

APPENDIX 10

ENVIRONMENTAL MONITORING PLAN


Environmental Management Program (EMPr)

PROPOSED REGISTERED BORROW PIT NEAR STELLA, NORTH WEST PROVINCE

Prepared By:
Environmental Management
Group (Pty) Ltd
P.O. Box 37473
Langenhoven park, 9330
Tel: 051 412 6350
Fax: 086 556 2125
Contact Person:
SE van Rooyen



Prepared by:
Environmental Management Group (Pty) Ltd

Specialist:	<i>Emma Ferreira</i> <i>Junior Ecologist and Environmental Specialist</i> <i>MSc (2020-current) Botany (Vegetation Ecology, Plant Taxonomy, Biogeography)</i> <i>BSc Hons Botany (Plant Taxonomy and Vegetation Ecology)</i> <i>BSc Botany and Zoology</i>
Reviewed by:	Ricus Nel <i>Senior Ecologist and Project Manager</i> <i>BSc Hons Botany (Vegetation Ecology)</i> <i>SACNASP – ECO SCI-144943</i>
Reviewed and approved by:	SE van Rooyen <i>EAPASA: 2019/309; SACNASP: 116554; IAIA 5901</i> <i>MSc Environmental Rehabilitation</i>  Signature:

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Terms and Abbreviations

Audit - regular inspection and verification of mining activities for implementation of the EMP

Bund - enclosure under / around a storage facility to contain any spillage.

Batch plant - a concrete or plaster mixing facility and associated equipment and materials.

Contractor - the principal persons / company undertaking the excavations of the mining.

Developer - The developer is the same person as the applicant or the client.

Development site - boundary and extent of development works and infrastructure.

Engineer - A person who represents the client and is responsible for enforcing the technical and contractual requirements of the project.

ECO - Environmental Site Agent: - Person responsible to applicant tasked with implementing and controlling the environmental requirements during mining.

RE – Resident Engineer: - Represents the Engineer on site

DEFINITIONS

Emergency – An incident, which potentially can significantly impact on the environment, and which, could cause irreparable damage to sensitive environmental features. Typical situations entails amongst others the:

- Spill of petroleum products and lubricants onto eco systems;
- Potential event of impeding the continuous flow of water to downstream water users dependant on the flow; and
- Dangerous situation where livestock and small children can be injured by any activity emanating from the operation or rehabilitation of the project implementation.

Alien Vegetation: alien vegetation is defined as undesirable plant growth which shall include, but not be limited to; all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined mining area and which are declared to be undesirable.

Aspect: Element of an organisation's activities, products or services that can interact with the environment.

Auditing: A systematic, documented, periodic and objective evaluation of how well the environmental management plan is being implemented and is performing with the aim of helping to safeguard the environment by facilitating management control which would include meeting regulatory requirements. Results of the audit help the organisation to improve its environmental policies and management systems.

Built Environment: Physical surroundings created by human activity, e.g., buildings, houses, roads, bridges, and harbours

Contamination: Polluting or making something impure.

Corrective (or remedial) action: Response required addressing an environmental problem that conflicts with the requirements of the EMP. The need for corrective action may be determined through monitoring, audits, or management review.

Degradation: The lowering of the quality of the environment through human activities, e.g., river degradation, soil degradation.

Ecology: The scientific study of the relationship between living things (animals, plants, and humans) and their environment.

Ecosystem: The relationship and interaction between plants, animals, and the non-living environment.

Environment: environment means the surroundings within which humans exist and that could be made up of –

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

Environmental aspect: an environmental aspect is any component of a contractor's mining activity that is likely to interact with the environment.

Environmental impact: an impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a mining activity. An impact may be the direct or indirect consequence of a mining activity.

Environmental Authorisation: an environmental authorisation is a written statement from the Department of Forestry, Fisheries and Environment (DFFE) that records its approval of a planned undertaking to improve, upgrade or rehabilitate and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.

Hazardous waste: Waste, even in small amounts that can cause damage to plants, animals, their habitat, and the well-being of human beings, e.g., waste from factories, detergents, pesticides, hydrocarbons, etc.

Land use: The use of land for human activities, e.g., residential, commercial, industrial use.

Mitigation: Measures designed to avoid, reduce, or remedy adverse impacts

1. Introduction

The main purpose of this Environmental Management Plan or Programme (EMPr) is to prevent avoidable damage and/or minimise or mitigate unavoidable environmental damage associated with any operational, or decommissioning activities where there is a risk of environmental damage and to enhance positive benefits of the project. The EMPr constitutes one of the contractual obligations which must be committed to by all contractors/employees involved with mining, maintenance or renovation operations. This document is compiled in accordance with the Integrated Environmental Management (IEM) philosophy which aims to achieve a desirable balance between conservation and development. IEM is a key instrument of the National Environmental Management Act [NEMA] (Act No. 107 of 1998). NEMA promotes the integrated environmental management of activities that may have a significant effect on the environment, while IEM prescribes a methodology for ensuring that environmental management principles are fully integrated into all stages of the development process. It advocates the use of several environmental management tools that are appropriate for the various levels of decision-making. One such tool is an EMPr. The IEM guidelines encourage a pro-active approach to sourcing, collating, and presenting information in a manner that can be interpreted at all levels. The basic principles underpinning IEM are that there be:

- informed decision-making;
- accountability for information on which decisions are taken;
- accountability for decisions taken;
- a broad meaning given to the term environment (i.e., one that includes physical, biological, social, economic, cultural, historical, and political components);
- an open, participatory approach in the planning of proposals;
- consultation with interested and affected parties;
- due consideration of alternative options;
- an attempt to mitigate negative impacts and enhance positive aspects of proposals;
- an attempt to ensure that the 'social costs' of development proposals (those borne by society, rather than the developers) be outweighed by the 'social benefits' (benefits to society because of the actions of the developers);
- democratic regard for individual rights and obligations;
- compliance with these principles during all stages of the planning, implementation, and decommissioning of the proposals (i.e., from 'cradle to grave'); and.

The Environmental Impact Assessment Regulations that took effect in April 2017 regulate the procedures and criteria for the submission, processing, consideration, and decision on applications for environmental authorisation of listed activities.

The general principles contained within this document apply to all **OPERATIONAL PHASE** and **DECOMMISSIONING PHASE** activities regarding the proposed registered borrow pit. The operational phase refers to the mining period in which excavating is active. As the site has already undergone active mining, the pre-mining phase or site-establishment phase has been merged with the operational phase.

2. Terms of reference

Environmental Management Group Consultants (Pty) Ltd (EMG), as independent environmental managers and impact assessors, has been appointed by **Naledi Local Municipality** to compile and submit an Environmental Management Programme (EMPr) under the National Environmental Management Act (Act No. 107 of 1998), for the application for environmental authorisation and registration of the proposed registered borrow pit near Stella on Farm Biesjes Bult 549/18.

In terms of the special conditions of the contract (specifications) the EMP must include the following:

- Details of the EAP (Refer to Page ii of this document)
- Purpose of the EMP
- Legal requirements
- Management of possible impacts
- Institutional arrangements
- EMP operational & implementation procedures

3. Purpose of the EMP

The purpose of this Environmental Management Programme (EMP) is to give direction and guidance to all responsible parties, and binds all contractors, sub-contractors and other persons working on the site to adhere to the terms and conditions of the EMP during the operational phase of the project. The implementation of the EMP is not an additional or “add on” requirement.

The overall aim of the EMP is to prevent avoidable damage and/or minimise or mitigate unavoidable environmental damage associated with the operational phase, and to a lesser degree the decommissioning phase of the proposed registered borrow pit.

The EMP is legally binding through NEMA. The proponent is to ensure that through the project tender process the EMP forms part of the Project Contract Document for the proposed operation to be incorporated in line with:

- General project specifications; and

This EMP:

- identifies project activities that could cause environmental damage (risks) and provides a summary of actions required;
- identifies persons responsible for ensuring compliance with the EMP;
- provides standard procedures to avoid and/or minimise the identified negative environmental impacts and to enhance the positive impact of the project on the environment;
- provides site and project specific rules and actions required, through the start-up report;

forms a written record of procedures, responsibilities, requirements, and rules for Contractor(s), their staff and any other person who must comply with the EMP; provides for monitoring of compliance and record keeping.

The EMP is partly prescriptive (identifying specific people or organisations to undertake specific tasks, to ensure that impacts on the environment are minimised), but it is also an open-ended document in that information gained during the operational activities and/or monitoring of procedures on site could lead to changes in the EMP.

4.1. Scope

This EMP addresses the operational and decommissioning phases and all activities associated with this project. Compliance to the EMP shall be monitored by an independent Environmental Control Officer (ECO) who will visit the site on a regular basis during the operational phase (at least once a month). **The Client** or the **Construction Engineer or Project Manager**, on behalf of the Client, will be responsible to ensure the implementation of the requirements of this EMP by all contractors and sub-contractors.

5. Project location and description

Naledi Local Municipality has initiated the registration process of an illegally active and open borrow pit on Farm Biesjes Bult 549/18 near Stella, North West Province. The borrow pit area will constitute the mining area, site offices and stockpile areas on approximately 1.9 ha of isolated fragmented land.

The proposed registered borrow pit site is in the North West Province, less than 2km northwest of Stella. The North-eastern boundary of the proposed registered borrow pit area runs parallel to the R377. The Northern and Western boundary of the proposed borrow pit area follow the form of unnamed gravel roads. The proposed registered borrow pit area is currently open and can be accessed from any side. However, the road into the excavation can be accessed from the unnamed gravel road from the Northern boundary.

6. Applicable legislation

Constitution of the Republic of South Africa (1996): of special relevance in terms of environment is section 24

Conservation of Agricultural Resources Act 43 of 1983 (CARA): supports conservation of natural agricultural resources (soil, water, plant biodiversity) by maintaining the production potential of the land and combating/preventing erosion; for example, by controlling or eradicating declared weeds and invader plants.

