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REPORT ON

Draft Environmental Management Programme for the Proposed Koffiefontein Diamond Mine Slimes Dam and Associated Infrastructure Project

Report No : 13034-46-Rep-003-DEMPr-Rev0

Submitted to:

Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs

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LIST OF ACROYNYMS

Acronym	Description
CA	Competent Authority
DESTEA	Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment Regulations
EMPr	Environmental Management Programme
EMS	Environmental Management System
I&APs	Interested and Affected Parties
ISO	International Organisation for Standardisation
NEMA	National Environmental Management Act 107 of 1998
WCDEADP	Western Cape, Department of Environmental Affairs and Development Planning

GLOSSARY OF TERMS

Term	Description
Competent Authority	In respect of a listed activity or specified activity, means the organ of state charged by the National Environmental Management Act 107 of 1998 (as amended) (NEMA) with evaluating the environmental impact of that activity and, where appropriate, with granting or refusing an environmental authorisation in respect of that activity.
Environmental Aspect	Element of an organization's activities or products or services that can interact with the environment.
Environmental Assessment Practitioner	The individual responsible for the planning, management, coordination or review of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instruments introduced through regulations.
Environmental Authorisation	The authorisation by a Competent Authority of a listed activity or specified activity in terms of this Act, and includes a similar authorisation contemplated in a specific environmental management Act.
Environmental Impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.

Term	Description
Environmental Impact Assessment	A systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and Scoping and Environmental Impact Reporting Process.
Environmental Management	Process concerned with human interactions, which seeks to identify what is environmentally desirable, what are the physical, economic, social and technological constraints to achieving it, and what are the most feasible options.
Interested and Affected Party	An interested and affected party contemplated in Section 24(4)(a)(v), of the NEMA refers to: (a) any person, group of persons or organisation interested in or affected by such operation or activity; and (b) any organ of stale that may have jurisdiction over any aspect of the operation or activity.

1 INTRODUCTION

The first known discovery of diamonds dates back to 4BC was made in Golconda Fort of Southern India. Perhaps one of the most famous stones from Golconda is the Blue Hope Diamond (Petra, 2015). The discovery of "The Star of South Africa" 83.5cts diamond in 1869 on the banks of the Orange River together with the first discovery of 'kimberlite' or 'hard rock' deposits (Petra Diamonds, 2015) marked the beginning of South Africa's diamond rush. South Africa has since firmly established itself as a major contributor of diamonds ranking fourth in the production of diamonds worldwide. Furthermore, the South African mining industry is a key component of JSE accounting for 24.7% of the all-share index (COMSA, 2014), generating substantial revenue estimated at R330 billion and makes up 20% of all investment in the country (KPMG, 2013).

The mining sector in South Africa contributes 5% to the national (Gross Domestic Product (GDP) and the mining activities within the Free State contribute 12.6% to the Provincial GDP (Stats SA, 2012). Specifically, within the Xhariep District Municipality mining generates less than 4% of jobs (Xhariep District Municipality IDP, 2014 – 2015). The diamond industry in the Free State was ignited after the founding of Jagersfontein mine where some of the first diamonds in South Africa were found. The Jagersfontein Mine was developed by De Beers in 1870's and produced many of the world's largest diamonds. The Excelsior, a 995.2 carat stone was the largest in the world for 12 years after it was found in 1893. Today Jagersfontein is the oldest and largest open mine in the South Africa and also a major tourism attraction (SA Tourism, 2015).

The project at hand is centred on providing additional infrastructure for the continued operation of the Koffiefontein Diamond Mine. The Koffiefontein Diamond Mine forms part of Petra Diamonds' portfolio which includes four producing mines in South Africa, including the aforementioned. Petra Diamonds' operations are focused on 'hard rock' kimberlite pipe orebodies, as opposed to alluvial deposits. Alluvial deposits refer to deposits of diamonds which have been removed from the primary kimberlite source by natural erosive action and eventually deposited in a new environment such as a river bed, an ocean floor or a shoreline. Conversely hard rock deposits are found at the primary source.

Koffiefontein Diamond Mine (KDM) is one of the largest kimberlite diamond mines in the world (mining technology.com; Oct 2015). Transport rider's habit of stopping and making coffee at the town is said to have led to the name Koffiefontein (coffee fountain in Afrikaans). So much so that upon entering the town tourists are welcomed by the vision of a suspended bronze kettle below the town name. In 1870, one of the transport riders picked up a diamond near the fountain.

