

Environmental Management Plan (EMPr)

KIMBERLEY NURSING COLLEGE AND STUDENT ACCOMMODATION



the dr&pw

Department:
Roads And Public Works
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

HDG

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EMG

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1. DEFINITIONS:

- 1.1. **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 construction area and which are declared to be undesirable.
- 1.2. **Aspect:** Element of an organisation's activities, products or services that can interact with the environment.
- 1.3. **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.
- 1.4. **Built environment:** Physical surroundings created by human activity, e.g. buildings, houses, roads, bridges and harbours.
- 1.5. **Contamination:** Polluting or making something impure.
- 1.6. **Corrective (or remedial) action:** Response required addressing an environmental problem that is in conflict with the requirements of the EMP. The need for corrective action may be determined through monitoring, audits or management review.
- 1.7. **Degradation:** The lowering of the quality of the environment through human activities, e.g. river degradation, soil degradation.
- 1.8. **Ecology:** The scientific study of the relationship between living things (animals, plants and humans) and their environment.
- 1.9. **Ecosystem:** The relationship and interaction between plants, animals and the non-living environment.
- 1.10. **Environment:** environment means the surroundings within which humans exist and that could be made up of -
 - 1.10.1. the land, water and atmosphere of the earth;
 - 1.10.2. micro-organisms, plant and animal life;
 - 1.10.3. any part or combination of (1.10.1) and (1.10.2) and the interrelationships among and between them; and
 - 1.10.4. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.
- 1.11. **Environmental aspect:** an environmental aspect is any component of a contractor's construction activity that is likely to interact with the environment.
- 1.12. **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 construction activity. An impact may be the direct or indirect consequence of a construction activity.
- 1.13. **Environmental Authorisation:** an environmental authorisation is a written statement from the National Department of Forestry, Fisheries and the Environment (DFFE) that records its approval of a planned development.
- 1.14. **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.
- 1.15. **Land use:** The use of land for human activities, e.g. residential, commercial, industrial use.
- 1.16. **Mitigation:** Measures designed to avoid, reduce or remedy adverse impacts

2. INTRODUCTION AND BACKGROUND:

2.1. SCOPE:

Environmental Management Group Consultants (EMG), as independent environmental managers and impact assessors, has been appointed by **Hospital Design Group (HDG)** for the **Northern Cape: Department of Roads and Public Works** to compile and submit an Environmental Management Programme (EMP) under the National Environmental Management Act No 107 of 1998, for the development of the **Kimberley Nursing College and Student Accommodation, Kimberley, Northern Cape Province.**

This document is compiled in accordance with the Integrated Environmental Management (IEM) philosophy which aims to achieve a desirable balance between conservation and development (DEAT, 1992). 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 EMP. 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 as a result 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 opportunity for public and specialist input in the decision-making process.

The Environmental Impact Assessment Regulations that took effect in December 2014 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 PLANNING PHASE, CONSTRUCTION PHASE, and OPERATIONAL PHASE activities with regard to the development of the Nursing College and Student Accommodation.

2.2. SITE SPECIFIC INFORMATION:

The Northern Cape Department of Roads and Public Works are developing the Kimberley Nursing College and Student Accommodation. The Development is situated in the southern parts of the city of Kimberley, Northern Cape Province within the Sol Plaatje local municipality.

