be quantified through a geotechnical assessment supported by basic road and foundation indicator analyses.

7.6 Water Control

The main objective of the rehabilitation plan is to ensure the 75 ha disturbed mining area and associated surface roads and infrastructure areas are vegetated with indigenous grass and shrub species and free draining with minimal erosion. It is imperative to implement proper water surface water control measures to cater for at least a 1:100 year rainfall event and rainfall intensities of up to minimum 50 mm/h. It is imperative to ensure the correct engineering design is implemented for the

rehabilitated areas with the required quality assurance quality control mechanisms checked by a professional engineer.

7.7 Chemical, Mineralogical and Physical Properties of Soil Material

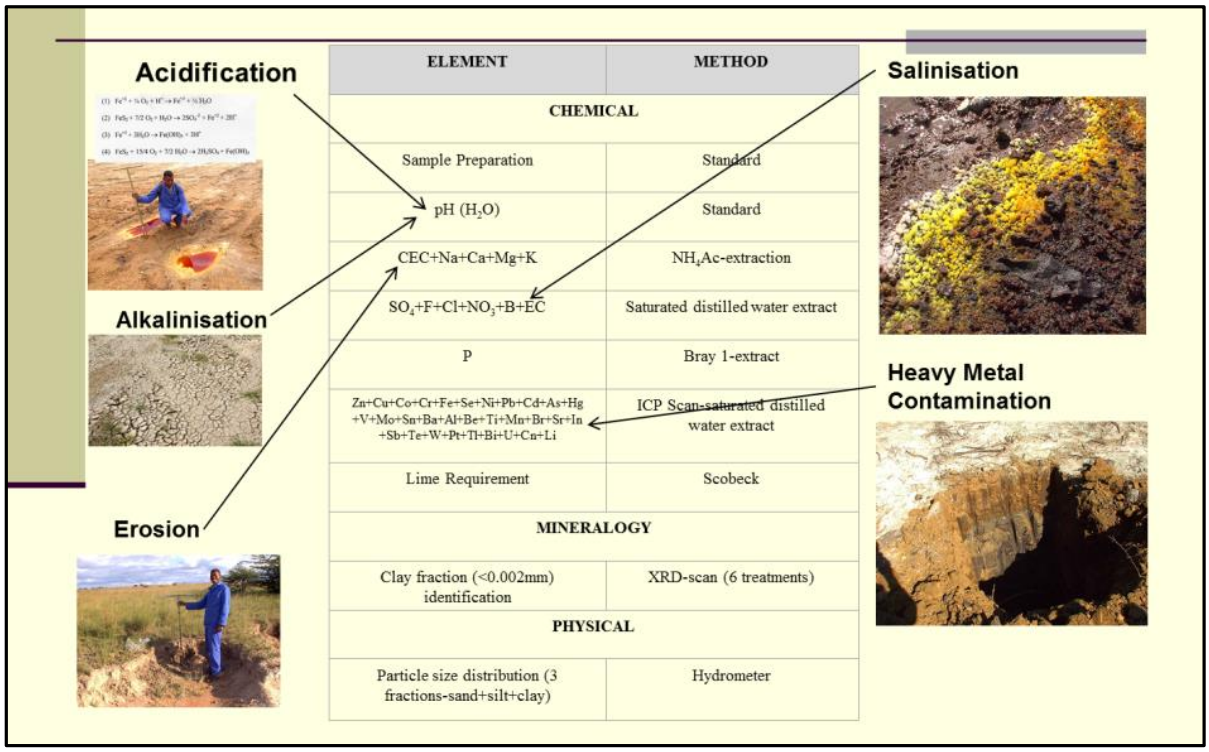


Figure 7: Inorganic soil contamination anomalies.

The *National Environmental Management: Waste Act 2008 (Act Nr. 59 of 2008)* stipulates the minimum requirements for soil contamination and anomalies, *e.g.* acidification, alkalinisation, salinization, erosion, *etc*. (***Figure 7***) should be remediated during rehabilitation.

The different diagnostic soil horizons of the different soils are uncontaminated, however it is recommended to conduct an assessment to confirm before any civil operations commence. If contaminated hot spots occur due to prospecting and mining activities, it might result in contamination being spread on uncontaminated areas during movement and placement of topsoil during rehabilitation.

TABLE 6. SOIL REQUIREMENTS FOR REHABILITATION

ELEMENT	STANDARD
CHEMICAL	
pH (H_2O)	5.3 – 7.2
Cation Exchange Capacity	>5cmol+/kg
Anion Exchange Capacity	>2cmol+/kg
Ca	200-3000
Mg	50-500
K	20-300
Na	ESP<15, SAR<1
EC	<450mS/m
SO_4	<100mg/kg
F	<1mg/kg
Cl	<10mg/kg
NO_3	5mg/kg
B	<1mg/kg
P	5mg/kg
Zn+Cu+Co+Cr+Fe+Se+Ni+Pb+Cd+As+Hg+V+Mo +Sn+Ba+Al+Be+Ti+Mn+Br+Sr+In+Sb+Te+W+Pt+ Tl+Bi+U+Cn+Li	<1mg/kg
Lime Requirement	0t/ha
MINERALOGY	
Clay fraction (<0.002mm) identification	1:1 (kaolinite), 2:1 (smectite, vermiculite) clay minerals
PHYSICAL	
Particle size distribution (3 fractions-sand+silt+clay)	5-30%
Water retention	60-80% moisture content between –40 to –800kPa
Permeability	10-20mm/h @ Bulk Density of 1275kg/m^3