2 CONTEXT OF DOCUMENT

As this draft Environmental Management Programme (EMPr) and the draft Environmental Impact Report (EIR) for the proposed project were prepared concurrently, the information that

is provided in the draft EIR largely informed and provided the context for this document. It is advocated that draft EMPr be revised and updated subsequent to the granting of Environmental Authorisation (EA) and when more detailed project information relating to the exact power line alignment within the approved corridor becomes available. This aligned with the view of the Environmental Assessment Practitioner (EAP) that the EMPr should not be considered a static but rather a working document that requires review and amendment during the project lifecycle. Taking the aforementioned into account this EMPr is largely based on the mitigation measures proposed in the draft EIR, and subsequent to the granting of EA any additional requirements stipulated in the EA.

It must be noted that this draft EMPr is intended to set out the mitigation measures so that the Competent Authority (CA) can determine whether the proposed mitigation and management measures are likely to be effective. The effectiveness of the EMPr as a mitigation tool will largely be determined by its implementation.

3 DOCUMENT ROADMAP

Specific provisions which are included in Regulation 33 of the Environmental Impact Assessment (EIA) Regulations 2010 (R.543[1]) relating to the contents of an EMPr is provided in Table 3-1. It should be noted that obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. Non-compliance to environmental law is a criminal offence and if prosecuted the holder of the EA will be liable for any environmental damage incurred.

[1] South Africa. 2010. National Environmental Management Act, 1998 (Act No. 107 of 1998) Environmental Impact Assessment Regulations, 2010. (Notice 543). *Government gazette* 33306:3, 18 June

Table 3-1: Document Roadmap

DOCUMENT ROADMAP		
Regulation 33 of the NEMA EIA Regulations (2010)	**Description of Regulation**	**Relevant part of document**
Regulation 33(a)	Details of – (i) the person who prepared the environmental management programme; and (ii) the expertise of that person to prepare an environmental management programme;	Part 4 - Environmental Assessment Practitioner
Regulation 33(b)	Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of— (i) planning and design; (ii) pre-construction and construction activities; (iii) operation or undertaking of the activity; (iv) rehabilitation of the environment; and (v) closure, where relevant.	Part 8 - Environmental Management Plan
Regulation 33(c)	a detailed description of the aspects of the activity that are covered by the draft environmental management programme;	Part **Error! Reference source not found.** - **Error! Reference source not found.**
Regulation 33(d)	an identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b);	Part 6 - Roles and Responsibilities
Regulation 33(e)	proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon;	Part 9 - Monitoring Environmental Performance
Regulation 33(f)	as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development, including, where appropriate, concurrent or progressive rehabilitation measures;	Part **Error! Reference source not found.** - **Error! Reference source not found.**
Regulation 33g)	a description of the manner in which it intends to— (i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) remedy the cause of pollution or degradation and migration of pollutants; (iii) comply with any prescribed environmental management standards or practices; (iv) comply with any applicable provisions of the Act regarding closure, where applicable; (v) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Part 812 - Environmental Management Plan

DOCUMENT ROADMAP		
Regulation 33 of the NEMA EIA Regulations (2010)	**Description of Regulation**	**Relevant part of document**
Regulation 33(h)	Time periods within which the measures contemplated in the Environmental Management Programme must be implemented;	Part 8 - Environmental Management Plan
Regulation 33(i)	the process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity;	Part 8 - Environmental Management Plan
Regulation 33(j)	an environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment;	Part 5 - Environmental Awareness and Training
Regulation 33(k)	Where appropriate, closure plans, including closure objectives.	Part **Error! Bookmark not defined.** - mine closure objectives

4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Zitholele Consulting Pty Ltd. (hereafter referred to as Zitholele) was appointed by the Koffiefontein Diamond Mine as the Environmental Assessment Practitioner (EAP) to carry out the mandatory environmental legislative process that is required to obtain Environmental Authorisation (EA) in terms of the National Environmental Management Act 107 of 1998 (as amended).

4.1 Details of Environmental Assessment Practitioner

In keeping with the Regulation 28(1)(a) of the NEMA EIA Regulations 2010, an overview of the expertise and details of the key project team member who prepared this Environmental Management Programme is provided in Table 4-1 and Part 4.2 of this report.

Table 4-1: Details of EAP

Name and Surname	Dr Mathys Vosloo
Highest Qualification	PhD (Zoology), Nelson Mandela Metropolitan University 2012
Professional registration	SACNASP (400136/12)
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4.2 Expertise of EAP

Dr Mathys Vosloo graduated from the Nelson Mandela Metropolitan University with a PhD in Zoology in 2012. Over the past few years Mathys has been involved in a variety of projects and has undertaken environmental authorisations for ranging from the construction of roads, rehabilitation of dam wall infrastructure, development of low cost housing, and electrical generation and transmission projects. Mathys has also been involved in the development of strategic environmental assessments and state of the environment reporting, and has developed numerous environmental management programmes during the course of his career. With more than 10 years of environmental and scientific field and more than 8 years in environmental consulting Mathys has gained an advanced and holistic understanding of environmental management in the built environment.