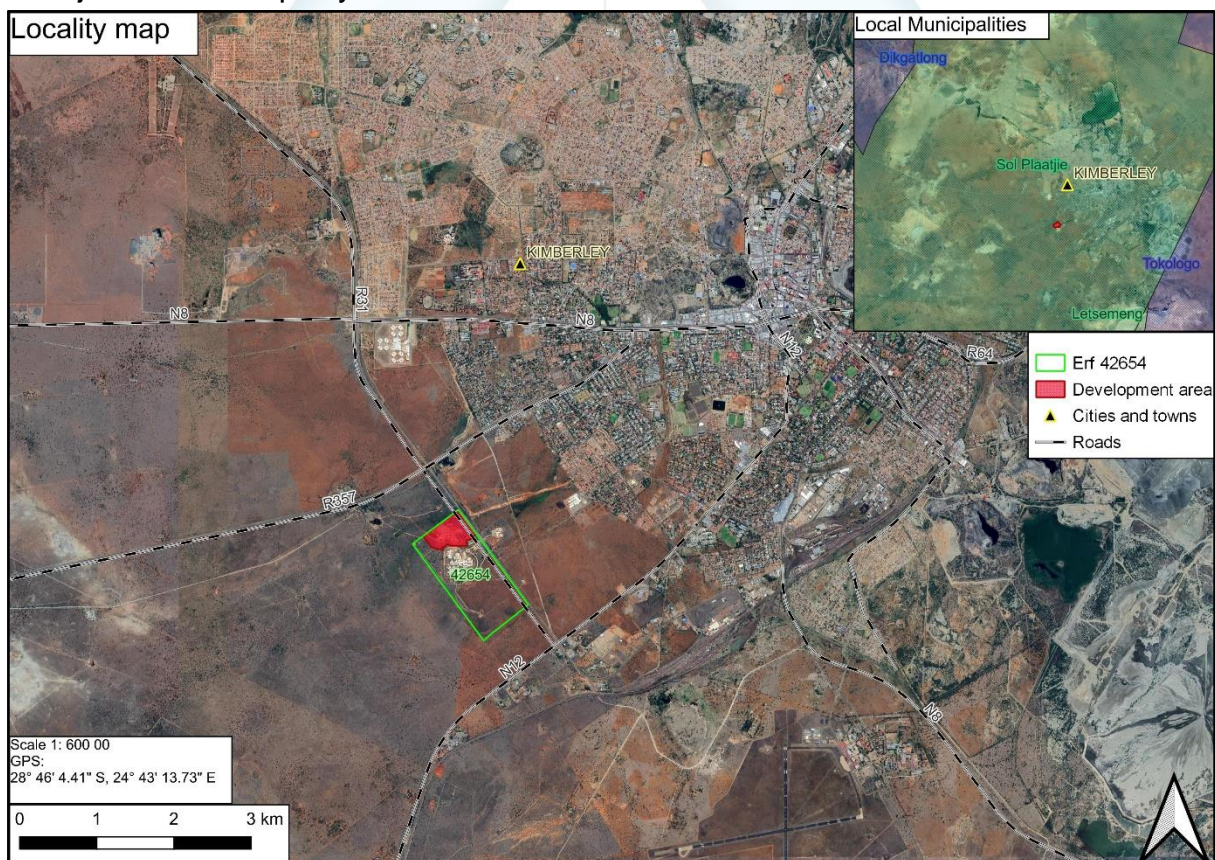


Figure 1 Map indicating the relative location of the proposed Phase 2 development in relationship to the town of Kimberley.

Hospital Design Group (HDG) has requested expertise of a suitable service provider to carry out the necessary assessments, planning and investigations in order to obtain the necessary permits (Environmental Authorisation, WULA, DFFE and FLORA permits) to capacitate the development of the nursing college and student accommodation phase 2.

The nursing college and accommodation will be located on the remainder of Erf Number 42654, situated immediately south of the R31, between the R357 and N12 roads. The student housing construction has begun as part of the original authorisation for the Kimberley mental health hospital (Phase 1).

The topography of the site is described as irregular flats, with a slight northeast to southwest running slope. Across this gentle slope, a 13.4 m, -39.7 m elevation gain and loss is experienced over a 5km stretch. No other topographical features exist on the site.

2.3. INTERPRETATIONS:

The implementation of the EMP is not an additional or “add on” requirement. 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 development to be incorporated in line with:

- 2.3.1. General project specifications; and
- 2.3.2. SANS 1200 A or SANS 1200 AA, as applicable.

3. ROLE PLAYERS AND RESPONSIBILITY MATRIX:

In order for the EMP to be successfully implemented, all the role players involved in the project need to co-operate. For this to happen, role players must clearly understand their roles and responsibilities in the project, must be professional, form respectful and transparent relationships, and maintain open lines of communication.

Table 1: Functions and Responsibilities of Project Team

KEY	FUNCTION	RESPONSIBILITY
P	Proponent	Proponent is ultimately accountable for ensuring compliance to the EMP. The ECO must be contracted by the Proponent (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. The Proponent is further responsible for providing and giving mandate to enable the ECO to perform responsibilities. The developer must ensure that the ECO is integrated as part of the project team.
CE	Consulting Engineer	Contracted by the developer to design and specify the project engineering aspects. Generally, the engineer runs the works contract. The CE may also fulfil the role of Project Manager on the proponent’s behalf (See PM).
PM	Project Manager	The Project Manager has over-all responsibility for managing the project, contractors, and consultants and for ensuring that the environmental management requirements are met. The CE may also act as the PM. All decisions regarding environmental procedures must be approved by the PM. The PM has the authority to stop any decommissioning activity in contravention of the EMP in accordance with an agreed warning procedure.
ER	Engineers Representative	The consulting engineer’s representative on site. Has the power/mandate to issue site instructions and in some instances, variation orders to the contractor, following request by the EO or ECO. The ER oversees site works, liaison with Contractor and ECO.