Table 6 specifies the minimum soil requirements to ensure successful establishment of vegetation during rehabilitation to at least 300 mm, considering intermixing of the different layers will be taking place during cut and fill. Saturated and unsaturated water flow conditions in the soil and/or saprolite soil mix growth medium will determine the plant available water between 33 – 1,500 kPa. It is anticipated plant available water will be in order of >1,100 kPa, especially on the side slopes (dry growth regime with little water retention and infiltration capacity >5 – 10 mm/h). It would be crucial to ensure indigenous plant pioneer species adapted to the micro and macro climate is used during re-vegetation, due to the negative water balance.

7.8 Possible Post Rehabilitation Land Use.

Careful consideration should be given to the final end land use post rehabilitation, because this will determine the level and cost of rehabilitation and should be in line with the expectations of the local communities. Consideration should also be given to the legal framework for decision making on final end land use post rehabilitation on local and regional scale (Table 7).

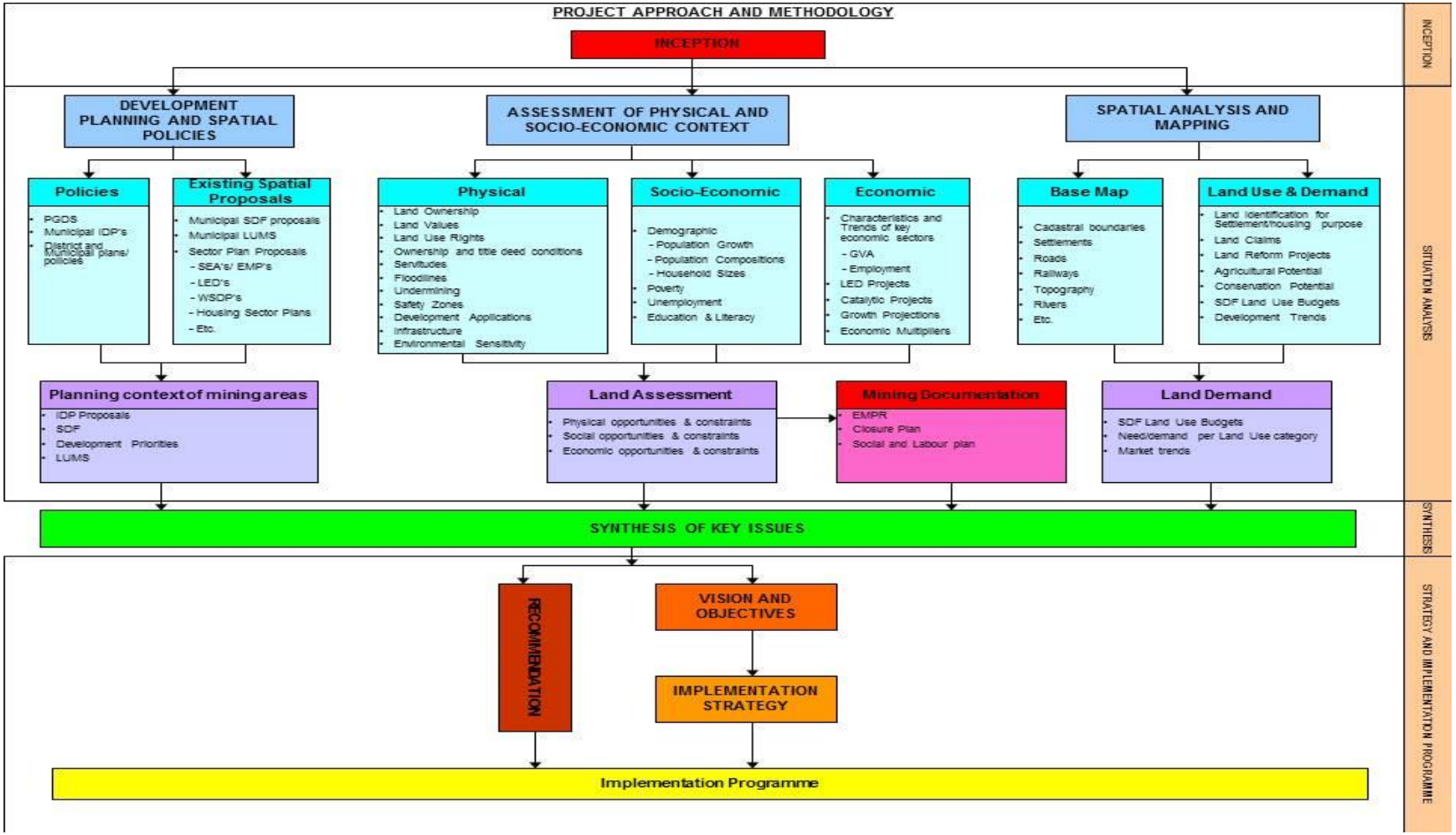


TABLE 7. FRAMEWORK FOR DECISION MAKING ON FINAL END LAND USE POST REHABILITATION

7.9 Financial Provisions for Rehabilitation and Closure

The methodology and cost calculations for the following sections are listed in Appendix C.

