

ENVIRONMENTAL MANAGEMENT PROGRAMME (AMEMDED)

FOR

**NC-PROVINCIAL NATURE RESERVE: OORLOGSKLOOF (REFERENCE NUMBER: DEAT
1/2000/1764)**

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ENVIRONMENTAL MANAGEMENT PROGRAMME: OORLOGSKLOOF NATURE RESERVE, NORTHERN CAPE PROVINCE, SOUTH AFRICA.

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List of acronyms used in the EMPr

CITES: Convention of International Trade in Endangered Species
CSIR: Centre for Scientific and Industrial Research
DAFF: Department of Agriculture, Forestry and Fisheries
DEA: Department of Environmental Affairs
DEAT: Department of Water and Environmental Affairs and Tourism (former)
DEO: Designated Environmental Officer
DME: Department of Minerals and Energy
DWEA: Department of Water and Environmental Affairs
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment
EMPr: Environmental Management Programme
EMS: Environmental Management System
I&APs: Interested and Affected Parties
ISO: International Standard Organisation
KPIs: Key Performance Indicators
NGOs: Non-Governmental Organisations
SANParks: South African National Parks
WESSA: Wildlife and Environmental Society of South Africa

Definitions used in this EMPr

The definitions contained within this document are for explanatory purposes only. In the event that any conflict occurs between the definitions herein and those contained within the final Contract, those within the Contract shall prevail.

Alien Species/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.

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

Contaminated Water: means water polluted by contractor's activities like concrete water and run-off from plant/personnel wash areas.

Contract: means the general conditions of contract and special conditions, specifications, drawings, tender, written records of matters agreed after submission of the Contractor's tender, letter of acceptance and agreement, together with other documents which the parties have agreed in writing shall form part of the contract and such amendments or additions to the contract as may be agreed in writing between the parties.

Contractor: refers to the person/company awarded the contract to undertake the proposed work. For the purposes of this EMPr "Contractor" also refer to the person (s) undertaking any of the proposed activities whether awarded a contract or not.

Construction Camp: refers to all storage and stockpile sites, site offices, staff accommodation, container sites, workshops and testing facilities, and other areas requires to undertake construction activities.

Designated Environmental Officer (DEO): is the site-based designated person responsible for implementing the environmental provisions of the Construction Contract and is appointed by the contractor that carries out construction activities. The DEO shall be the designated responsible person, for implementing any remedial measures as required from time to time and for any authorizations/licences that are required in terms of the service contract. The DEO shall record and communicate environmental issues (as they occur) to the Contractor and maintain records thereof. The DEO shall report concurrently to the contractor and the ECO.

Environmental Control Officer (ECO): A suitably qualified and experienced person or entity appointed for the Construction Works, to perform the obligations specified in the environmental authorisation. The ECO's duties shall include, *inter alia*:

- Confirming that all required environmental authorizations and permits, where necessary, have been obtained from the relevant authority(ies);
- Monitoring all activities relating to the project, on a daily basis (or as agreed), for compliance with the provisions of the environmental authorisation, environmental legislation and recommendations of the EMP;
- Conducting annual environmental performance audits in respect of the activities undertaken relating to the project.

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

Environmental Authorisation (formerly known as, Record of Decision): A written statement from the relevant environmental authority, with or without conditions, that records its approval of a planned undertaking to build the accommodation facilities and other associated structures and infrastructure and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.

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.

Environmental Impact Assessment: The process of examining the environmental effects of a proposed development.

Environmental Management System: The internationally accepted and recognized environmental management system (EMS) which enables companies, organizations and operations to systematically manage, prevent and reduce environmental problems and associated costs. In terms of ISO 14001 and EMS is defined as, *“that part of the overall management system includes organizational structure, planning activities, responsibilities, procedures, processes and resources for developing, implementing, reviewing and maintaining the environmental policy.”*

Environmental Policy: A statement by the organisation of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets.

Environment: means the surroundings within which humans exist and that are made up of-

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

Interested and Affected Party: Refers to an interested and affected party contemplated in section 24(4)(d) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and which in terms of that section includes –

- a) Any person, groups of persons, organization interested in or affected by an activity, and;
- b) Any organ of state that may have jurisdiction over any aspect of the activity.