Hazardous Substances Act 15 of 1973: to control substances that may cause injury, ill-health, or death through their toxic, corrosive, irritant, strongly sensitizing or flammable nature, or by the generation of pressure.

National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA): replaces the Atmospheric Pollution Prevention Act (No. 45 of 1965).

National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA): supports conservation of plant and animal biodiversity, including the soil and water upon which it depends.

National list of ecosystems that are threatened and in need of protection (GN 1002 of 9 December 2011).

National Environmental Management: Protected Areas Act 57 of 2003 (as amended Act 31 of 2004) (NEMPAA): To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes.

National Environmental Management: Waste Act 59 of 2008 (NEMWA): To reform the law regulating waste management to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.

National Heritage Resources Act 25 of 1999: supports an integrated and interactive system for the management of national heritage resources, including supports soil, water and animal and plant biodiversity.

National Veld and Forest Fire Act 101 of 1998 (NVFFA): protects soil, water and plant life through the prevention and combating of veld, forest, and mountain fires

National Water Act 36 of 1998 (NWA): promotes the protection, use, development, conservation, management, and control of water resources in a sustainable and equitable manner.

7. Special conditions required

Summary of special/specific conditions proposed for the registered borrow pit from the North West Provincial Governance Department of Public Works and Roads:

- a. The Department of Public Works and Roads should be notified of intent to transport abnormal trucks/ equipment on either of the D986_020 (R377) and D3515_010.
- b. Any blasting is to be compliant with current applicable Explosives Regulations/ Acts to prevent possible damage to roads.
- c. No claims can be laid against the Premier of North West and the Department of Public Works and roads cannot be held liable unless proved negligent.
- d. The road reserve widths for Road D968_020 (R377) and road D3515_010 are 32 m, or 16 m from the centre of the road.

- e. The minimum building line relaxation has been granted for 45m from the centre of the Road (or 29 m from the road reserve boundary).
- f. No structures will be allowed to be erected inside of the road reserves without written approval from the North West Department of Public Works and Roads and Deputy Director General.

8. Recommendations

The following are site specific recommendations, as per the various specialist assessments of the project. Please note that if there is any contradiction between the following specialists' recommendations and/or the conditions of the Environmental Authorisation, and the recommendations, the Environmental Authorisation and specialist recommendations take president.

8.1. Specialist's recommendations on impact minimisation

- The operational phase of the project must be done in accordance with this environmental management programme, the aim of which is, to minimise environmental impact during the operational phase.
- A suitable qualified ECO must be appointed to oversee the operational phase.
- The borrow pit's boundary must be fenced for human and animal safety and hold warning/danger signs.
- Access to the borrow pit area should be controlled and restricted to staff members.
- Habitat disturbance and vegetation clearance should be restricted to the authorised area.
- Cleared indigenous vegetation should be mulched for use in rehabilitation.
- Removal permits need to be obtained from the relevant authority for *Vachellia erioloba*. No firewood collection should be permitted.
- Vehicle movement should strictly be kept on designated dirt/gravel roads.
- An alien and invasive management plan should be drafted and adhered to.
- All barren/unvegetated spaces including topsoil should be kept clear of vegetation.
- Topsoil should be kept in stockpiles along the edge of the excavation less than 3 m high to prevent wind erosion and dust emissions.
- Topsoil should not be accidentally mixed with the material being excavated or other contaminants.
- Alien and invasive species monitoring and eradication must take place quarterly.
- A decommissioning and rehabilitation plan should be drafted.
- All staff should be informed of all possibly occurring SCC.
- New observations of floral SCC should follow the procedures set out in the EMPr.

9. Role players and their responsibilities.

The Applicant – Naledi Local Municipality.

The applicant is ultimately accountable for ensuring compliance to the EMPr. The ECO must be contracted by the applicant (full time or part time depending on the size of the project) as an independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of the EMP for the project. Further responsibilities of the applicant include:

- Providing and giving mandate to enable the ECO to perform responsibilities.
- Ensure that competent people are employed on the project by its contractor. Where necessary a skills development program will be instituted to ensure that the required levels of competency are attained.
- Ensure that the selected contractor is able to adequately deal with the environmental challenges in this project.

The Independent Environmental Control Officer (ECO)

The applicant shall appoint a suitably experienced, competent, independent Environmental Control Officer (ECO) to objectively monitor implementation of relevant environmental legislation, conditions of Environmental Authorisations (EA's), and the EMP for the project. Thus, the responsibilities of the ECO are to:

- Undertake monthly audits in respect of compliance with the EMPr.
- Inform the applicant and its contractors/quarry operators on any identified opportunities for improving environmental performance.
- Be proactive and have access to specialist expertise as and when required, these include botanists, ecologists, etc. Further, the ECO must also have access to expertise such as game capture, snake catching, etc.
- Conduct audits on compliance to relevant environmental legislation, conditions of EA, and the EMP for the project. The size and sensitivity of the development, based on the EIA, will determine the frequency at which the ECO will be required to conduct audits. (A minimum of a monthly site inspection must be undertaken).
- Be the liaison between the relevant authorities and the project team. The ECO must communicate and inform the developer and consulting engineers of any changes to environmental conditions as required by relevant authoritative bodies. The ECO must ensure that the registration and updating of all relevant EMP documentation is carried out.
- Handle information received from whistle blowers as confidential and must address and report these incidences to the relevant Authority as soon as possible.