7.10 Mitigation, Rehabilitation and Closure Planning

The following describes the rehabilitation and closure liabilities for the Spitsvale Project, and forms the basis of the current closure cost estimate. It is assumed that most tasks will be outsourced, but the responsibility still lies with BCR to appoint those subcontractors as well as an Environmental Officer that will monitor compliance throughout. BCR plans to implement rehabilitation on an ongoing basis as soon as areas can be rehabilitated, hence a small section of possible mitigation and rehabilitation measures that should be implemented as part of this ongoing process has been listed as well.

7.10.1 General Activities from Prospecting to Commencement of New Activities

Component	Activities	Notes	Timeframe
Planning of new activities, including infrastructure placement.	Avoid where possible: • All vegetation and habitats with high sensitivity, including large fluvial systems Minimise: • Clearing of high indigenous shrubs and large trees outside the approved mining areas must be kept to the lowest number possible, regardless of species/ protection status. • Components of the proposed mining activities that may under no circumstance be located in or within 100 m of any drainage or other fluvial system would include: o Man-camps and/or ablution facilities. o Any form of waste/soil/overburden disposal or storage. o Any form of storage of materials or machinery. o Any infrastructure that will be sensitive to inundation in case of an extreme (rainfall) event.		Design and operational phases.
Vegetation conservation.	Undertake pre-clearing walkthrough survey, carried out by a suitably qualified specialist, of the footprint area (including mining areas, safety berms and other areas to be cleared) for protected flora and burrowing terrestrial fauna: The final footprint investigation (walkthrough) is aimed to fully inform the Project Company, responsible conservation authority	Possible on-site nursery not exceeding 1ha.	Before new ground is cleared for any component.

Component	Activities	Notes	Timeframe

	(that will issue the relevant permits and authorisations), contractors, EO and ECO about:
	• Protected and red data and protected species that will be affected by the development and for which permits need to be obtained for clearing and/or relocation.
	  ○ indicating the red-data and protection status of each species observed,
	  ○ Location of protected plant species within the footprint area – either individually mapped or approximate areas of occurrence, especially dense patches (alternatively, for linear structures, between which structures or other markers).
	  ○ Identification of the affected species by providing a representative photo record that enables EO/ECOs and contractors to identify such plants.
	  ○ How many specimens per species may be affected –estimate based on random transect surveys.
	  ○ Which species can successfully and thus must be relocated, which and how many will have to be destroyed.
	• Depending on the findings, some species may have to be maintained in an on-site nursery:
	  ○ Plants that can be considered for rescue and included in subsequent rehabilitation programs are all desirable geophytes and indigenous succulents.
	  ○ Replanting should occur in spring to early summer once sufficient rains have fallen, in order to facilitate establishment.
	• All trenches, excavations, etc., through sensitive areas should be excavated carefully in order to minimise damage to surrounding areas and biodiversity.
	• Any animals found within the active mining areas must be removed in a safe manner, unharmed, and placed in an area where the animal will be comfortable.
	• If the ECO or contractor is unable to assist in the movement of a fauna species, ensure a member of the conservation authorities assists with the translocation.
	• All mammal, large reptiles and avifauna species found injured during mining operations will be taken to a suitably qualified veterinarian or rehabilitation centre to either be put down in a humane manner or cared for until it can be released again.		

Soil Handling and Rehabilitation.	Including stripping depth, methods, supervision.		Ongoing.
Soil stockpiling.	No stockpiling of soils is envisaged, top soils on the currently mined slopes are very thin and due to the nature of the boulder slopes impossible to extract separately. However: Where feasible, BCR can remove the upper 15 – 25 cm of topsoil (although it may have a large component of rock fragments) from more level areas and apply these directly to areas that have been rehabilitated and landscaped to ensure all geophytes and soil seed resources are contained within and make out part of the rehabilitation process. *e.g.* if Phase 1 mining areas have already been partially re-filled and re-landscaped, and the Tubatse ore stockpile area needs to be cleared		Ongoing.

Component	Activities	Notes	Timeframe
Land preparation and landscaping.	Looking here at access roads and clearing of new stockpile areas.		Ongoing.

7.10.2 Annual Rehabilitation Expectations

As mentioned above, a detailed annual rehabilitation plan cannot be devised at this stage. However, general expectations on annual rehabilitation have been set below, to be reviewed and updated on an annual basis. The expectations below should not be seen in isolation, but in addition to the expectations in 7.2.1 above and 7.2.3 below.