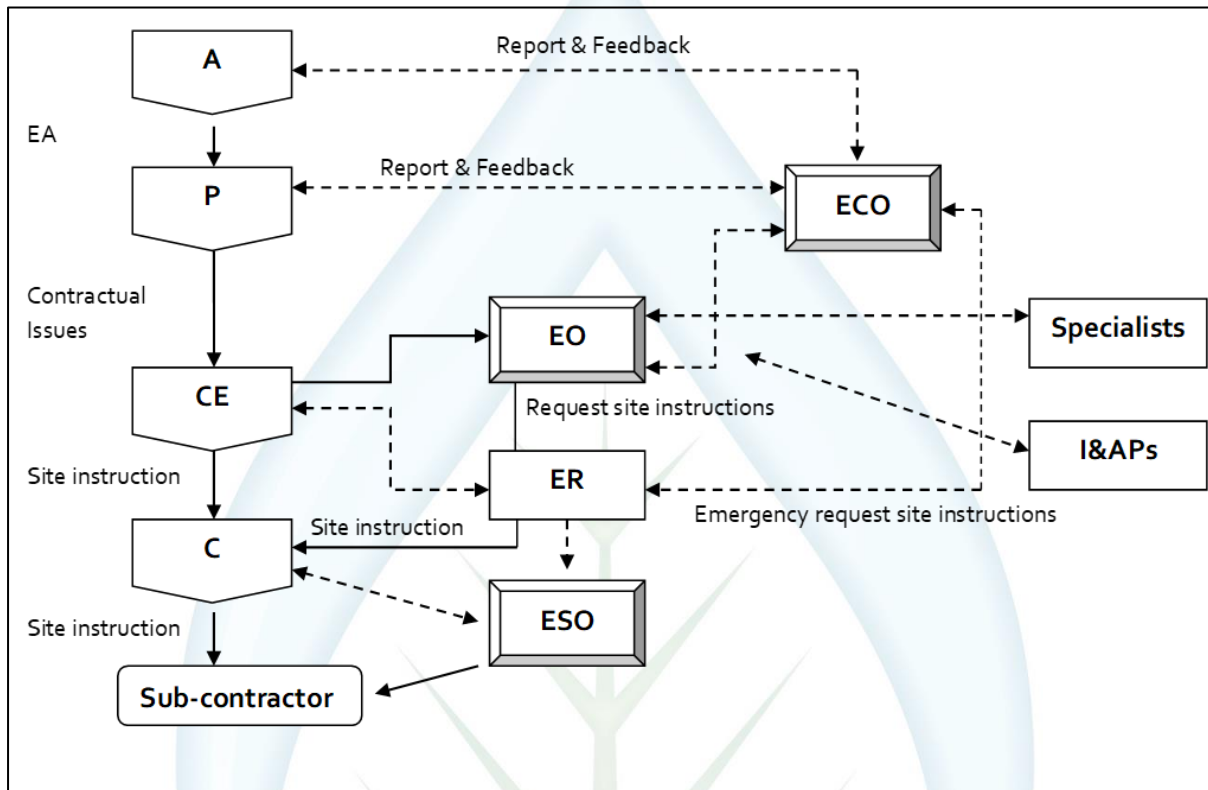
EO/EM	Environmental Officer / Environmental Manager	<p>Appointed by the Consulting Engineers as their environmental representative on site. The EO is not independent but must rather act on behalf of the consulting engineers with the mandate to enforce compliance under the project contract, which must include the EMP. The EO has the directive to issue non-conformance and hazard certificates. Further, in terms of accepted industry practice the EO could issue the equivalent of a “cease works” instruction only in exceptional circumstances where serious environmental harm has been or is about to be caused i.e. in cases of extreme urgency and then only when the ER is absent.</p> <p>The EO must form part of the project team and be involved in all aspects of project planning that can influence environmental conditions on the site. On certain types of projects, such as linear developments (fences, pipelines, etc), the EO must also be the liaison between the contractor and landowners. The EO must attend relevant project meetings, conduct daily inspections to monitor compliance with the EMP, and be responsible for providing reports and feedback on potential environmental problems associated with the development to the project team and ECO.</p> <p>The EO 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.</p> <p>The EO must be suitably experienced with the relevant qualifications and preferably competent in construction related methods and practices.</p>
ECO	Environmental Control Officer	<p>An independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of Environmental Authorisations (EA’s), and the EMP for the project. The ECO must be on site prior to any site establishment and must endeavour to form an integral part of the project team. The ECO must 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. The ECO must 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).The ECO must 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.The ECO must be suitably experienced with the relevant environmental management qualifications and preferably competent in construction related methods and practices.The ECO must 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.</p>