On small projects, where no EO is appointed, the ECO must convey the contents of this EMP to the Contractor site team and discuss the contents in detail with the Contractor as well as undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors and their workforce.

The Appointed Contractor

The contractor refers to the team/company appointed by the Applicant to undertake the developmental activities for the mine/borrow pit. The Contractor shall have the following responsibilities:

- To implement all provisions of the EMPr and ensure that the appropriate levels of measuring and monitoring are done.
- To ensure that all staff and sub-contractors are familiar with the EMPr and that duties and responsibilities of employees working on site include environmental responsibilities pertaining to the nature of their work.
- To make personnel aware of environmental issues and to ensure they show adequate consideration of the environmental aspects of the project.
- To report any incidents of non-compliance with the EMPr to the ECO and the applicant.
- Further responsibilities of the appointed contractor will be shown in the table below.

Monitoring matrix

The expected monitoring requirements are shown in the Table provided.

	Issue	Monitoring methodology	Monitoring frequency	Responsibility
A	Social Issues			
	Community complaints.	Recording the number of complaints received.	Monthly record of incidents.	Contractor.
	Fair labour recruitment.	Recording local vs migrant labour.	Monthly key labour statistics.	Contractor.
B	General site issues			
	Location of parking, offices etc.	Visual check of site suitability.	At site office establishment.	Contractor.
	Vegetation clearance.	Areas cleared.	At site office establishment. Ongoing during life of Mine (LOM)	Contractor.
	Surface or gully erosion on site.	Visual check of surfaces.	Ongoing during LOM. Record NCs monthly.	Contractor.
	Adequacy of fencing and beacons.	Visual check of integrity of fencing.	Ongoing during LOM. Record NCs monthly.	Contractor.
	Suitability of storage areas for waste.	Check no. of receptacles and bunding.	Ongoing during LOM. Record NCs monthly.	Contractor.
	Fire breaks.	Visual check.	Ongoing during LOM. Record NCs monthly.	Contractor.
	Proper functioning of sanitation facilities.	Check that there is no overflows and effluent spillages.	Ongoing during LOM. Record NCs monthly.	Contractor.
	Control of Fires/Prevention of burning	Monitor incidences of non-compliance Check that firefighting equipment is serviced.	Ongoing during LOM. Record NCs monthly.	Contractor.
	Overall appearance of site/housekeeping	Visual check of litter and order.	Ongoing during LOM. Record NCs monthly.	Contractor.
C	Worker conduct			
	General environmental awareness training.	Record people and issues trained.	At recruitment and site office establishment, then as necessary. Training records must be kept.	Contractor.
	Prohibition of hunting and collection of plant material.	Monitor incidences of non-compliance..	Ongoing during LOM, Record NCs monthly.	Contractor.

	Issue	Monitoring methodology	Monitoring frequency	Responsibility
	Limitation of access to operational mine areas.	Monitor incidences of non-compliance	Ongoing during LOM, Record NCs Monthly	Contractor.
D	Equipment maintenance			
	Adequate Maintenance of Vehicles	Check compliance with schedule	Ongoing during LOM. Keep monthly maintenance records	Contractor.
	Oil Leaks and spills clean-up	Monitor incidences of non-compliance	Ongoing during LOM. Record NCs Monthly	Contractor.
	Excessive vehicular emissions control	Monitor incidences of non-compliance	Ongoing during LOM. Record NCs Monthly	Contractor.
E	Material storage			
	Suitability of storage facilities	Record material usage Check receptacles and bunding integrity	Ongoing during LOM. Keep monthly usage records	Contractor.
F	Waste management			
	Efficiency of collection of waste streams	Record waste disposed	Ongoing during LOM. Record Monthly disposal	Contractor.
	Adequacy of storage receptacles	Visual checks	Ongoing during LOM. Record NCs Monthly	Contractor.
	Containment of liquid waste	Visual checks of leakages & bunding	Ongoing during LOM. Record NCs Monthly	Contractor.
	General Cleanliness of area	Visual checks of no littering	Ongoing during LOM. Record NCs Monthly	Contractor.
	Containment of contaminated waste	Visual check of bunding & receptacles	Ongoing during LOM. Record NCs Monthly	Contractor.
G	Excavations, exposed surfaces, screening			
	Stability of slopes.	Visual checks of cracks and failure signs.	Ongoing during LOM. Record NCs monthly.	Contractor.
	Safety signs and demarcations.	Visual checks of integrity.	Ongoing during LOM. Record NCs monthly.	Contractor.
	Adequacy of site drainage.	Check that storm water is moving freely.	Ongoing during LOM. Record NCs monthly.	Contractor.
	Dust Suppression on dust generating area.	Check adequacy of water spraying.	Ongoing during LOM. Record NCs monthly.	Contractor.
	Surface erosion on site.	Visual check of surfaces.	Ongoing during LOM. Record NCs monthly.	Contractor.
H	Water resources			