Method Statement: is a written submission that describes the scope of the intended work in a step by step description in order for the Environmental Officer and Engineer to understand the Contractor's intentions. This will enable them to assist in devising any mitigation measures, which would minimize environmental impact during these tasks. For each instance wherein it is requested that the Contractor submit a method statement to the satisfaction of the Engineer and ECO, the format should indicate the following:

What- a brief description of the work to be undertaken;

How- a detailed description of the process of work, methods and materials;

Where- a description/sketch map of the locality of work (if applicable); and

When- the sequencing of actions with due commencement dates and completion dates estimates.

The Contractor must submit the method statement before any particular construction activity is due to start. Work may not commence until the method statement has been approved by both the Engineer and ECO.

An example of a method statement has been included as annexure B

Mitigate: The implementation of practical measures to reduce the adverse impacts, or to enhance beneficial impacts of a particular action.

No-Go Area: Areas where construction activities and construction personnel are prohibited.

Pollution: According to the National Environmental Management Act, No. 107 of 1998, pollution can be defined as, *“Any change in the environment caused by (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future”*

Potential hazardous substance: is a substance that, in the reasonable opinion of the Engineer and/or relevant environmental authority, can have a deleterious effect on the environment.

Project Manager: A person representing the Developer/Implementer on site and who is responsible for the management of all technical and contractual implementation of the works to be undertaken. This is usually the engineer, but may be any other person authorized by the Developer/Project Implementer to fulfill this role.

Rehabilitation: To re-establish or restore to a healthy, sustainable capacity or state.

Species of Special Concern: Those species listed in the Rare, Indeterminate, or Monitoring categories of the South African Red Data Books, and/or species listed in Globally Near Threatened, Nationally Threatened or Nationally Near Threatened categories (Barnes, 1998).

Oorlogskloof Environmental Management Programme (EMPr)

Solid waste: means all waste in a solid form, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste.

Threatened species: Threatened species are defined as: a) species listed in the Endangered or Vulnerable categories in the revised South African Red Data Books or listed in the Globally Threatened category; b) species of special conservation concern (i.e. taxa described since the relevant South African Red Data Books, or whose conservation status has been highlighted subsequent to 1984); c) species which are included in other international lists; or d) species included in Appendix 1 or 2 of the Convention of International Trade in Endangered Species (CITES).

Topsoil: The top 100mm- 500mm of soil and may include top material e.g. vegetation and leaf litter. The depth of topsoil differs from place to place and is distinguished by the dark colour in relation to the pale soil underneath.

1. Introduction

1.1 Environmental Management Programmes

Environmental Management Programmes are intended to be documents which indicate how the mitigation measures proposed for a project can be implemented in practice. As such they should be practical, reasonable and feasible. They should also meet the requirements of the legislation, in particular, regulation 33 of the 2010 EIA Regulations. In reality it is likely that a number of documents will guide construction practices on site. These include:

- This EMPr
- The Environmental specifications included in the tender documentation
- The conditions of the environmental authorization
- The conditions in the water use licenses issued by DAFF and/or their General Authorisations.

While every attempt has been made to integrate the requirements of these documents as far as possible this is sometimes difficult (e.g. authorisations can only be issued if the EIA and this EMPr are considered favourably first) and it is important to ensure that these documents are read in conjunction.

The Bill of Rights – Chapter 2 of the Constitution Act No. 108 of 1996, includes an environmental right (Section 24) according to which, *“everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and the sustainable use of natural resources while promoting justifiable economic and social development”*.

In addition, Section 28 of the National Environmental Management Act No 107 of 1998 (NEMA), requires, *“every person causing significant pollution or degradation of the environment, to take reasonable measures to prevent it from occurring, continuing or recurring”*. Therefore, in order to promote effective environmental management throughout the life-cycle of a project, it is important that management actions arising from Environmental Impact Assessments (EIAs) are clearly defined and translated into an Environmental Management Programme (EMPr) for the design, construction, operation and/or decommissioning phases of a project.