5 ENVIRONMENTAL AWARENESS AND TRAINING

The successful implementation of the management and mitigation measures that are provided in the Environmental Management Programme (EMPr) lies in the various role players assuming their responsibilities (see Part 6) and executing their allocated responsibilities. It is therefore fundamental that these role players be provided with the required knowledge and capacity to ensure that the EMPr provisions are implemented efficiently and effectively. The Environmental Awareness and Training that will provided will inevitably foster general environmental awareness must be fostered among the workforce, thereby encouraging environmentally sound practices. Furthermore the Environmental Awareness Training, relating specifically to the aspects of the proposed project, will be aligned with the Koffiefontein Diamond Mine's (and therefore Petra Diamonds Mining Group) aim to continually improve their environmental management systems, to promote and maintain high standards of environmental management by implementing sound procedures and monitoring processes, as well as raising environmental awareness amongst our employees and local communities.

The approach that will be adopted for Environmental Awareness and Training will be centred on transferring knowledge to those parties whose actions throughout the project lifecycle are most likely to result in interaction with the environment (i.e. environmental aspects). Furthermore in keeping with the requirements of Regulation 33 of the National Environmental Management Act 107 of 1998 (NEMA) Environmental Impact Assessment (EIA) Regulations 2010, the following will also be incorporated in the planned Environmental Awareness and Training:

- Communicating the environmental risk posed by each environmental aspect associated with the remaining project lifecycle phases; and
- Manner in which environmental risks and impacts will be addressed to prevent pollution and environmental degradation of the environment.

5.1 Environmental Management System

All underground pipe mines which form part of the Petra Diamond Group, including the Koffiefontein Diamond Mine, are ISO 14001 certified. Environmental Competence, Training, and Awareness is one of the requirements / elements (Requirement 4.4.2) of the ISO 14001 standard. To a certain extent Environmental Awareness and Training is therefore already implemented at the Koffiefontein Diamond Mine as part of their established ISO 14001 accredited Environmental Management System (EMS). Key fundamentals of the aforementioned ISO 14001 requirement include the following:

- Ensure that persons performing tasks that have or can have significant impact on the environment and / or relate to the legal and other requirements are competent to do those tasks. Competence is ensured through appropriate education, training, and / or experience;

- Identification of training needs, the significant aspects, and the legal and other requirements and make sure this training is provided (*records of such are to be maintained*);
- Developing and implementing a procedure which ensures that:
    - all parties are aware of the need to conform with all EMS procedures and requirements and what they specifically need to do to do so;
    - the significant aspects and the legal and other requirements associated with their respective responsibilities and why improved performance is beneficial; and
    - the consequences of not following these procedures and requirements. In addition to job-specific knowledge, it expected that all personnel within the EMS have general awareness on items such as the policy and emergency response.

5.2 Environmental Awareness

Environmental awareness could be fostered in the following manner (WCDEADP, 2010:21)

- Providing an Induction Course for all workers on site, prior to commencing with construction;
- Daily toolbox talks at the start of each day with all workers coming on site, where workers might be Conveying and emphasising particular environmental concerns associated with tasks that are scheduled for that day or the area / habitat; and
- Presenting courses by suitably qualified personnel and in a language and medium understood by workers.

5.3 Training Needs Analysis

A Training Needs analysis should be carried out prior to the commencement of Construction Phase of the Project. The appointed ECO should take the lead in conducting the Training Needs Analyses. Analysis the training needs of all individuals whose actions may result in an environmental impact should be centred and tailored based on the following:

- Existing capacity of trainees and level of understanding of Environmental Management;
- Identify all job functions that affect the environment; and
- Identify the training and type of training these people currently receive that relates to environmental and health and safety concerns.

5.4 Environmental Communication

The following methods of communication may be employed to convey environmental performance including levels of conformance as well as environmental concerns relating to project activities:

- Daily Toolbox Talks: During the daily Toolbox Talks matters relating to the execution of the borrowing activities which have resulted in environmental impacts that could have otherwise been prevented with the implementation of mitigation measures, as well as any incidents, should be discussed.
- Site Meetings: A specific item on the Site Meetings Agenda must be allocated to discuss any Environmental Matters which require attention or the implementation of corrective / remediation measures as well as an indication of the responsible parties.
- Print Media: Newsletters, leaflets and posters displaying environmental performance, recorded environmental incidents and overall Environmental Awareness can be placed at strategic places within the construction footprint (e.g. pause areas, site offices etc.); and
- All meetings that are held onsite should commence with a discussion / overview of applicable safety, health and environmental requirements.