Component	Activities	Notes	Timeframe

Open pit excavations and associated safety benches	• Waste rock/overburden will be retrieved to fill in any mined-out open pit area
	• The area will then be reshaped to create a gently sloping, free-draining topography
	  o It is recommended that no smooth slope be created, but rather a broken slope resembling contour-berms in which runoff and soil resources, as well as wind-blown seed can accumulate
	  o This will greatly facilitate the re-establishment of vegetation
	• Re-vegetation should be initiated as soon as possible by following the Slope Revegetation Specification
	• ANNUAL expectations:
	  o It is expected that every year between 1 - 2 ha of refilled pit as well as disused prospecting area will be rehabilitated
	  o The approximate measurements of mining area to be rehabilitated will have to be measured by a reviewer or the mine annually
	  o This needs to be done during the onset of winter, so that landscaping can be undertaken and completed before the onset of the rainy season, during which revegetation will have to be initiated
	  o The first rehabilitated and re-vegetated slopes shall be monitored during the annual review i.t.o. the effectiveness of catching runoff and preventing erosion (i.e. soil features), as well as composition, cover and stability of newly established vegetation.
		To be detailed during the first year after commencement of full mining activities, thereafter to be reviewed on an annual basis	Throughout operation, as areas become available for final landscaping and rehabilitation

7.10.3 Closure Rehabilitation Actions

These actions will be undertaken as soon as pits are considered mined out, alternatively during and after LoM closure or during and after possible Premature Closure.

Component	Activities	Notes	Timeframe
Permanent and temporary buildings and weighbridge.	• Removal of all salvageable equipment. • Dismantling of all temporary structures. • Removal of permanent structures.	Surface rehabilitation will be implemented on all infrastructure areas, refer to General Surface Rehabilitation.	Within one year from closure and removal of remainder of ore.
Storage facilities.	• All storage facilities will be dismantled and removed. • Foundations and bund areas will be excavated and removed. ○ These materials can be crushed and used in the repair of road surfaces where applicable, provided they are not soiled with hydrocarbons or other chemicals. • All sections contaminated with hydrocarbons or other chemicals (if applicable) will be cleaned or disposed of in an appropriate matter.	Surface rehabilitation will be implemented on all infrastructure areas, refer to General Surface Rehabilitation.	Within one year from closure and removal of remainder of ore.
Ore stockpiles.	• All ore stockpiles will be removed from site. • Remaining bare surfaces will be rehabilitated according to the General Surface Rehabilitation requirements.		Within one year from closure and removal of remainder of ore.

Access Roads.	• All internal road surfaces will be rehabilitated or repaired.
	• Surface rehabilitation will be implemented on all infrastructure areas, refer to General Surface Rehabilitation.
	• If all internal roads need to be rehabilitated, the total length is expected to be between 8 and 10 km, with a width of up to 10m.
	  ○ Access roads within the site should be ripped as far as possible, except those needed to access the facilities for inspection after closure.
	  ○ Roads that can and will be used by other users post closure should, however, be left provided this is agreed upon by all parties concerned.
		This will be done in consultation with the landowner.	Within one year from closure and removal of remainder of ore.

Fencing.	• All security fencing will be removed in consultation with the landowner.		Within one year

Component	Activities	Notes	Timeframe
	• Current berms around fencing structures will be levelled according to the General Surface Rehabilitation.		from closure and removal of remainder of ore.
Waste rock dumps.	• Waste rock is currently tipped over the edge of the slopes as it is excavated. • All waste rock (apart from individual large boulders that have fallen onto the foot slopes and surrounding plains) will be used as backfill as mine-pits are considered mined-out as part of the ongoing rehabilitation efforts. o This need to be prevented, *i.e.* a waste rock stockpiling plan should be put in place to minimise load and haulage distance of waste. Tipping of waste rock significantly increases environmental liability and rehabilitation & closure costs.		Within one year from closure and removal of remainder of ore.

Open pit excavations and associated safety benches.	• Waste rock/overburden will be retrieved to fill in any mined-out open pit area.
	• The area will then be reshaped to create a gently sloping, free-draining topography.
	  o It is recommended that no smooth slope be created, but rather a broken slope resembling contour-berms in which runoff and soil resources, as well as wind-blown seed can accumulate.
	  o This will greatly facilitate the re-establishment of vegetation.
	• Re-vegetation should be initiated as soon as possible by following the Slope re-vegetation Specification
			Throughout operation, as areas become available for final landscaping and rehabilitation.

Exploration excavations and boreholes.	• Will be filled in where applicable, re-landscaped and revegetated or removed in consultation with the landowner.		Within one year from closure.
Erosion and stormwater control.	• Surface water control engineering designs and mechanisms should be implemented and maintained to minimise surface water erosion and sediment loss. • A risk assessment of minimum 1:100 flood scenario should be done for risk assessment and planning. • Fortunately the geology don't yield sodium rich sediment that could be subject to erosion due to dispersive anomalies.		Ongoing

Alien Invasive Plants.	• Species that must be eradicated and controlled include:
	  o *Agave americana* and *A. sisalana.*
	  o *Argemone ochroleuca.*
	  o *Datura stramonium.*
	  o *Lantana camara.*
	  o *Melia azedarach.*
	  o *Morus alba.*
	  o *Pennisetum setaceum.*
	  o *Opuntia* species.
		Communicate expert advice to land-owners on eradication and control programs, as this will create an ongoing risk for the liability of BCR.	Throughout operation and up to 3 years post closure.