C	Contractor	<p>The principle contractor, hereafter known as the 'Contractor', is responsible for implementation and compliance with the requirements of the EMP and conditions of the EA's, contract and relevant environmental legislation. The Contractor must ensure that all sub-contractors have a copy of and are fully aware of the content and requirements of this EMP.</p> <p>The contractor is required, where specified, to provide Method Statements setting out in detail how the management actions contained in the EMP will be implemented.</p>
ESO	Environmental Site Officer	<p>The ESO is employed by the Contractor as his/her environmental representative to monitor, review and verify compliance with the EMP by the contractor. This is not an independent appointment; rather the ESO must be a respected member of the contractor's management team. Dependent on the size of the development the ESO must be on site one week prior to the commencement of construction. The ESO must ensure that he/she is involved at all phases of the construction (from site clearance to rehabilitation).</p>
A	Lead Authority	<p>The authorities are the relevant environmental department that has issued the Environmental Authorisation. The authorities are responsible for ensuring that the monitoring of the EMP and other authorisation documentation is carried out, this will be achieved by reviewing audit reports submitted by the ECO and conducting regular site visits.</p>
OA	Other Authorities	<p>Other authorities are those that may be involved in the approval process of an EMP. Their involvement may include reviewing EMP's to ensure the accuracy of the information relevant to their specific mandate. Other authorities may be involved in the development, review or implementation of an EMP. For example, if a specific development requires a water use licence for the relevant national authority then that authority should review and comment on the content of the particular section pertaining to that mandate.</p>
EAP	Environmental Assessment Practitioner	<p>The definition of an environmental assessment practitioner in Section 1 of NEMA is "<i>the individual responsible for the planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management plans or any other appropriate environmental instruments introduced through regulations</i>".</p>



EMMG

3.1. RECOMMENDED FORMAL ENVIRONMENTAL COMMUNICATION CHANNELS:



3.2. OBJECTIVES OF THE EMP:

The specific objectives of this EMP are to:

- To provide explicit operational guidelines and environmental monitoring requirements during the construction phases so that activities are done in environmentally responsible and sustainable manner.
- To benefit the host communities, minimise the impacts on the environment and to ensure the health and safety of the community by creating a development that eliminates unacceptable health hazards and ensures public and animal safety.
- To enable Department of Roads and Public Works and its contractors to use resources efficiently and effectively during the project lifecycle in order to reduce wastage and thereby reduce associated negative environmental impacts. In addition, the aim is also to handle waste streams responsibly and apply the 'reduce, re-use and recycle' principle, wherever possible
- To leave areas disturbed by construction in a rehabilitated, stable, non-polluting and tidy condition.
- The EMP should not be regarded as a static document, rather it needs to be updated in response to monitoring findings.

4. ACTIVITIES COVERED BY THE EMP:

4.1. PLANNING STAGE:

The project planning stage consists of layout design surveying and ensuring that all plans and required contracts, permits/ licenses and agreements are set in place.

4.2. CONSTRUCTION PHASE:

The construction phase will start after the relevant authorizations are granted. The construction phase involves earthwork, structure development, service provision and finishing. The construction phase will start after the relevant authorizations are granted. This phase includes:

- Establishment of construction camp and equipment yards;
- transportation of construction material and other resource inputs;
- use of heavy construction equipment on site;
- storage of input materials and disposal of waste generated;
- construction of building structures;
- rehabilitation of the disturbed areas through:
 - demolition/removal of any unwanted construction fences and infrastructure;
 - top-soiling and re-vegetation of areas disturbed by construction.

5. IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS:

The contractor shall identify likely aspects before commencing with any construction activity. Examples of environment aspects include:

- Waste generation
- Storm water discharge
- Chemical use operations
- Energy use operations
- Water use operations
- Use of natural resources
- Noise generation

Thereafter the contractor shall programme his work in such a way that each cause and effect of a construction activity is also identified and the activity planned so as to prevent any impacts from happening. If prevention is not practicable, or in the event of mishap or misapplication, the contractor shall provide plans and measures for the engineer's approval, which will limit and contain the magnitude, duration and intensity of the impact. The contractor shall demonstrate that he is capable of carrying out any repair and reinstatement of the damaged environment. Listed below are some environmental impacts that could adversely alter an aspect of the environment through usual construction activities:

- Pollution of atmosphere, soil or water
- Destruction or removal of fauna and flora and effect on biological diversity
- Deformation of the landscape

- Soil erosion
- Effect on the built environment

6. LEGAL REQUIREMENTS:

6.1. GENERAL:

Construction activities will be according to the best industry practices, as identified in the project documents. This EMP, which forms an integral part of the contract documents, informs the contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by Construction activities associated with the project. The contractor should note that obligations imposed by the EMP 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. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

6.2. STATUTORY AND OTHER APPLICABLE LEGISLATION:

The contractor/ operating team is deemed to have made himself conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract. Throughout all phases of this project, the managing team albeit the contractor, the proponent or the operating team must comply the relevant statutory and legislative requirements of South Africa's environmental law and its subsidiary regulations:

- The **National Environmental Management Act (NEMA) of 1998**: This act provides the overarching framework for environmental management in South Africa and establishes the principles and procedures for environmental decision-making.
- The **National Environmental Management: Air Quality Act (NEMAQA) of 2004**: This act regulates air quality in South Africa and establishes a framework for the management of ambient air quality.
- The **National Environmental Management: Biodiversity Act (NEMBA) of 2004**: This act provides for the conservation and sustainable use of biodiversity in South Africa.
- The **National Environmental Management: Protected Areas Act (NEMPAA) of 2003**: This act provides for the management of protected areas in South Africa, including national parks and nature reserves.
- The **National Water Act (NWA) of 1998**: This act provides for the management and protection of water resources in South Africa.
- The **National Forest Act (NFA) of 1998**: This act provides for the management and protection of forests in South Africa.
- The **National Heritage Resources Act (NHRA) of 1999**: This act provides for the protection of cultural heritage resources in South Africa, including the preservation of historical and archaeological sites.
- The **Minerals and Petroleum Resources Development Act (MPRDA) of 2002**: This act provides for the regulation of the mining and petroleum industries

in South Africa and establishes a framework for the sustainable development of mineral and petroleum resources.