	Issue	Monitoring methodology	Monitoring frequency	Responsibility
	Cleaning up of contaminated soils.	Report incidences of non-conformances.	Ongoing during LOM. Record NCs monthly.	Contractor.
	Water consumption at site.	Report amount of water used.	Ongoing during LOM. Record NCs monthly.	Contractor.
J	Final rehabilitation			
	Removal of infrastructure.	Visual check of removal. Keep removal records.	At decommissioning. Record of Disposal	Contractor.
	Rehabilitation of access roads.	Visual check.	At decommissioning. Record NCs monthly.	Contractor.
	Removal of contaminated soils	Record disposal record.	At decommissioning. Monthly disposal record	Contractor.
	Reshaping of the borrow pit and stabilisation.	Visual check.	At decommissioning.	Contractor.
	Establishment of adequate drainage structure.	Visual check of non-pooling.	At decommissioning. Record NCs monthly.	Contractor.
	Replanting with indigenous local species.	Record areas planted.	At decommissioning. Keep record of action done.	Contractor.
	Checking the re-vegetation efforts.	Visual check.	Quarterly thereafter.	Contractor.
	Monitoring for floral alien and invasive species emergence and establishment.	Visual check and as per an alien and invasive management plan.	Completed removal after decommissioning has been completed.	Contractor.

General EMP

5.1. Method statements

The Contractor shall submit written Method Statements for all environmentally sensitive aspects of the work. It should be noted that Method Statements must contain sufficient information and detail to mitigate the potential impacts of the works on the environment. The Contractor will also need to thoroughly understand what is required of him / her to undertake the works. Work shall not commence until Method Statements have been put in place.

The method statement defines the nature of the planned work with a step-by-step outline such that the ECO and the applicant may understand the intentions of the contractor. It would enable them to assist in the implementation of any mitigating steps that will mitigate the environmental effects across such tasks. Until any mining activity is scheduled to start, the contractor must submit the method document. Work may not begin until the method statement has been accepted by the ECO and the applicant.

The method statement must cover the relevant information concerning:

- Location and timing of activities
- How to store material
- How to get equipment to and from site
- Procedures for the mining
- Compliance/ non-compliance with the Specifications, and
- Any other information which the applicant and ECO find appropriate

The contractor must comply with these approved method statements and any operation covered by a method statement must not begin until the applicant and the ECO have approved this method statement.

5.2. Record Keeping

All records relating to the implementation of this Environmental Management Plan must be kept together, be readily retrievable and available for scrutiny by any relevant authority. Records include the following:

- Declarations of understanding;
- ECO Checklist, audits and/or diary;
- Method statements
- Photographs (must be taken before, during and immediately after mining as a visual reference);
- The Environmental completion statement.
- These records must be available for scrutiny by any relevant authorities

5.3. Social and Environmental Issues

It is important to minimize any negative perception, by taking proactive measures to prevent any social conflicts or social gaps and to develop a positive attitude within the community of the project. The following management strategies are to be implemented:

- Transparent fair recruitment and procurement practices. The contractor that was appointed, should maximize the involvement of local communities in mining and support activities, to the extent possible, based on available skill levels. Whenever possible, training programmes that will benefit both mining stage skills requirements and long-term employment demand should be developed.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.
- Priority should be given to the local suppliers of goods and services, which meet requirements of project procurement as far as is possible. To optimize the opportunities for local businesses to supply goods and services to the project, the contractor will do a survey of the capabilities of the goods and services that are locally available that are of an acceptable standard and quality and a survey of the capabilities of local construction/mining companies and identify opportunities for local suppliers.
- A public complaint register and system to ensure that community complaints clearly investigated and adequate remedial taken should be instituted.
- Adequate notification should be done to people residing close to where mining activities are taking place especially if they are to be affected by them. In addition, there should be a system of compensation for any damages to infrastructure that may occur.
- Each worker should be required to abide by a Code of Conduct which will limit unsavoury activities in local towns and communities and restrict certain behaviours in the work sites and accommodation.

5.4. Establishing office / camp sites

- Before the commencement of establishing the site offices/camp sites an ecologist must be present to supervise the development thereof.
- The area chosen for the purposes of the development shall be required to be of the minimal acceptable standard and will involve the least disturbance to vegetation as approved by an ecological specialist. No flora/vegetation of any type will be felled or damaged for the purpose of obtaining firewood, creating new unapproved gravel access roads, or removing protected/endangered species for personal use.