6 ROLES AND RESPONSIBILITIES

6.1 Applicant

The Applicant namely the Koffiefontein Diamond Mine is responsible for ensuring that the mitigation measures provided in this EMPr are implemented and that the mitigation measures are clearly understood by all relevant parties. Where the implementation of Construction and / or Operational activities associated with the proposed project are contracted out (e.g. to Contractors and / or Sub-contractors), the legal responsibility associated with non-compliance still rests with the Project Proponent (*unless otherwise agreed upon by the Competent Authority*).

6.2 Engineer

The Project Proponent will appoint an Engineer who will function to ensure that all construction activities are carried out in accordance with the approved detail design and supervision of the contract. In addition, the role and responsibility of the Engineer will include:

- Providing assistance to the ECO in the monitoring and execution of the Contractors or Sub-contractors' Method Statements;
- Review and approve the Method Statements developed by the Contractor;
- Maintaining a photographic record of the construction activities;
- Verifying that the EMPr have been included in the contract documents. In the event the EMPr is not included in the tender documents, it shall be issued officially to the Contractor once approved;
- Ensuring that Environmental Compliance Matters are addressed during all Site Meetings;

- Provide technical guidance and assistance to onsite teams regarding the implementation and compliance with the EMPr;
- Consults and co-operates with the ECO concerning environmental matters;
- The Engineer may appoint an Engineer's Environmental Representative (EER) to plan and direct the implementation of the EMP and provide advice on environmental matters;
- Designate or appoint a staff member to review weekly site inspections undertaken by the Contractor to determine whether construction activities are carried out as per the detailed design and management measures provided in the EMPr and Method Statements; and
- Provide inputs, as and when required, to the monthly Environmental Compliance Report prepared by the ECO.

6.3 Project Manager

The Project Manager, appointed by the Koffiefontein Diamond Mine will function to coordinate and manage the Construction and Operational Phases of the proposed project. Separate Project Managers for the Construction Phase and Operation Phase may be appointed. Any project activity, which may result in adverse environmental consequences and for which mitigation and management measures are not provided in this EMPr must be approved by the Project Manager. The Project Manager must instruct the Contractor / Sub-contractor to cease any construction activity which is in contravention of this EMPr and the Environmental Authorisation (EA).

6.4 Contractor and Sub-contractor/s

Where specific EMPr responsibilities are assigned to Contractors or Sub-contractors, these must be clearly stipulated and included in the contract documentation. Any construction activities or actions of onsite personnel which results in environmental damage, non-compliance with the EA and EMPr, must be reported to the project proponent by the Contractor. The roles and responsibilities of the Contractor will also include the following:

- To prepare Method Statements which sets out the manner in which the management actions contained in the EMPr will be implemented;
- Ensure that all sub-contractors and onsite personnel understand and are familiar with the management measures provided in the EMPr;
- Ensure that all mitigation and management measures relating to construction activities are implemented;
- Report any non-compliance with the EMPr and / or EA Conditions to the project proponent and ECO;
- Rehabilitate the construction footprint as well as any sensitive environment damage resulting from negligence on the part of the Contractor, to the satisfaction of the ECO; and

- All personnel shall be required to familiarise themselves with the content of this EMPr.

6.5 Environmental Control Officer

The Environmental Control Officer (ECO) will be appointed by the project proponent for the duration of the Construction Phase up to the completion of rehabilitation. The ECO's primary role will be to monitor compliance with the conditions provided in the EA and the implementation of the EMPr, and to report the compliance / non-compliance to the Competent Authority. The appointed ECO must meet the following requirements:

- Have an appropriate Environmental Management / Science qualification / degree and be registered with a recognised professional affiliation (e.g. International Association of Impact Assessment and the South African Council for Natural Scientific Profession;
- Appropriate training and experience in the implementation of environmental management specifications; and
- Have no vested interest in the proposed project.