- The **National Environmental Management: Waste Act (NEMWA) of 2008**: This act provides for the management and regulation of waste in South Africa.

6.3. ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS:

6.3.1. APPOINTMENT OF AN ENVIRONMENTAL SITE OFFICER (ESO):

To implement the conditions contained herein, the contractor shall submit to the engineer for approval the appointment of a nominated representative of the contractor as the ESO for the contract. The request shall be given, in writing, at least fourteen days before the start of any work, clearly setting out reasons for the nomination and with sufficient detail to enable the engineer to make a decision. Within seven days of receiving the request, the engineer will approve, reject, or call for more information on the nomination. Once a nominated representative of the contractor has been approved, he/she shall be the ESO and shall be the responsible person for ensuring that the provisions of the EMP are complied with during the life of the contract. The engineer will be responsible for issuing instructions to the contractor where environmental considerations call for action. The ESO shall submit regular written reports to the engineer, but not less frequently than once a month.

The engineer shall have the authority to instruct the contractor to replace the ESO if, in the engineer's opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the EMP or this specification. Such instruction will be in writing and shall clearly set out the reasons why a replacement is required.

6.3.2. ESO ADMINISTRATION:

Before the contractor begins each construction activities the ESO shall give to the engineer a written statement setting out the following:

- The type of construction activity.
- Locality where the activity will take place.
- Identification of the environmental aspects and impacts that might result from the activity.
- Methodology for impact prevention for each activity or aspect.
- Methodology for impact containment for each activity or aspect.
- Emergency/disaster incident and reaction procedures.
- Treatment and continued maintenance of impacted environment.

The contractor may provide such information in advance of any or all construction activities provided that new submissions shall be given to the engineer whenever there is a change or variation to the original.

The engineer may provide comment on the methodology and procedures proposed by the ESO, but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

6.4. COMMUNICATION PROCEDURES ON SITE:

Each of the documents described below must be available in duplicate, with copies for the RE and ESA or alternatively an agreement could be reached to use a single system. These books should be available to the authorities for inspection or on request. Contractor's meeting minutes must reflect environmental queries, agreed actions and dates of eventual compliance. These minutes form part of the official environmental record.

6.4.1. SITE INSTRUCTION ENTRIES:

The Site Instruction Book entries will be used for the recording of general site instructions as they relate to the works on site. It will also be used for the issuing of stop work orders for the purposes of immediately halting any particular activities of the contractor in lieu of the environmental risk that they may pose.

6.4.2. ESA DIARY ENTRIES:

The purpose of these entries will be to record the comments of the ESA as they relate to activities on the site.

6.5. TRAINING:

The designated environmental site officer (ESO) must be conversant with all legislation pertaining to the environment applicable to this contract and must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

The contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. The environmental training should, as a minimum, include the following:

- The importance of conformance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Agency's environmental management systems, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities.

In the case of permanent staff, the contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the contractor shall inform the engineer when and how he intends concluding his environmental training obligations.

7. RECORD KEEPING:

All records related to the implementation of this management plan (e.g. site instruction book, ESA diary, method statements) must be kept together in an office where it is safe and can be retrieved easily. These records should be kept for a minimum of two years and should at any time be available for scrutiny by any relevant authorities.

It is recommended that photographs are taken of the site prior to, during and immediately after construction as a visual reference. These photographs should be stored with other records related to this EMP.

8. ENVIRONMENTAL COMPLIANCE:

8.1. GENERAL:

The contractor shall establish an internal review procedure to monitor the progress and implementation of the Construction EMP. Where necessary, and upon the recommendation of the ECO, procedures that require modification shall be changed to improve the efficiency of the Construction EMP. Any slight changes or adjustments to the Construction EMP shall be discussed with the ECO and documented. Significant modifications to the Construction EMP shall however need to be approved by Dept of Environmental Affairs before the changes or adjustments to the EMP are implemented.

The ECO shall visit and audit the site once a month to ensure that correct operational procedures are being implemented and that the Contractor is complying with the environmental specifications in the Construction EMP. Additional site inspections by the ECO may be needed during the initial and final stages of the project. The ECO shall address any queries to the contractor and the proponent. If the queries cannot be resolved at this level if necessary, the Department of Environmental Affairs shall be involved.