Component	Activities	Notes	Timeframe

	• Rehabilitate disturbed areas as quickly as possible to prevent such becoming target areas for alien invasive establishment.
	• It is recommended that all non-seeding material from cleared invasive shrubs and other woody vegetation be shredded and used as mulch as part of the rehabilitation and revegetation plan or as dust control around infrastructure.
	• Ensure that material from invasive plants that can regenerate – seeds, suckers, plant parts are adequately destroyed and not further distributed:
	  o Where possible, destroy seeding material of weeds and invasives by piling and burning (in designated areas or suitable containers).
	• Do not import soil from areas with alien plants.
	• It can be anticipated that invasive species and weeds will germinate on rehabilitated soils.
	  o These need to be hand-pulled before they are fully established and/or reaching a mature stage where they can regenerate.
	  o Where invasive shrubs re-grow, they will have to be eradicated according to the Working for Water specifications.
	• Risks from alien invasives do not only arise from invasives present within the footprint area, but also from alien invasives along the verges of the major transport routes, especially invasive grasses and smaller weeds. Similarly, invasives can be spread by construction processes to surrounding areas. To avoid the distribution of weeds and invasive plants, establish a routine amongst contractors/all staff to regularly check:
	  o that clothing and shoes are free of mud and seeds.
	  o that foot wells inside vehicles and mats are cleared of weed seed.
	  o radiator and grill, along wheel trims, around wheels, mud flaps, undercarriage of vehicle or other moving machinery for mud and seed.
	• For species-specific eradications measure see Appendix D. The use of herbicides should always be regarded as the last option.		

General Surface Rehabilitation.	• This applies to all compacted areas, including access roads. • All compacted areas must be ripped in contours (regardless of slope or absence thereof) to a depth of at least 500 mm, then shaped and trimmed at the edges to blend in with the surrounding landscape. • Other disturbed areas need to be reshaped and levelled, filling all voids and making the area free-draining but avoiding excessive compaction. • All ripped areas need to be revegetated as soon as possible, see Revegetation Specifications. • Where available, reshaped and ripped areas can be covered with a layer of 250 mm topsoil sourced from within the footprint area. • Where necessary, soil may have to b chemically ameliorated to ensure that the upper soil surface is suitable for plant germination.		Within one year from closure and removal of remainder of ore.
Revegetation on slopes.	• Re-vegetation should be initiated after the onset of rains by incorporating a locally collected seed mixture (grasses, shrubs	Revegetation is	Throughout

Component	Activities	Notes	Timeframe
	and trees) and/or commercially available seed of: o *Anthephora pubescens* (Borseltjiegras, Wool Grass). o *Digitaria eriantha* (Smuts Vinger, Common Finger Grass). o *Eragrostis curvula* (Weeping Love Grass). • In the case where only commercial grass seed is available, it is further recommended that small plants of local shrubs be planted in scattered clumps across the rehabilitated area to establish a structural diversity of the vegetation, which will ensure the overall long-term stability of revegetated areas and a gradual onset of natural succession. Recommended species that should be cultivated for such purposes include: o *Combretum apiculatum* and *C. hereroense.* o *Elephantorrhiza praetermissa.* o *Kirkia wilmsii.* o *Sclerocarya birrea.* o *Searsia* species. o *Terminalia prunioides.* • Revegetation efforts must be monitored regularly and maintained until an indigenous perennial vegetation cover of approximately 40% grasses and 10% shrubs and trees is established. • Where areas have been landscaped as desired and topsoil (even if with pebbles or rock fragments) can and needs to be removed from areas to be cleared, it is recommended that such soil be placed directly onto these re-landscaped slopes, as they will contain a vast amount of geophytes and soil seed banks that can result in a natural re-vegetation. • Exclusion of cattle from rehabilitated areas by means of access control or brush packing with thorny species may become necessary to prevent the continuous destruction of rehabilitation efforts, especially as the grasses will be very palatable and attractive to cattle. • Compaction of newly landscaped soils must be avoided. • Any sign of accelerated erosion on slopes must be mitigated immediately. • Monitoring and maintenance of re-vegetation must be done up to 3 years post closure or longer if the desired vegetation composition has not been achieved.	aimed to create a functional and stable ecosystem that will both support long-term grazing as well as create an environment in which a gradual natural succession of vegetation will occur that will resemble the structural diversity of mountainous grasslands, and have the potential to regain an as near-natural species composition over time as possible. Due to the physical alteration of niche habitats, the full restoration of the original vegetation will not be possible.	operation and within one year of closure, as areas become available for final landscaping and rehabilitation.
Revegetation on plains.	• After general surface rehabilitation has been completed, at the onset of rains sow with a mixture of: o Hand collected seeds from indigenous grass and forb species. o Commercially available grass species, focusing on: ▪ *Anthephora pubescens* (Borseltjiegras, Wool Grass). ▪ *Digitaria eriantha* (Smuts Vinger, Common Finger Grass). ▪ *Eragrostis curvula* (Weeping Love Grass). o Desirable high shrub and tree species including: ▪ *Albizia anthelminthica.* ▪ *Bolusia speciose.* ▪ *Boscia albitrunca.*	Revegetation is aimed to create a functional and stable ecosystem that will both support long-term grazing as well as create an environment in which a gradual natural succession of	Throughout operation and within one year of closure, as areas become available for final landscaping and rehabilitation.