The responsibilities of the ECO will include the following:

- Review and approval of Method Statements prepared by the Contractor for activities on the construction site;
- Conduct weekly site inspections / audits and record compliance / non-compliance with the management and mitigation measures provided in the EMPr and EA Conditions observed during the inspection;
- Based on the observations made during weekly site inspections issue site instructions to the contractor for any corrective actions which may be required;
- Document the findings of the site inspection / audits;
- Monthly Environmental Compliance Audit Reports should be submitted to the Competent Authority. The Environmental Compliance Report should provide an overview of any trends in non-compliance recorded;
- Develop and maintain an I&APs Complaints Register in which all complaints are recorded, as well as remedial action taken and the response provided to the I&APs;
- Verify that the management and mitigation measures provided in the EMPr as well as the EA Conditions have been communicated to, and are understood by all personnel on site including the Contractors and Sub-contractors;
- Report incidents which have lead / may lead to substantial danger to the surrounding communities /public or significant environmental damage, to the Competent Authority. Any remediation or corrective measures which have been / proposed to be implemented to prevent danger to the surrounding communities /public or significant environmental damage from occurring must also be reported to the Competent Authority (DESTEA);

- Ensure that a copy of the approved revised EMPr and EA is kept onsite and is accessible to all personnel on site; and
- Provide Environmental Awareness Training to all personnel on site, Contractor and Sub-contractor. Documented proof of the Environmental Awareness Training as well as the content of the training must be kept onsite and should be made available to the Competent Authority upon request. All visitors to the site (including project team members which are not based onsite), must undergo Environmental Induction before being permitted to the construction and associated area. The Environmental Induction should be structured so as to provide a condensed version of the comprehensive Environmental Awareness Training that will be provided to the workforce / onsite staff.

6.6 Interested and Affected Parties

The role of I&APs will include the following:

- Request updates on the progress of the Construction Phase and the effectives of the EMPr implementation;
- Provide input into corrective actions where appropriate and to the revisions of the EMPr;
- Report any non-conformance with the EA Conditions and EMPr observed to the Competent Authority and ECO; and
- Ensure that the communication platforms provided, such as the Community Consultative Forum are utilised to communicate any queries or concerns relating to the Construction Phase Activities.

7 MINE CLOSURE OBJECTIVES

Koffiefontein Mine JV to be please provide Mine Closure Objectives

8 ENVIRONMENTAL MANAGEMENT PLAN

It was the intention of the EAP to produce an EMPr that is practical and which can be easily implemented post EA. Furthermore, the EAP has also drawn on methods that have been proven to be effective in minimising, managing and controlling environmental impacts (refer to Part **Error! Reference source not found.** of this document) as well as from the specialist input received. The EMPr is therefore essentially an action plan that deals with the measures required to mitigate and manage impacts and therefore provides detail of:

- The mitigation measures (what needs to be done and how);
- Roles and responsibilities for implementation (by whom actions need to be undertaken);
- Timeframe or programme (by when actions need to be completed or if they are ongoing); and
- Monitoring requirements.

It must be noted that this draft EMPr is intended to set out the mitigation measures so that the Competent Authority (CA) can determine whether the proposed mitigation and management measures are likely to be effective. The effectiveness of the EMP as a mitigation tool will largely be determined by its implementation. The management measures documented in each of the sub-sections below have been compiled using the following information:

- Impact Assessment and mitigation measures documented in the draft Environmental Impact Report for the proposed project; and
- Mitigation and management recommendations provided by the specialist studies.

In addition to the abovementioned information sources, the EMPr will be updated to include the conditions documented in the Environmental Authorisation (EA). Refer to the table below for mitigation and management measures proposed for potential impacts predicted during the project lifecycle.

Table 8-1: Management of Air Quality Impacts

Environmental Aspect	Environmental Impact	Management Objective	Mitigation Level	Mitigation Measures	Applicable Legislation	Responsible Party	Time Period
The increased dust, PM levels and gaseous emissions will adversely impact on the ambient air quality of the immediate environment.	Decreased ambient air quality	It must be ensured that the volumes of dust generated by the construction and associated activities, do not exceed the National Ambient Air Quality Standards and Minimum Emissions Standards and may not result in any adverse impacts on human health.	Reduction	• Contractors should take preventative measures to minimise complaints regarding dust nuisances (e.g. screening, dust control, timing, pre-notification of I&APs); • Drop height reduction during materials handling activities; • Wet suppression during materials handling activities; • Load wet suppression of materials transported by road (i.e. load spraying) or load covering with tarpaulins to reduce fugitive dust generation; • Wind speed reduction through sheltering (where possible). • Wet suppression on all construction access roads; • Rigorous speed control and the institution of traffic calming measures to reduce vehicle entrainment. A recommended maximum speed of 20 km/h to be set on all unpaved roads and 35 km/h on paved roads; • Avoidance of dust track-on onto neighbouring paved roads; and • Wind speed reduction through sheltering (where possible).	National Ambient Air Quality Standards and Minimum Emissions Standards	Holder of EA & Contractor	Construction Phase