At the conclusion of the project an environmental performance report shall be compiled and submitted to Department of Environmental Affairs. This report shall be compiled by the ECO, in collaboration with the proponent and the project managers. It shall, as a minimum, outline the implementation of the Construction EMP, and highlight any problems and issues that arose during the construction period to report, on a formal basis, and the lessons learned from the project.

8.2. ENVIRONMENTAL FILE:

An environmental file should always be kept on site. This file should be made available on request by any of the relevant parties. The environmental file should contain the following information:

- A copy of the environmental authorisation.
- All environmental induction/ awareness training documents.
- Environmental complaints register/ I&AP register.
- Environmental emergency procedures.
- Records of all environmental incidents.

- Fire prevention and management plan.
- An organogram of contractor's management structure.
- A formal agreement with a toilet service provider.
- The environmental management programme (EMP).
- All monthly ECO reports.
- Records of rehabilitation, preferably with photographs and dates.
- Any other relevant authorisations.

8.3. COMPLIANCE AND PENALTIES:

The contractor shall act immediately when a notice of non-compliance is received, correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register, and the response noted with the date and action taken. This record shall be submitted with the monthly reports and an oral report at the monthly site meetings.

Any non-compliance with the agreed procedures of the EMP is a transgression of the various statutes and laws that define the manner by which the environment is managed; therefore, any avoidable non-compliance, dependant on severity, shall be considered sufficient grounds for contact to be made with relevant provincial or national authorities.

The engineer's decision with regard to what is considered a violation, its seriousness, and the action to be taken against the contractor shall be final. Failure to redress the cause shall be reported to the relevant authority. The responsible provincial or national authorities shall ensure compliance and impose penalties relevant to the transgression as allowed for within its statutory powers.

8.4. REPORT AVAILABILITY:

Copies of this EMP shall be kept at the construction site office and will be accessible to all senior contract personnel. All senior personnel working on the project shall be required to familiarise themselves with the contents of this document.

8.5. ENVIRONMENTAL MITIGATION SPECIFICATIONS FOR IMPACTS:

It's important to note that the recommendations listed below should apply to any phase to which it is relevant.

8.5.1. SOCIAL 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 chosen should maximize the involvement of local communities in construction and support activities, to the extent possible, based on available skill levels. Whenever possible, training programmes that will benefit both construction

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. In order 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 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 construction 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.

8.5.2. FENCING:

- Fencing of the campsite and construction area (if applicable) shall be suitably secured to prohibit access by livestock and local fauna.
- No unauthorised pedestrian or vehicular access shall be allowed into fenced off-limits areas.
- Fencing shall be kept neat at all times. The contractor shall be responsible for the maintenance of all fences.
- If temporary fencing is removed temporarily for the execution of work, the contractor shall reinstate it as soon as practicable.
- Breaches in the fencing must be repaired immediately.
- The purpose of the fenced areas is to control construction and personnel activity within the designated areas, and limit unauthorised access.
- No fences or gates that provide access to the site/construction campsite may be cut, lowered, removed or damaged in any way.
- Leave private gates, as they are found (open or closed). Gates to adjacent properties or onto public roads must be closed at all times.
- Open gates must be guarded to prevent animals from straying onto adjacent camps, roads or properties.

8.5.3. CLEARING AND GRUBBING:

- Contractor shall at all times carefully consider what machinery is appropriate to the task while minimising the extent of environmental damage.

- Topsoil shall be cleared of woody vegetation and specifically exotic vegetation before ripping and removing.
- The topsoil is regarded as the top 300 mm of the soil profile irrespective of the fertility appearance.
- Topsoil is to be stripped when it is in as dry a condition as possible in order to prevent compaction.
- The topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process.
- Soil stockpiles shall not be higher than 2.5 m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1m vertical to 2.5m horizontal.
- No vehicles shall be allowed access onto the stockpiles after they have been placed.
- Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.
- The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This can include the use of erosion control fabric or grass seeding.
- If at any stage of the clearing operations archaeological artefacts are unearthed or identified the relevant organisations are to be contacted immediately to conduct a thorough scientific investigation of the finds.
- The works shall be cleared of alien vegetation as identified by the ESA. An effort must be made to remove the entire root system where after the plant shall be left to dry out on a hard surface that will not facilitate the germination of seed.
- Burning of any material is not permitted under any circumstances.
- All unattended trenches/ excavations should be demarcated.

8.5.4. ESTABLISHING OFFICE / CAMP SITES:

- The area chosen for these purposes shall be the minimum reasonably required and which will involve the least disturbance to vegetation.
- Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a fire-break shall be cleared around the perimeter of the camp and office sites.
- Lighting and noise disturbance or any other form of disturbance that may have an effect on the landowner/tenant/persons lawfully living in the vicinity shall be kept to a minimum.
- 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 must take place in consultation with the landowner/tenant.
- In cases where facilities are linked to existing sewerage structures, all necessary regulatory requirements concerning construction and maintenance should be adhered to. The facilities must comply with water act requirements.