According to the national Department of Water and Environmental Affairs, an Environmental Management Programme (EMPr) can be defined as, *“an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the project are enhanced”*. The purpose of an EMPr is therefore to:

- Encourage good management practices through planning and commitment to environmental issues;
- Define how the management of the environment is reported and performance evaluated;
- Provide rational and practical environmental guidelines to:
 - Minimise the extent of environmental impacts and to manage environmental impacts and where possible, to improve the condition of the environment;
 - Prevent long-term or permanent environmental degradation.
 - Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment;
 - Provide guidance regarding method statements which are required to be implemented to achieve environmental specifications;
 - Define the corrective actions which must be taken in the event of non-compliance with the specifications of the EMPr;
 - Describe all monitoring procedures required to identify impacts on the environment, and;
 - Train employees and contractors with regard to environmental obligations.

EMPr is a very important tool in the sound environmental management of projects, provided that the specifications are implemented and the user understands the contents of the report, and the reasons for the implementation of certain specifications.

There are essentially four broad categories of EMPr: Design EMPr, Construction EMPr, Operational EMPr and Decommissioning EMPr. The objectives of these EMPr is the same and include; identifying the possible environmental impacts of the proposed activity, and developing measures to minimise, mitigate and manage the negative impacts while enhancing the positive ones. The difference between these EMPr is related to the different mitigation measures required for the different stages of the project lifecycle. Each category of EMP is discussed in more detail below.

Design EMPr: The Design EMPr is an integral component of the project life cycle and requires interaction between the design engineers and environmental consultants to ensure that the engineers are aware of the environmental constraints that they must consider and incorporate these into the final design of the project. The format of the design EMPr is that of a checklist in nature, to ensure that all specifications are included in the design phase. The design EMPr requires ongoing and in-depth discussions between the contractors final design team and the environmental

officer. The engineer will have to cost for and be available for ongoing discussions with the environmental officer at all stages of final design.

Construction EMPr: The construction phase EMPr provides specific environmental guidance for the construction phase of a project where impacts range from those incurred during start-up (e.g. site clearing) to construction activities (e.g. erosion). The Construction EMPr consists of both a management system and environmental specifications which contain detailed specifications that need to be undertaken or adhered to by the contractor. Two types of specifications need to be complied with by the contractor namely; standard and specific. Standard specifications apply to all project components and specific specifications outline specific instructions for managing and minimizing environmental impacts resulting from the actual activity. The Construction EMPr needs to be developed in parallel with the Final Design Stages, and constructive input should be invited from the selected contractor. Sound environmental management is orientated around a pragmatic, unambiguous but enforceable set of guidelines and specifications, and for this reason it is imperative that the contractor, while being bound by the EMPr, fully understands it and has had input into its development. Although the contractor tenders on the EMPr that has been approved by the relevant authority, it must also be understood that the EMPr is a dynamic document that is subject to change.

Operational EMPr: The operational phase EMPr provides specific guidance related to operational activities associated with a particular development. Operational EMPr is sometimes referred to as Environmental Management Systems (EMS).

Decommissioning EMPr: As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased. Examples of potential residual impacts and risks include contamination of soil and groundwater and old (unserviceable) structures. Decommissioning phase EMPr is typically encountered within extractive industries such as minerals mining and oil and gas exploration and extraction.

It is widely recognised that there is no standard format for EMPr. The format needs to fit the circumstances in which the EMPr is being developed and the requirements that it is designed to meet (World Bank, 1999; CSIR, 2002; DEAT 2004). Additionally, the level of detail in an EMPr varies depending on the size of the project as well as the magnitude of environmental impacts. Section 1.2 below provides an overview of the information that needs to be included in the EMPr based on current South African legislative requirements.

1.2 Objectives of the EMPr

The EMPr provides the management actions required to avoid and minimize the environmental impacts generated during preconstruction, construction, operational and decommissioning activities for the proposed project, and it also gives recommendations for the rehabilitation of impacted areas. This report should be read in conjunction with the Basic Assessment Report for the proposed project.

1.3 Contents of the EMPr

The contents of the EMPr must be consistent with the requirements as set out in Regulation 33 of the EIA Regulations published as Government Notice No R.544 in Government Gazette No 33306 of 18 June 2010 in terms of Chapter 5 of the National Environmental Management Act No 107 of 1998 (NEMA).