Component	Activities	Notes	Timeframe
	▪ *Combretum hereroense.* ▪ *Sclerocarya birrea.* ▪ *Searsia* species. ▪ These species could also be reared by community members and planted in scattered clumps. • Monitor regularly to avoid the rapid establishment of indigenous invasive shrubs including *Acacia tortilis*, *Acacia mellifera* and *Dichrostachys cinerea*, as these will displace grazing and dense stands thereof will lead to long-term degradation of soils. • It is advisable to protect newly re-vegetated areas with a continuous layer of cut brush (brush packing) from non-seeding material of locally available indigenous invasive shrubs to avoid cattle and wildlife from denudating preferential grazing before it is thoroughly established.	vegetation will occur that will resemble the structural diversity of open grassed bushveld, and have the potential to regain an as near-natural species composition over time as possible. Due to the physical alteration of niche habitats, the full restoration of the original vegetation will not be possible.	
Maintenance and monitoring during operation and post closure.	• Erosion monitoring should be carried out throughout the operational phase up to post-closure, initially at a quarterly frequency: o During the operation phase, erosion monitoring should also be done after intense thunderstorms/rainfall events. o Zones where accelerated erosion is observed must be inspected for the source of erosion, which must be mitigated by surface re-landscaping and revegetation. ▪ Emerging small rills and gullies can be plugged with brush packing or bales of straw combined with large rock. • Monitoring of re-vegetation progress should be done from the onset of any revegetation effort at a quarterly frequency by the on-site Environmental Officer. o This should be complemented by an annual inspection by a suitably qualified botanist during the operation phase and up to 3 years post closure. • It is recommended that the Landscape Functional Analysis method be used along fixed transects for the monitoring of rehabilitation progress		Throughout operation and within one year of closure, as areas become available for final rehabilitation.
Water monitoring	• Surface and sub-surface water monitoring should be conducted to ensure water quality remains in the limits set by the Integrated Water Management Plan.		Ongoing
Specialist Studies	Unless a need is determined by BCR or during the annual review of the rehabilitation and closure plan, no additional studies (excepting the pre-commencement footprint investigations by a botanist) are envisaged at this stage		To be determined

8 RISK ASSESSMENT

The objective of the environmental risk assessment is to:

a) ensure timeous risk reduction through appropriate interventions;

b) identify and quantify the potential latent environmental risks related to post closure;

c) detail the approach to managing the risks;

d) quantify the potential liabilities associated with the management of the risks; and

e) outline monitoring, auditing and reporting requirements.

The anticipated impacts (and possible knowledge gaps) associated with the proposed mining activities have been assessed in the Impact Assessment by the respective specialists. In response, a detailed Envrionmental Management Programme has been devised to mitigate impacts where-ever possible, which will initially be considered best-practice to minimise any future or unforeseen risks of the mining activities to man and the envrionment. However, the identification of latent risks without the initiation of full mining activity and monitoring of the implementation of the relevant mitigation strategies remains hypothetical at this stage and thus is not possible to assess.

In an effort to prevent any possible latent impacts/risks from the proposed mining activities during operation AND post closure, the following knowledge gaps have been identified to be addressed annually during operation and/or upon closure where applicable:

- Slope water management.
- Stability and seepage analyses.
- Closure material characterisation.
- Vegetation trials on blended growth media.
- Closure water balance.

After initiation of full mining activities, on an annual basis, the anticipated impacts identified by the various specialists and their mitigation recommendations will be reviewed to:

- Determine any impacts that have not been accounted for that need to be either mitigated or managed

    - This may also include a socio-economic analysis, if deemed necessary, and possible related post-closure liabilities that may arise from the mining activities or abandonment thereof

- Determine the possible extent of residual and/or latent impacts that may arise and that will have to be managed

- Monitor and verify the effectiveness of the annual rehabilitation and final closure plan to address especially the following:

    - Sources and degree of accelerated erosion due to anthropogenic influence

    - Effectiveness of storm water control

    - Sources of pollution

    - Extent and possible sources of alien invasive infestation

    - Effectiveness of revegetation methods implemented

    - Effectiveness of mitigation measures prescribed in the Environmental Management Programmes

9 APPENDIX A: STAKEHOLDER ENGAGEMENT

A meeting with the BCR management staff as well as representatives of the Dithamaga Community and Dithamaga Trust was held on the premises of the Spitsvale Project on 11 February 2016.

The overall aim of the meeting was to find out more about the expectations of the Dithamaga on future land use of the farm Spitskop 33, challenges currently faced and how Dithamaga perceptions on their natural resources and environment may influence closure and rehabilitation efforts.