Table 8-2: Management of impacts on Heritage Resources

Environmental Aspect	Environmental Impact	Management Objective	Mitigation Level	Mitigation Measures	Applicable Legislation	Responsible Party	Time Period
Excavating the trench may expose and damage underlying heritage resources, in particular unmarked graves. Furthermore, in the case where stone tools are not removed prior to the commencement of the trenching, these may be damaged or lost.	Loss and damage of heritage resources.	Prevent disturbance and damage of unmarked graves and stone tools.	Prevention	• It is recommended that a local institute such as the McGregor Museum be allowed to do surface collection of the stone tools prior to the commencement of construction; • It is recommended that a heritage practitioner monitor the possible burial sites during the excavation process; • Indicators of unmarked sub-surface sites including ash deposits, bone concentrations, ceramic fragments and stone concentrations of any formal nature; • In the case were any remains are found on site that is potentially human remains, the South African Police Service must be informed thereof. Furthermore all work must cease until such time the SAPS has concluded their investigation; and • No graves may be destroyed, damaged, altered, exhumed or removed from its original position until a permit to do so has been issued by South African Heritage Resources Agency.	National Heritage Resources Act 25 of 1999	Holder of EA & Contractor	Duration of Construction and Operational Phases

Table 8-3: Management of impacts on flora

Environmental Aspect	Environmental Impact	Management Objective	Mitigation Level	Mitigation Measures	Applicable Legislation	Responsible Party	Time Period
Vegetation clearing	Loss of Conservation Important and other species specimens, habitats and ecosystem services.	Through the implementation of the management and mitigation measures, the loss of vegetation beyond the demarcated construction area must be prevented.	Prevention	• The proponent is required by law to remove Category 1 species, therefore an alien and invasive plan needs to be compiled and implemented; • Daily wetting of exposed surfaces during earth works to control dust; • Erosion Management Plan to be compiled and implemented. Measures that could be assessed include: • Placing biodegradable sand bags around stockpiles, construction footprint etc. As the topography is flat these are recommended as opposed to berms. • Rehabilitation of areas disturbed outside of the slimes dam footprint; • Rehabilitation of existing impacts, for example removal of berms, infill and re-vegetation of borrow pits (Only locally indigenous and weed-free flora should be used for re-vegetation of disturbed areas); • During earthworks a faunal specialist should be on hand for any species that will require translocation during the construction phase; and • Construction crews should be informed about the importance of biodiversity through an induction process. Awareness of potentially harmful animals such as snakes should also be raised. The appointed Environmental Control Officer on site should be trained to handle snakes	National Environmental Management Biodiversity Act 10 of 2004	Contractor & Holder of EA	Construction Phase

Table 8-4: Management of Surface Water Impacts

Environmental Aspect	Environmental Impact	Management Objective	Mitigation Level	Mitigation Measures	Applicable Legislation	Responsible Party	Time Period
The activities associated with the construction of the slimes dam will entail ground excavations, levelling, deposition and compacting.	Loss of artificial wetland and associated ecosystem services	Ensure that all reasonable measures are taken to prevent any impacts on the characteristics of the watercourses associated with the development area.	Reduction	• Stockpile what remains of topsoil in the southern section (not covered historically by slimes) to retain viability of the seed bank; • Investigate the NFEPA status assigned to the pans to the south as this will affect the integrity of the buffer; • Petra Diamonds EO to be on site regularly and to monitor progress and implementation of mitigation measures; • Vegetation should preferably be cleared during winter, when many fauna are less active or have migrated; • It is recommended that a walk down of the site be conducted by herpetologist, to intensively search for and oversee the relocation of reptiles and amphibians within the proposed footprint area; • Demarcate and restrict anthropogenic disturbances to the construction area; • Where possible in the removal process, species such as geophytes should be collected and stored for future rehabilitative efforts around the mine in a nursery. Grass seeds can also be collected and stored and used during operation in a number or rehabilitation exercises, such as dam wall coverage; and • Construction crews should be informed about the importance of biodiversity through an induction process. Awareness of potentially harmful animals such as snakes should also be raised. The appointed EO on site should be trained to handle snakes	National Water Act 36 of 1998	Holder of EA & Contractor	Construction Phase