According to Regulation 33, an environmental management Programme must include –

a) Details of –

(i) the person who prepared the environmental management programme; and

(ii) the expertise of that person to prepare an environmental management programme;

b) Information on any proposed management of mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of –

(i) Planning and design;

(ii) Pre-construction and construction activities;

(iii) Operation and undertaking of the activity;

(iv) Rehabilitation of the environment; and

(v) Closure, where relevant.

c) A detailed description of the aspects of the activity that are covered by the environmental management plan;

d) An identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b);

e) Where appropriate, time periods within which the measures contemplated in the environmental management plan must be implemented; and

f) Proposed mechanisms for monitoring compliance with the environmental management plan and reporting thereon.

Provided in the Chapters that follow is an EMPr for the proposed development at the Oorlogskloof Nature Reserve, based on the requirements of Regulation 33 of GNR 543 as detailed above.

Provided below is a very brief description of the proposed Project. Should a more detailed project description be required, the reader should refer the Basic Assessment Report.

2. BACKGROUND INFORMATION

2.1 The Oorlogskloof Nature Reserve Development deliverables:

The National Department of Environmental Affairs, through its Social Responsibility Projects has funded for the development of tourism accommodation facilities within the Oorlogskloof Nature Reserve.

The project involves the upgrading of the camping tents into log cabins that can accommodate a maximum of 15 people at each site. Each camp site will be supplied with water from one of the following alternative sources;

- a. Boreholes
- b. Stream water
- c. Rain water
- d. Fountains

Boreholes are the preferred source of water for the camping sites. However, the topography of the area, the availability of groundwater and its quality, the availability of stream water (temporary/permanent), the feasibility (economic, environmental, etc.) of each source of water as related to the other option will determine the most feasible source of water at each site.

These are the proposed deliverables for the project:

- 10 by 15 sleeper log cabins;
- Upgrade of hiking trails;
- Upgrade of the an access road;
- Construction of pedestrian crossings, low level bridges, culverts and drifts;
- Solar energy installation;
- Water reticulation and sewer reticulation;
- Signage and art;
- Entrance gates;
- Removal of alien species at strategic points.

2.2. Brief overview of the Environmental Assessment Process followed

In accordance with Section 24 of the National Environmental Management Act (NEMA) (Act No 107 of 1998), the proposed Oorlogskloof Nature Reserve was subject to a Basic Environmental Impact Assessment (EIA as an activity with the potential to have a detrimental effect on the environment. The application was lodged under the NEMA; therefore the works must also conform to NEMA, as this Act regulates the management of the environment.

In terms of the EIA process, all reports generated from the environmental studies form part of a series of documents for the project. The revised Basic Assessment Report (IKAMVA Consulting, July 2012) identified potentially significant environmental impacts and is one of the reports in the series. The BAR has investigated potentially significant environmental issues and recommended appropriate mitigation measures.

This EMPr interprets the findings of the BAR, and prescribes project-specific specifications to be achieved. In addition to the requirements of Regulation 33 of GNR 543, this EMPr is based on the principles of Integrated Environmental Management (IEM) and is intended to culminate in the adoption of an Environmental Management System (EMS) based on the ISO 14001 international standards.

3. The Oorlogskloof Nature Reserve Environmental Management Programme.

3.1 Details and Expertise of the Environmental Assessment Practitioner that prepared this EMPr.

3.1.1 Details of the EAP

This EMPr was prepared by Mr. Thulani Gweje and Thozamile Babane of IKAMVA Consulting. In fulfillment of this requirement, provided below are the details of KAMVA Consulting:

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In addition to the above, IKAMVA wishes to point out the expertise of the project team that prepared this EMPr, which includes IKAMVA Consulting as a consulting firm and this team's members.

3.1.2 Expertise of the EAP

IKAMVA Consulting is an experienced Company, which has a sound track record in providing Environmental Management services to individuals, Companies, Municipalities, and other Governmental and non-governmental organizations within the entire province of Eastern Cape and the neighbouring province.

The Company primarily specializes in assessing the impacts of development on the natural, social and economic environments. IKAMVA's core expertise lies in the fields of strategic environmental assessment, environmental management plans, environmental management systems, ecological/environmental water requirements, environmental risk assessment, environmental auditing and monitoring, integrated coastal zone management, social impact assessment and state of environment reporting.