- No waste will be burned on site and fires for recreational purposes will be made off-site.
- If required by applicable legislation, a firebreak shall be cleared around the perimeter of the camp and office sites, only if it was approved in a management plan by an ecological specialist.
- Lighting and noise disturbance or any other form of disturbance that may influence the landowner/tenant/persons lawfully living in the vicinity shall be kept to a minimum. *Please refer to the Impact Assessment mitigation measures.*
- Chemical toilet facilities or other approved toilet facilities should be sited in such a way that they do not cause water or other pollution. The use of existing facilities (if any) must take place in consultation with the landowner/tenant. Record must be kept of the chemical toilet service intervals and agreements with the sub-contractor.
- In cases where facilities are linked to existing sewerage structures, all necessary regulatory requirements concerning operation and maintenance should be adhered to. The facilities must comply with water act requirements.
- The site office must be located either outside of the authorised area on an already developed surface or on the authorised area where vegetation clearance was approved. No site office may be erected in the surrounding areas that were not approved.
- If the workshop is located at the office's premises an impermeable surface (usually concrete) will be solely used for the repair and maintenance of vehicles. No other areas will be used for this purpose.
- The camp where the vehicles are parked and stored must preferably occur on an impermeable surface, as to prevent oil spills, but correctly placed drip trays, which are regularly emptied and disposed of correctly, will also suffice.
- Adequate signage must be provided for each sector of the site office including workshop areas and parking bays, as well as the whole area being appropriately fenced off.
- Waste Management will occur from the site office. It is therefore crucial that numerous waste bins of various disposal types be available at all times on site. A sub-contractor must be appointed to dispose of waste at a registered landfill as well as weekly "clean up runs" being performed to collect all types of waste that occurred on site and in the surrounding area.

5.5. Air Quality

The main sources of impact on air quality are mobilization of equipment, and earthworks. To ensure air quality characteristics of the project area are maintained near the baseline conditions during of the operational/mining stage, the following measures shall be done:

- Regular inspection and scheduled maintenance of all equipment to ensure that construction vehicles are in good condition, are utilising fuel efficiently and do not produce excessive hazardous emission. A signed checklist must be kept on site recording scheduled maintenance.
- Gravel access roads must undergo dust suppression (with water) each day and if necessary, can be more. It is highly recommended that special care be given to the amount of dust suppression on these gravel roads. Too much water quickly deteriorates the surface of the gravel road which may form erosion gullies. Due to the sensitive nature of the vegetation, it comes highly recommended that this forms part of the environmental checklist.
- Slowing down the vehicles carrying the construction materials by implementing speed bumps and speed limits of 20 – 30 km/h to reduce dust generation.
- Truck removing waste from site will not be overloaded and will have a sheet covering the bucket to avoid waste falling off the truck.
- Confine vehicle movements on unpaved roads to demarcated areas only.
- Providing and using the safety equipment such as dust mask for employees who work near the dusty location.
- Optimization of working schedule and work to help to minimize several material vehicle mobilization trips.

5.6. Noise and vibrations

The primary noise sources will be vehicles and equipment utilized during the operational/mining stage including graders, bulldozers, general purpose vehicles, etc. To manage the impact the following will be done:

- Working schedule for the activities with high noise level will be arranged between 06:00 AM to 17:00 PM.
- Only well-maintained vehicles and equipment should be operated onsite, and all machinery should be serviced regularly during the operational/mining stage.
- Avoiding unnecessary simultaneous activities that produce noise.
- No amplified music shall be allowed at the site.
- Selecting 'quiet' construction equipment and working method and avoiding unnecessary revving and hooting.
- Providing ear protection for activities that are likely to create noise to protect worker's health and safety.

5.7. Erosion control

Operational/mining activities will require the removal of vegetation cover, potentially resulting in soil erosion and subsequent impacts on surface water quality due to uncontrolled rainwater run-off or mechanical/wind action.

The following measures are necessary to minimise impacts.

- Clearance of vegetation should be restricted to the absolute minimum required to facilitate construction activities. Disturbance of topsoil and vegetation rootstock must be minimized as far as possible.
- Appropriate drainage systems will be built to accommodate the surface water movement from the rain and wind.
- Mining activities shall take place only within the approved demarcated area. Appropriate drainage facilities must be constructed to make sure water runs smoothly downstream.
- Topsoil layer will be kept in order for rehabilitation to occur in previous disturbed areas.
- Areas where mining has been finished should immediately be re-vegetated.
- Mining to be contained within the approved boundaries and unnecessary disturbance adjacent to the site be avoided.
- Designated roads should be used during mining.

5.8. Contamination of land

Land contamination may occur because of fuel and oil leaks or spills and/or poor fuel, chemical and waste storage.