- Adequate signage must be provided and the area must be appropriated secured.
- Adequate parking and security should be provided at the campsites.
- All formal documentation should be kept at the site office, and be made available during monthly audits.

8.5.5. AIR QUALITY:

The main sources of impact on air quality are mobilization of equipment, land clearing and earthworks. To ensure air quality characteristics of the project area are maintained near the baseline conditions during of the construction 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 smoke.
- Periodically watering the bare surfaces and excavations during construction to keep the dust level down.
- Slowing down the vehicles carrying the construction materials to reduce dust generation.
- Properly wrapping the material truck containers with cover to avoid dust spreads on windy days and prohibiting transport of over loaded trucks.
- Providing and using the safety equipment such as dust mask, noise cover for employees who work near the dusty location such as the heavy equipment operators
- Optimization of working schedule and work to help to minimize several material vehicle mobilization trips.

8.5.6. NOISE AND VIBRATIONS:

The primary noise sources will be vehicles and equipment utilized during the construction 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 08:00 AM to 17:00 PM.
- Only well-maintained vehicles and equipment should be operated onsite and all machinery should be serviced regularly during the construction stage.
- Avoiding unnecessary simultaneous noisy activities.
- 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 in order to protect worker's health and safety.

8.5.7. EROSION CONTROL:

Construction 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 to proceed. 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.
- Construction activities shall take place only within the approved demarcated area. Appropriate drainage facilities must be constructed to make sure water runs smoothly downstream.
- Top soil layer will be kept to rehabilitate and will be adequately stored to protect it from erosion.
- Areas where construction has been finished should immediately be rehabilitated up to industry relevant standards.

8.5.8. CONTAMINATION OF LAND:

Land contamination may occur as a result of fuel and oil leaks or spills and/or poor fuel, chemical and waste storage. The following measures are necessary to mitigate/avoid the adverse effects of land contamination:

- The storage areas shall be securely fenced and appropriately marked to indicate the goods in the storage. Material Safety Data Sheets should be kept for all hazardous materials on site.
- All hazardous substances and stocks such as diesel, oils, detergents, etc., shall be stored in areas with impervious flooring such as concrete and properly bunded. Drip pans, other impervious surface, shall be installed in such storage areas with a view to prevent soil and water pollution.
- Dedicated impervious areas should be designated for concrete mixing and the spillage from concrete mixed should be cleaned immediately.
- The waste management strategy on the construction site should be hinged on the waste hierarchy model of '*reduce, reuse and recycle*' waste in order 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.
- Spills should be cleaned up immediately by removing the spillage together with the polluted soil and by disposing of them at a recognised facility.

- Adequate waste receptacles shall be made available and all waste shall be adequately stored so that it does not pose a pollution risk.
- General waste is to be disposed of through the municipal service. Any other waste will be disposed of through only licensed waste disposal facilities.
- Volatile waste items such as plastic bags, cement bags, etc. should be temporarily stored in a suitable manner as to prevent it from being dispersed via wind.

8.5.9. SURFACE WATER QUALITY:

Poor chemical storage and poor waste management practices may lead to the contamination of water sources. 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 have to be instituted:

- Chemical toilets shall be used during the construction stage and a registered service provider shall be contracted to service the toilets regularly. Chemical toilets shall not be placed within 30 meters of the stormwater channel.
- Suitable covered receptacles for waste shall be available at all times 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 and should not take place within 30 meters of the stormwater channel.
- Spills or overflows from chemical or other toilets used by construction staff must be dealt with by a sanitation expert immediately.
- 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.
- A comprehensive stormwater management plan should be implemented.

8.5.10. WATER USAGE:

- Any water that is used which does not emanate from Municipality supplies must be registered and authorised by the Department of Water Affairs prior to usage commencement.
- The contractor shall promote responsible water use by all personnel.
- The contractor is requested to notify the Department of Water Affairs in writing of the proposed commencement of construction and provide the department with a construction programme, prior to any work commencing in proximity of a river or riverbank.
- No construction materials or pollutants, such as cement, shall be allowed to fall/ flow into the stormwater channel.
- No washing of clothes or vehicles will be allowed in the stormwater channel.
- Only environmentally friendly bio-degradable detergents will be allowed in the construction camp.

- Any activity which brings about the run-off of sediments into any watercourse shall be forbidden.
- Any activity which adversely affects aquatic fauna and flora shall be forbidden.

8.5.11. FAUNA AND FLORA:

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

- Clearance of vegetation should be restricted to the absolute minimum required to facilitate access and undertaken construction activities.
- Topsoil shall be removed and kept separate for use during rehabilitation.
- The Contractor shall be responsible for the removal of alien vegetation within areas affected by the construction activities including cleared ground and topsoil stockpiles.
- Equipment used should be regularly washed down to avoid transporting seeds (invasive species) or plant diseases.
- All protected plant species will be demarcated using construction tape or any relevant means as to prevent their damage.
- No **protected or endangered** plant species shall be removed/killed/pruned or damaged in any way without a permit or license (**see Appendix 1**).
- Protected species should be incorporated into the layout and design as far as possible.
- No trees or shrubs will be felled or damaged for the purpose of obtaining firewood.
- The rehabilitation activities require the re-planting of vegetation in any areas cleared for the construction activities. This will promote soil stability, improve the visual environment and provide faunal habitat.
- Hunting/gathering/trapping of wild fauna by construction workers must not be permitted.
- 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.