The Corporation is entirely owned by young black entrepreneurs who had participated in student leadership and other leadership positions in the areas of development and environmental management with sole objective of ensuring that there is transference of skills to other organizations for the betterment of our world.

Specific to Environmental Management Consulting, IKAMVA has multi-disciplinary team of consultants. The organization has undertaken major environmental projects for the National Government, Provincial Government and the District Municipalities throughout South Africa. At present, the team is based in our Mthatha Office but operating throughout South Africa.

Provided below are short *curriculum vitae* (CVs) of each of the project team members involved in the preparation of the EMPr for the proposed development at the Oorlogskloof Nature reserve.

Mr. Thulani Gweje is the Environmental Consultant and Researcher for IKAMVA Consulting with four years experience in Environmental Impact Assessments (EIAs), Integrated Waste Management Plans (IWMPs), Environmental Compliance Monitoring and Environmental Awareness Trainings. He has undertaken various Basic Assessments and Full EIAs for projects in the Eastern Cape and KwaZulu Natal Provinces during the past three years.

Mr.Thozamile Babane is an Environmental Officer and Researcher for the Company with more than 5 years of experience in the field of Environmental Management, doing Environmental Impact Assessments, Environmental Compliance Monitoring & Auditing, Vegetation Assessments, Feasibility Studies and Integrated Environmental Waste Management Plans.

3.2 Scope of this EMPr

The purpose of this EMPr is to ensure "good environmental practice" by taking a holistic approach to the management of environmental impacts during the construction and operation of the proposed Oorlogskloof Nature Reserve development. This EMPr therefore sets out the methods by which proper environmental controls are to be implemented by the applicant and his nominated contractor based largely on the mitigation measures recommended in BAR and EMPr . However, where necessary, these methods have been expanded upon and additional issues addressed in order to ensure that all environmental aspects are appropriately considered and monitored. The duration over which the contractor's controls shall be in place cover the construction period of the project as well as the limited time after contract completion defined by the General Conditions of Contract, and the project specifications, as the defects notification period. It is important to note that this EMPr will be focused primarily on the construction and operation phases of the proposed project.

The provisions of this EMPr are binding on the contractor during construction period. They are to be read in conjunction with all the documents that comprise the suite of documents for this contract. In the event that any conflict occurs between the terms of this EMPr and the project specifications or Environmental Authorisation (formerly termed 'Record of Decision') once/if issued, the terms herein shall be subordinate.

This EMPr has been designed to suite the particular activities and needs of the proposed Oorlogskloof Nature Reserve development, and incorporates the following:

- General construction mitigation measures;
- Specific project mitigation measures;
- Input from the Project Team.

The EMP therefore identifies the following:

- Construction activities that will impact on the environment.
- Operation activities that will impact on the environment.
- Specifications with which the contractor shall comply in order to protect the environment from the identified impacts.
- Actions that shall be taken in the event of non-compliance.

It is important to note that the EMPr is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any substantial changes shall be submitted to the Contractor, Resident Engineer/Project Manager, Department of Environment and Nature Conservation and relevant environmental authorities in writing for approval. It must be emphasised that some changes may have budget and timeframe implications.

3.3 Applicable Documentation

The following environmental documentation is applicable to this project, and should therefore be read in conjunction with this EMPr.

- The Basic Assessment Report
- Cognisance of the Environmental Authorisation must be taken once/if it is issued by the Department of Environmental Affairs (DEA). Where necessary, this EMPr must be amended to comply with this Environmental Authorisation, and submitted to DEA for approval.

Other documentation which should be considered includes:-

- All contract documentation applicable.
- All applicable environmental legislation.

4. Environmental Policy

4.1. Environmental Policies and Guidelines

4.1.1. Environmental Policy

The Contractor is required to compile an environmental management policy, which must consider the following:

- The Contractor's mission, vision and core values;
- Guiding principles;
- Requirements of, and communication with interested and affected parties (I&APs);
- The need to work towards continual improvement;
- The obligation to prevent pollution and ecological degradation;
- The importance of coordination with other organisational policies (e.g. quality, occupational health and safety, etc.);
- Reference to specific local and/or regional conditions; and
- A commitment to compliance with relevant environmental laws, regulations, by-laws and other criteria to which the Contractor subscribes.