Table 8-5: Management of impacts on groundwater resources

Environmental Aspect	Environmental Impact	Management Objective	Mitigation Level	Mitigation Measures	Applicable Legislation	Responsible Party	Time Period
Excavation activities required for the construction of the slimes dam may breach shallow perched aquifer. Significant spills of hazardous substances that will be used during the construction phase solvents and hydrocarbons introduces an environmental risk.	Contamination of groundwater resources.	No contamination of groundwater resources.	Prevention	**Storage and handling of hazardous substances** • All hazardous substances must be stored in secure, safe and weatherproof facilities, underlain by a bunded concrete slab to protect against soil and water pollution. The bunded area must be able to contain 110% of the total volume of the stored hazardous substance; • In the event of a significant hazardous substance spillage or leakage, the ECO must Investigate the incident and prepare a report which documents the following information: • Environmental Aspect associated with the incident; ▪ The manner in which the incident happened; ▪ Indicate whether any preventative measures were not implemented; ▪ Determine the reason why the incident occurred; ▪ Required and appropriate rehabilitation and remediation measures; ▪ Indicate whether the actions which resulted in the incident were aligned with the	National Water Act 36 of 1998	Contractor	Construction Phase

Environmental Aspect	Environmental Impact	Management Objective	Mitigation Level	Mitigation Measures	Applicable Legislation	Responsible Party	Time Period
				applicable Method Statements; ▪ The type of work, process or equipment involved; and ▪ Recommendations to avoid future such incidents and/or occurrences. • Any accidental spills must be cleaned immediately, treating the spilled material using absorbent material. Spill kits must be kept on site to use in the event of a hazardous substance spillage; and • All cleaning of equipment, batching plants, trucks and flushing of mixers will not result in pollution, with all contaminated wash water entering the waste water collection. Contaminated water may therefore not be discharged to the environment.			
Operation of slimes dam – infiltration of contaminants	Contamination of groundwater resources.	No contamination of groundwater resources.	Prevention	• Construction of a cut-off trench reduces migration of the plume in a south-westerly direction. Decrease in groundwater quality during deposition of the tailings material is expected to be of low significance subsequent to the implementation of mitigation measures.	National Water Act 36 of 1998	Contractor	Operational Phase

Table 8-6: Health and Safety

Environmental Aspect	Environmental Impact	Management Objective	Mitigation Level	Applicable Legislation	Responsible Party	Time Period
The nature of the construction activities and magnitude of the proposed project activities inherently have the potential to impact on the health and safety of the construction workers and the community.	Unsafe working conditions and the absence of a Health and Safety Plan may result in injury to workers and loss of life.	Provision of a safe working environment to construction workers and the public.	Prevention	Occupational Health and Safety Act 85 of 1993		Duration of Construction Phase

Table 8-7: Health and Safety - Mitigation and Management Measures

Health and Safety - Mitigation and Management Measures
The following mitigation and management measure aimed at ensuring the health and safety of working and preventing injury or loss of human life must be implemented: • The safety of all construction and operational personnel, as well as any member of the public on the site is the responsibility of the Contractor. The Contractor shall also ensure the site is managed to ensure the unauthorised persons does not come to harm; • Control access onto and off the site by means of a register system; • Ensure that first aid / emergency facilities / procedures are in place; • Ensure that all personnel are trained in basic site safety procedures; • A register with contact numbers of all people employed and one emergency contact person for each employee; • Keep a list of all relevant emergency numbers in an easily accessible location on site; • Maintain a record of all incidents and illnesses on site and make the information available at meetings;

- Ensure that proper footwear is worn by employees at all times;
- Ensure that employees are issued with and make use of the necessary safety equipment when working in dusty, noisy and / or dangerous situations. Personal Protective Equipment (PPE), including, but not limited to hardhats, goggles, masks, earplugs, gloves, safety footwear and safety ropes as required;
- Ensure that adequate drinking water, wash water and sanitary facilities are available at all times and on all work sites;
- A designated are for food storage, preparation and consumption must be provided on site; and
- Ensure that all vehicle and machine operators are qualified and licensed to operate their vehicles / machines.