- The designated storage areas for waste shall be secured and appropriately marked to indicate the waste type in the storage.
- Material Safety Data Sheets should be kept for all hazardous materials on site as well as for the sub-contractor removing the waste from site.
- All hazardous substances and stocks such as diesel, oils, detergents, etc., shall be stored in areas with impermeable surfacing (concrete, HDPE linings) and properly bunded. Drip pans, other impervious surface, shall be installed in such storage areas with a view to prevent soil and water pollution.
- All spillages of hazardous substances will be immediately mitigated by removing the contaminated soils and disposing of them in a designated waste receptacle for removal by a sub-contractor.
- Dedicated impervious areas should be designated for concrete mixing and the spillage from concrete mixed should be cleaned immediately. No concrete will be mixed adjacent to the mining area in the field or surrounding natural environment.
- The waste management strategy on the construction site should be hinged on the waste hierarchy model of 'reduce, reuse and recycle' waste to reduce the ultimate impact on the environment.
- All used oils, grease or hydraulic fluids shall be placed in appropriate impervious containers and these receptacles will be removed from the site on a regular basis for disposal at a licensed disposal facility or sent for recycling/reuse with a registered facility.

- Residues from machinery maintenance and other sources contaminated with hazardous waste should be stored in proper containers that avoid seepage to ground.
- General waste is to be disposed of through the municipal service. Any other waste will be disposed of through only licensed waste disposal facilities.
- Weekly exercises will be conducted on site by the environmental officer, or any person appointed this duty, to clean the site of general and non-recyclable waste. An environmental register recording these activities need to be on-site for inspection.

5.9. Surface and groundwater resources

Poor chemical storage and poor waste management practices may lead to the contamination of water resources. Sewage and sanitary effluent have the potential to adversely affect the quality of receiving water bodies unless properly managed. To eliminate the risk of contamination, the following measures must be instituted:

- Chemical toilets shall be used during the operational stage and a registered service provider shall be contracted to service the toilets regularly. Special care should be taken on where these portable toilets are placed.
- No portable toilets shall be placed in non-authorized areas and at least 100 m away from drainage lines, watercourses, and pans. These toilets will also have to be placed on impermeable surfaces (usually HDPE liners).
- Suitable covered receptacles for waste shall always be available and conveniently placed for the disposal of waste.
- Refuelling, fuel loading/unloading, oil change-outs, waste storage and disposal activities must be carefully managed to prevent spillages.
- Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and treated prior to discharge or removed from the site for appropriate disposal at a recognised facility.
- Responsible management of the site will be required to reduce risks/threats to groundwater and surface water.
- Erosion controls must be as per SWMP to mitigate the effects of excessive silt entering the drainage lines/ watercourses.
- The contractor **will at all times** have an environmental incident register present at the site office and record all incidents of spillages included but not limited to: Time of incident, brief explanation of incident, mitigation measures followed and disposal.
- The flood lines need to be clearly demarcated prior to mining to ensure no movement occurs within the flood plains. The flood plains should be treated as no-go areas as far as possible and no mining activities, material or waste should occur or be placed in these areas.

- Monitoring of mining including weed establishment and erosion should take place and should also specifically include any impacts or alterations to the surrounding flood plains.

5.10. Water usage

- Any water that is used which does not emanate from Municipality supplies must be registered and authorised by the Department of Water and Sanitation (DWS) prior to usage commencement.
- The contractor shall promote responsible water use by all personnel.

5.11. Fauna and Flora

Fauna and flora are negatively impacted by noise from operational activities (disturbance) and gathering/ hunting of flora and fauna by workers. The following measures are necessary to mitigate impacts.

- Before any contractor enters the site, an induction must be given explaining the significance of the flora and fauna found on site and all the mitigation measures that will be required.
- Topsoil shall be removed and kept for later use during rehabilitation. Together with stockpiling valuable soils. All stockpiles MUST have a designated area.
- The Contractor shall be responsible for the removal of alien vegetation within areas affected by the operational activities including cleared ground and topsoil stockpiles.
- No protected plant species shall be removed without a permit.
- Reckless behaviour resulting in the accidental destruction of species of conservation concern will be subject to legal action.
- The induction courses should be taken seriously and all personal made aware of the situation.
- No trees or shrubs will be felled or damaged for the purpose of obtaining firewood or creating a new access road.
- The rehabilitation activities require the re-planting of vegetation in any areas cleared for the operational activities. This will promote soil stability, improve the visual environment, and provide faunal habitat.
- Hunting/gathering by mine workers must not be permitted and the contractor or individual guilty of this offence can face legal action against them.
- Localized habitat features such as nests, dens or burrow sites should be avoided as much as possible. In addition, care should be taken in working in areas of active nesting, spawning, and feeding areas.
- An Avifaunal specialist must be appointed to form part of the Environmental Awareness training and must be notified if a nest is found.
- Before commencement of mining activities special care should be given to the avifauna assessment report and adhere to all the mitigation measures. These

mitigation measures must form part of induction and part of environmental toolbox talks.

- Monitor rehabilitation via site audits and site inspections to ensure compliance. Record and report any non-compliance.
- Strict application of all recommendations in the ecological and wetland specialist reports pertaining to the limitation of the footprint.