8.5.12. SAFETY:

- The Contractor shall be responsible for the protection of the public and public property from any dangers associated with the construction and operation of the road 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 the 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 work areas.
- Any damage caused as a result of the construction activities shall be repaired to the satisfaction of the project manager and owner.

8.5.13. HISTORICAL ARCHEOLOGICAL AND HERITAGE IMPACTS:

- Should any cultural or archaeological artefacts be found during operational activities, operations must cease immediately and the area secured and SAPS, and the South African Heritage Resources Agency and other relevant authorities informed immediately.
- No site of archaeological or historical significance may be moved without a permit from the SAHRA. Any permitted removal of any archaeological or historical matter must be done under the strict supervision of a qualified registered archaeologist.

8.5.14. REHABILITATION:

- 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 or ripped to aerate and promote the infiltration of water.
- On completion of operations, the areas shall be cleared of any contaminated soil, which must be dumped as per the waste management plan.
- All infrastructure, equipment, plant, temporary housing and roads and other items used during the construction period will be removed from the site and rehabilitated if necessary.
- 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 construction 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 shall be spread evenly to its original depth over the whole area. The area shall then be fertilised if necessary (based on a soil analysis).
- Exotic species will have to be continually removed to prevent their proliferation.

- The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, there might be need that the soil be analysed and any deleterious effects on the soil arising from the construction operation be corrected and the area be seeded with a seed mix to his or her specification.

8.5.15. HANDLING OF EMERGENCIES:

- The contractor should identify all situations that can lead to emergency situations and provide response strategies. The situations should include fire and major chemical spill.
- Contact details of all departments/service providers to be contacted in case of an emergency shall be made available to employees.
- Equipment for dealing with emergencies such as spill kits, firefighting equipment, first aid boxes etc shall be made available and personnel properly trained in its use.
- All staff on site should be trained on how to handle emergency situations and emergency drills/ rehearsals should be conducted periodically to ensure that staff prepared.
- All emergencies/ incidents should be reported and distributed to the relevant parties.

8.6. METHOD STATEMENTS:

The Contractor shall submit written Method Statements to 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 in order to undertake the works. Work shall not commence until Method Statements have been put in place.

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9. APPENDICES:

9.1. APPENDIX 1: PROTECTED PLANT SPECIES



Figure 3 Camel thorn tree (*Vachellia erioloba*)



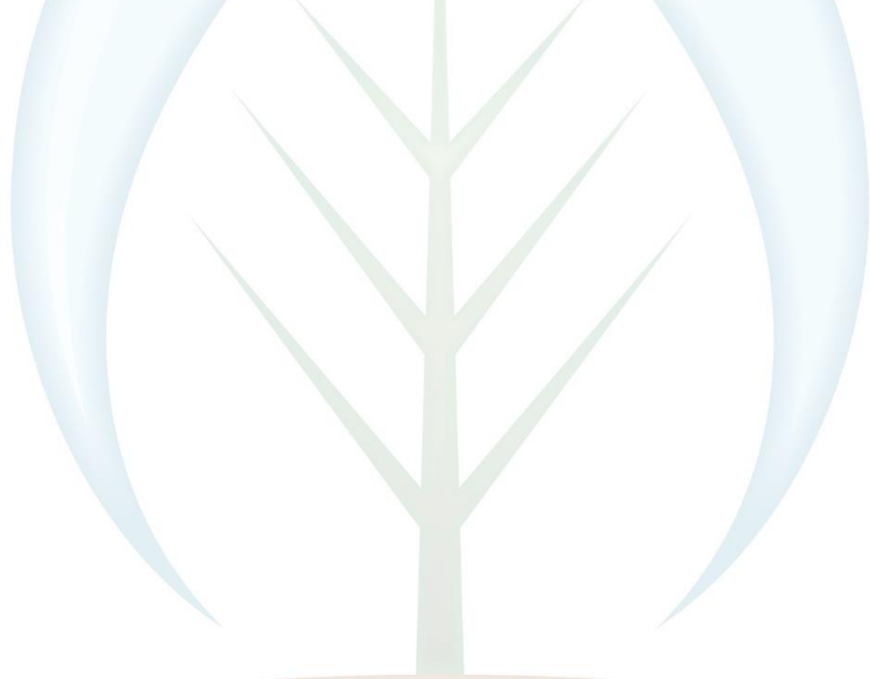
Figure 3 Vleilelie (*Nerine laticoma*)

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9.2. APPENDIX 2: SITE PICTURES



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