Table 8-8: Noise Control

Environmental Aspect	Environmental Impact	Management Objective	Mitigation Level	Applicable Legislation	Responsible Party	Time Period
The movement of construction activities, construction vehicles and heavy machinery as well as construction personnel will alter the ambient noise levels in the area. The construction site would operate 24-hours per day, for a portion of the construction period, if not for the full duration.	The increased noise levels caused by the movement of construction activities, construction vehicles and heavy machinery as well as construction personnel, and which is audible by the surrounding receptors may cause a nuisance and disturbance.	Increased noise levels must be maintained below levels which will be audible by the surrounding receptors.	Minimisation	Local municipal by-laws specific to noise	Contractor & Holder of EA	Duration of Construction Phase

Table 8-9: Noise Control - Mitigation and Management Measures

Noise Control - Mitigation and Management Measures
The following management and mitigation measures relating to the control of noise generated during the Construction Phase must be implemented: • Noise mufflers and/or soft explosives must be used during blasting to minimise the impact on humans and animals; • No amplified music will be permitted on site and in construction camps; • All noise levels must be controlled at the source. If the noise levels at the boundaries of the site exceed 7 dB above ambient levels, the local health authorities must be informed; • All onsite workers must be provided with the necessary ear protection gear; • I&APs must be informed of the excessive noise factors; • Local municipal by-laws specific to noise must be adhered to; • Blasting operations must be strictly controlled with regard to the size of explosive charge in order to minimise noise and air blast, and timings of explosions. The number of blasts per day should be limited, blasting should be undertaken at the same times each day and no blasting should be allowed at night. All I&APs must be notified least 24 hours prior to the blasting; • The SANS10103 (2008) should be applied to provides a guidance for determining the community's response to the increase in the general ambient noise level caused by the Construction Phase; • Blasting and noise intensive operations must be restricted to normal working hours (7 am to 5 pm). Amplified noise such as sirens and announcements limited to restricted hours other than cases of emergency; • Ensure that employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours; and • Respond to community complaints with regard to noise generation, taking reasonable action to ameliorate the impact. Where complaints cannot be addressed to the satisfaction of all parties, the Contractor will, upon instruction by the Project Manager, provide an independent and registered Noise Monitor to undertake a survey of the noise output levels.

9 MONITORING ENVIRONMENTAL PERFORMANCE

9.1 Corrective Action

The independent ECO will be responsible for compliance monitoring, auditing and reporting throughout the life of the proposed development. Checking and corrective action forms part of the environmental management function and is aimed at ensuring that the necessary environmental management activities are being implemented and that the desired outcomes are achieved. When non-conformities do occur that have a negative impact on the environment, these should be rectified by the implementation of corrective actions issued by the ECO and Project Manager within a reasonable or agreed period of time. All corrective actions need to be documented and the outcome photographed.

9.2 Penalties Structure

Section 30 of Chapter five of NEMA proposes penalties for non-compliance with the provisions of Chapter five. Any person who contravenes the regulations set out here or commits an offence as described in this section is liable for a fine or jail term. Fines and penalties shall be managed in accordance with the Public Management Finance Act. A penalties and fines system shall be developed for this project and shall take the following in consideration:

- Penalties will be issued for the transgressions and non-compliances where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications. The Contractor shall be liable to pay a penalty over and above any other contractual consequence.
- Penalties may be issued per incident at the discretion of the PM and ECO. The exact value of the penalty imposed shall be at the discretion of the PM and ECO and enforcement shall be at the discretion of the holder of the EA. The Contractor will also be responsible for remediation costs;
- Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the EMPr. The PM will inform the Contractor of the contravention and the amount of the penalty, and will deduct the amount from monies due under the Contract.
- The PM and ECO shall be the judge as to what constitutes a transgression in terms of this clause subject to the provisions of the General Conditions of Contract;
- For each subsequent similar offence, the penalty may, at the discretion of the PM and ECO be doubled in value to a maximum value to be determined; and
- Payment of any penalty in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

9.3 Documentation and Record Keeping

All records related to the implementation of this EMPr (e.g. method statements, audit inspection protocols, incident reports, etc.) must be filed together by the ECO in a safe place where it can be easily retrieved. These records should be kept for two years, following the completion of the Construction Phase and should, at any time, be available for scrutiny by relevant authorities. It is also recommended that photographs be taken of the site prior to, during and immediately after construction/ installation, as a visual reference. These photographs should be stored with other records related to this EMPr.

10 CONCLUSION

This EMPr has not only been collated to provide an integrated document that provides the proposed mitigation measures, specialist recommendations and EIR, but also conform to the environmental legislative requirements and environmental best practice principles. It is the opinion of the EAP that the implementation of the management and mitigation measures provided in the EMPr is sufficient to prevent the environmental impacts associated with the proposed project. This EMPr will furthermore contribute the realising the following over-arching objectives set out to be reached by the use of the document as an environmental management tool.

The effectiveness of this EMPr will to a large degree rest on adherence to and fulfilling the roles and responsibilities of each role player and stakeholder provided in Part 6, which clearly defines the responsibilities for management actions contained in the EMPr and arrangements for coordination among the role players.

11 REFERENCES

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APPENDIX A :

APPENDIX B :