Issues Discussed	Response
Brief history of people	• The settlement was started in 2006 • Some of the inhabitants were the old farm workers who have been on the land since the 1960's • Currently there are about 160 households, some are tenants of the Dithamaga Trust (DT), others are Beneficiaries • Management decisions are taken by the DT, and all communication between BCR and the Dithamaga should go via the DT
Use of natural resources: Grazing	• The DT keeps a small herd of about 42 Nguni Cattle under mentorship of the University of Limpopo and the local branch of the Department of Agriculture, taken to grazing areas daily by a shepherd • Members within the settlement have their own cattle, of which there are currently about 220 – these cattle roam freely • In addition, there is pressure from neighbouring communal areas from which cattle often roam onto the Dithamaga land, as there is no border fence • Although there is a committee within the settlement to monitor and discuss issues around livestock, the lack of internal and limited peripheral fencing makes grazing control and management almost impossible • In addition, there are no cattle watering points, and there is not always water in the mostly ephemeral rivers for animals • One of the observations during the ecological survey was that several areas on the plains tend to suffer from severe bush-encroachment. This usually occurs where the perennial grass layer, through a combination of erratic rainfall as well as continuous intense grazing is wakened to such extent that it cannot outcompete the many seedlings of less palatable, often thorny shrubs. The latter can thus establish unabated until an impenetrable thicket is formed in which grasses struggle to re-

Issues Discussed	Response
	establish due to excessive shading. → Expectations for post-closure land use: where possible an increase in available grazing should receive priority
Use of natural resources: Wood	• During the ecological survey it was noted that a fair amount of wood is being harvested where ever there is access to an area for vehicles ○ Preference of species harvested appeared to be depending on density of wood and size of tree trunks. Thus species such as Commiphora with large trunks were avoided as they have a very light, porous wood, but large trees of *Kirkia*, *Peltophorum*, *Bolusanthus* and others, even *Sclerocarya birrea* (Morula – a protected tree) were being cut. • Wood harvesting is done opportunistically to be sold as a much-needed source of income, rather than being used in households • The ecologist pointed out to the meeting attendees that several of the trees being cut are nationally protected, and that it is regarded a criminal offence to cut or destroy a live protected tree without a valid permit from the relevant authorities → Expectations for rehabilitation and post-closure: this was rather seen as an opportunity for community members wanting to generate an additional income – they could start experimenting with raising some of the trees commonly found on the slopes to then sell to the mining community (not just BCR) as part of their rehabilitation efforts. They could possibly approach BCR to help with the initial materials such as growing bags to start the cultivation. BCR expressed strong interest in obtaining such plants from the community for future re-vegetation efforts.
Use of natural resources: Medicinal Plants	• Use of medicinal plants at this stage appears limited, but it was hoped in future there may be an opportunity for a botanist and a knowledgeable person from the Dithamaga to go into the field together to record the ethnobotanical uses further • The tree most revered and protected by the community is the 'Mohlopi', ***Boscia albitrunca***, as it helped local communities survive a devastating drought in the early 1980s. Also commonly known as Witgat or Shepherd's Tree. It is also nationally protected under the National Forests Act.

Issues Discussed	Response
	• Other trees the Dithamaga know and use medicinally or for fruit include: ○ Morula: ***Sclerocarya birrea*** (nationally protected) ○ Modulakgokgo: ***Terminalia prunioides*** (purple-pod Terminalia, Bloedvrugboom) ○ Mufhapabere (?) ***Hippobromus pauciflorus*** (False-Perdepis - Horsewood) ○ Munari (?) - ***Ptaeroxylon obliquum*** (Sneezewood) ○ Mogaba – ***Kirkia wilmsii*** (Wild Pepper Tree) ○ Mosehla - ***Peltophorum africanum*** (African Wattle, Huilboerboom) ○ Morukudi / Morekuri - ***Spirostachys africana*** (Tamboti – protected in Limpopo) ○ Aloes – mostly ***Aloe castanea*** – put into water as panacea for chicken
Alien Invasives	• The ecologist explained that there are several listed alien invasive plants on the Dithamaga land (beyond the Spitsvale current or planned footprint area), and that according to the latest legal regulations it is their responsibility to eradicate and/or control this • The DT acknowledged that they are aware of the problem, but would need some guidance on eradication → BCR will communicate all available information from the closure plan with the DT, as these invasives may spread to areas disturbed by mining activities
Other issues	• There are many grave-sites on the Dithamaga property, many are still being discovered, without any knowledge of who these people were. → As sites are newly discovered, this will be communicated between the parties to ensure that graves are adequately fenced and not disturbed

Attendance Register

1 of 2

MEETING: Spitsvale Rehab & Closure Discussions. Community Representatives.

DATE: 11 February 2016

TIME: 8:00

NAME	COMPANY	DESIGNATION	ADDRESS	CONTACT DETAILS	SIGNATURE
Moadia Eunice	Trust Dithamaga			TEL: CELL: 072341 5096 EMAIL:	[signature]
Seloane Joyce	Dithamaga Trust			TEL: CELL: 079 936 1182 EMAIL:	[signature]
Leshaba Penuel	Dithamaga Du.C	secretary of the structure	P O Box 490 Steelpoort 1133	TEL: CELL: 072 626 5565 EMAIL: penuel.alalia@gmail.com	[signature]
Stewart McQuade	BCK	Director	Block 7 Stratford Office Park Broadacres	TEL: CELL: 0828275801 EMAIL:	[signature]
Walter Murray	BCK	Director	Block 7, Stratford Office Park, c/o Cedar & Valleyview	TEL: CELL: 082 333 3719 EMAIL:	[signature]
Chris J. Viljoen	Viljoen Associates	CEO	Po Box 20954 Potchefstroom 2522	TEL: CELL: 0832716304 EMAIL:	[signature]