5.11.1. Procedure to follow if any floral species of conservation concern is observed

- When a floral species of conservation concern or a species which is suspected to be of conservation concern is spotted the on site EO should immediately be informed.
- The on site EO or any other individual in a supervisor's position should contact an environmental consultant.
- The plant should be immediately demarcated with at least 20 m around an individual or 50 m around a small sub-population. This demarcation area is to be treated as a **NO-GO** area.
- The consultant shall appoint a suitably qualified specialist to confirm the identification of the species.
- Provided a transplant permit for the specific species is available on site, the correct procedures to transplant the specimen to the protected environment be followed. If no permit is available for that specific species, the DEARL should be consulted.
- The protected species' transplant should be supervised by a qualified botanist.

5.12. Safety

- The Contractor shall be responsible for the protection of the public and public property from any dangers associated with the mining/operational activities.
- All work should be handled in accordance with the Occupational Health and Safety Act and adequate safety precautions taken and suitable sanitation facilities provided in line with the requirements of the act. It is the duty of the contractor to ensure that all protective measures against accidents are done.
- Any works/activities which may pose a hazard to humans and/or domestic animals are to be protected or cordoned off and, if appropriate, warning signage erected.
- Appropriate security is to be provided at the site to protect equipment and provide for a safe construction site and works areas.
- Any damage caused because of the construction activities shall be repaired to the satisfaction of the project manager and owner.

5.13. Historical, archaeological and heritage impacts

- A professional archaeologist should be appointed as part of the project management plan to monitor, and map potentially rare Early Stone Age LCT occurrences at the proposed registered borrow pit site.

5.14. Solid waste management

Waste refers to all solid waste, including domestic waste, hazardous waste, and construction debris (recyclable and non-recyclable). The Contractor is responsible for the establishment of a refuse control system (which must consider recycling wherever possible) that is acceptable to the ECO. Disposal arrangements must be made in advance and cleared with the ECO before mining starts.

- No littering or on-site burying, dumping or burning of any waste materials, vegetation, litter, or refuse is acceptable in any form.
- All solid waste must be disposed of offsite at an approved landfill site in terms of section 20 of the Environment Conservation Act (Act No. 73 of 1989). The Contractor must supply the ECO with a certificate of disposal.
- The Contractor must provide problem animal- and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced daily. The lids must be always kept firmly on the bins. Bins must not be allowed to become overfull and must be emptied regularly.
- Waste from bins may be temporarily stored on Site in a central waste area that is weatherproof and scavenger proof and which the Engineer and the ECO has approved.
- All hazardous waste must be disposed of at a registered hazardous waste disposal site and certificates of safe disposal must be obtained.
- The Contractor must make provision for workers to clean up the Contractor's camp and working areas as part of their everyday duties. The Contractor must remove from site the refuse collected at least once a week.
- All sewage as well as any waste generated during the operational phase, should be collected, contained, and disposed of at the permitted and/or licensed facilities of the Local Authority. Please note that proof of the agreement between the Applicant and the concerned Local Authority must be submitted to the Department of Water and Sanitation.
- The disposal of general waste and that of hazardous waste must be carried out in an environmentally safe way as to prevent and/or minimise the potential for pollution of water resources and collection of which should be done by an accredited waste collector. All applicable Sections of the National Environmental Management: Waste Act (Act 59 of 2008) should be strictly adhered to.

- Any contaminated soil that was removed from the environment, must be stored in a separate waste bin and sub-contractor qualified to handle the waste product must be contracted to safely remove it from site.

5.15. Rehabilitation

- The contractor must comply with the specific standards for rehabilitation of a borrow pit as stipulated by DMRE and any other site-specific requests.
- The borrow pit must as a minimal requirement for rehabilitation, slope and level the disturbed area as close to the original topography as possible.
- Once rehabilitation of the borrow pit is completed, the are must be fenced and signs erected stating that this was a mining area and sharp drop-offs can be expected.
- On completion of operations, all buildings, structures, or objects on the camp/office site shall be demolished and removed.
- Where office/camp sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified, ripped and revegetated immediately to avoid erosion.
- On completion of operations, the areas shall be cleared of any contaminated soil, waste, concrete etc. The “leave the site as or close to its original state” principal will apply.
- The entire infrastructure, equipment, plant, temporary housing and gravel/temporary roads and other items used during the construction period will be removed from the site.
- Waste material of any description, including receptacles, scrap, rubble, and tyres, will be removed entirely from the area, and disposed of at a registered waste disposal facility. It will not be permitted to be buried or burned on the site.
- Disturbed areas should be left in a safe and stable manner. Preventative measures may be necessary to construct adequate drainage structures including ditches and other structures to facilitate the movement of surface water.
- Photographs of the camp and office sites, before and during the mining and after rehabilitation, shall be taken at selected fixed points and kept on record.
- The disturbed surfaces shall then be ripped or ploughed and the topsoil previously stored (if any) shall be spread evenly to its original depth over the whole area.
- The contractor must indicate to the ECO when the construction phase is completed so that a close-out report can be compiled and assessed by all the specialists, to determine if all environmental aspects have been sufficiently rehabilitated.