2 of 2

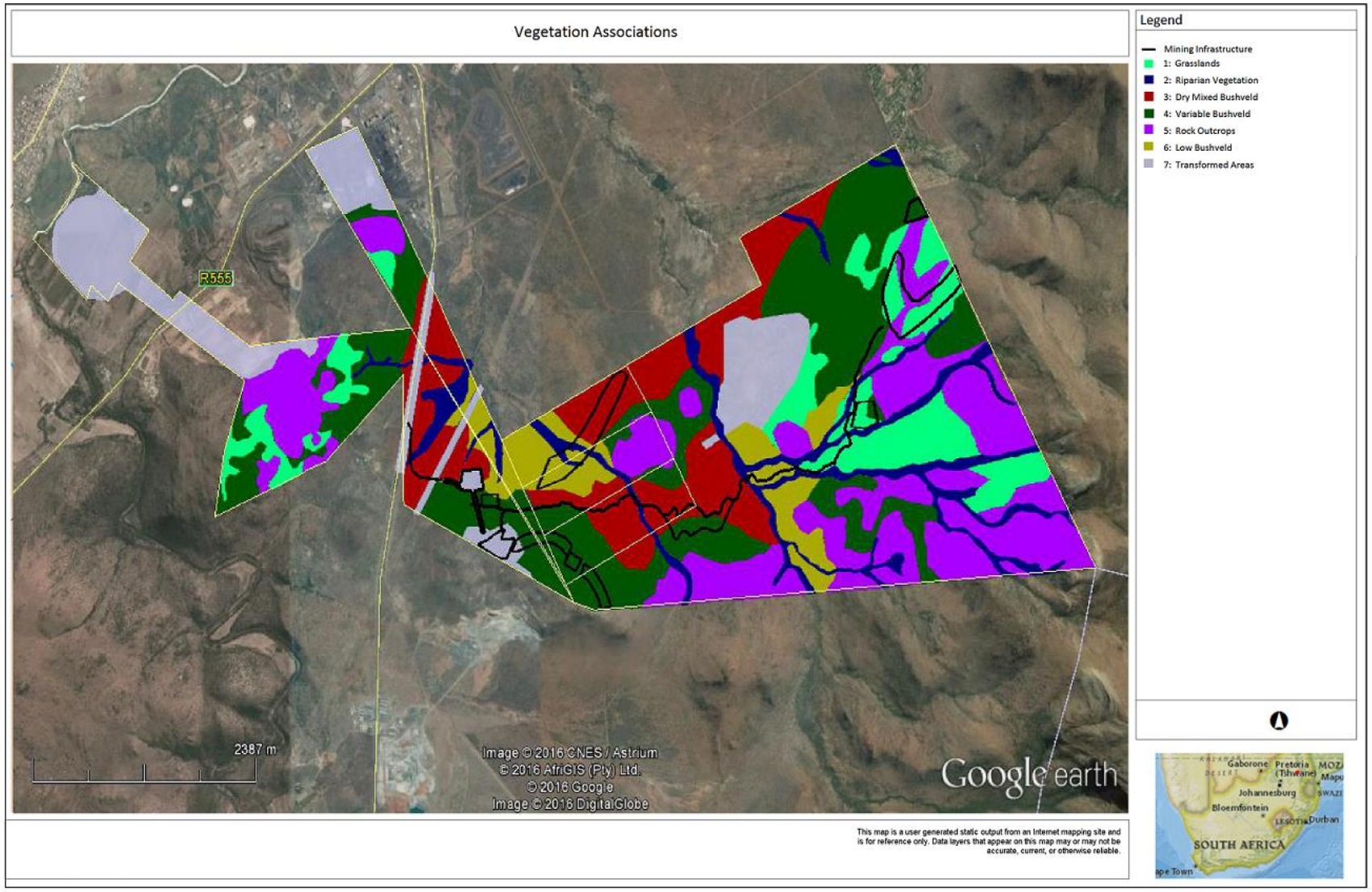
MEETING: Spitsvale Rehab & Closure Discussions Community Representatives.

DATE: 11 February 2016

TIME: 8:00

NAME	COMPANY	DESIGNATION	ADDRESS	CONTACT DETAILS	SIGNATURE
Thomas Mphahlele	Dithamaga Trust	Projects Coordinator	Box ~~655~~ 695 Steelpoort 1133	TEL: 0711022453 CELL: EMAIL:	[signature]
Frederick Maela	DDC	Deputy Chair	Box 470 Steelpoort 1133	TEL: CELL: 0769136618 EMAIL:	[signature]
Marianne Strohbach	SMA.	Ecologist	Pretoria	TEL: CELL: EMAIL: str.marianne@gmail.com	[signature]
				TEL: CELL: EMAIL:	
				TEL: CELL: EMAIL:	
				TEL: CELL: EMAIL:	

10 APPENDIX B: VEGETATION MAP



11 APPENDIX C: FINANCIAL PROVISIONS REPORT

12 APPENDIX D: ALIEN INVASIVE PLANT CONTROL