The policy, once approved by the Applicant, must be communicated to all employees and contractors (and sub-contractors) of the Contractor, and made available to the public, if requested.

4.1.2 Environmental Objectives and Targets

In order to meet the commitments detailed within the environmental policy, as well as those included within the environmental specifications of this EMPr, the Contractor shall develop environmental objectives and targets. The objectives and targets shall conform to, and comply with, the following criteria:

- The objectives and targets shall constitute the overall goals for environmental performance identified in the environmental policy and strategy.
- When establishing objectives and targets, the Contractor shall take into account the identified environmental aspects and associated environmental impacts, as well as the relevant findings from environmental reviews and/audits.
- The targets must be set to achieve objectives within a specified timeframe.
- Targets should be specific and measurable.
- When the objectives and targets are set, the Contractor must establish measurable Key Performance Indicators (KPIs). These KPIs will be used by the Contractor as the basis for an environmental performance evaluation system and can provide information on both the environmental management and the operational systems. Objectives and targets shall apply broadly across the Contractor's operations, as well as to site-specific and individual activities.
- Objectives and targets shall be reviewed from time to time in view of changed operational circumstances and/or changes in environmental legal requirements, and shall also take into consideration the views of Interested and Affected Parties (I&APs).

All objectives and targets must be supplied to the Independent Environmental Consultant or ECO for review and use during audits, as would be prescribed in the conditions of the Environmental Authorisation, when the project is approved.

4.2 Legislative Framework

Construction must be according to the recognized best industry practices and will include measures prescribed in this document. This EMPr, 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 approved 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.

4.2.1 Statutory and Other Applicable Legislation and Standards

The development shall comply with all South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable to the design, construction and implementation phases of the project must be complied with. The list of applicable legislation provided below is intended to serve as a guideline only and is not exhaustive:-

- The Constitution of the Republic of South Africa (Act No. 108 of 1996)
- National Environmental Management Act (Act No. 107 of 1998)
- National Environmental Management: Protected Areas Act (Act No. 31 of 2004)
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
- National Environmental Management: Air Quality Act (Act No. 39 of 2004)
- National Environmental Management: Waste Act (Act No.59 of 2008)
- National Forests Act (Act No. 84 of 1998)
- National Water Act (Act No. 36 of 1998)
- Conservation of Agricultural Resources Act (Act No.43 of 1983)
- National Veld and Forest Fire Act (Act No. 101 of 1998)
- Hazardous Substances Act (Act No. 15 of 1973)
- National Heritage Resources Act (Act No. 25 of 1999)
- Health Act (Act No.61 of 2003)
- Occupational Health and Safety Act (Act No. 85 of 1993)
- Northern Cape Conservation Act (Act No. 9 of 2009)
- White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity
- All relevant provincial legislation, Municipal by-laws and ordinances.

The following permits requirements would be relevant to the proposed project:

- Environmental authorization from DEA for NEMA EIA listed activities associated with the project;
- Permit to be obtained from Department of Forestry in terms of the National Forest Act (Act No. 84 of 1998) if protected trees are to be disturbed on the site;
- Approval from the Department of Water Affairs for river crossings;
- Approval from the South African Heritage Resources Agency (SAHRA) if heritage resources are to be impacted on;

The Contractor shall establish and maintain procedures to keep track of, document and ensure compliance with environmental legislative changes.

5. Administration and Regulation of Environmental Obligations

5.1 Management Structure

The following role players will be responsible for the implementation of the EMPr.

5.1.1 Project Proponent/Applicant

The Northern Cape Department of Environment and Nature Conservation is the applicant and shall therefore be the entity monitoring the implementation of the EMPr and compliance with the authorisation. However, since the Applicant appointed a Project Implementer to implement the project and hence implement the proposed mitigation measures documented in this EMPr on their behalf, then the Project Implementer/Contractor and/or sub- contractor's responsibilities are outlined in Section 5.1.2 that follows.

Ultimately, the liability associated with environmental non-compliance rests with the project proponent.

5.1.2 Contractor

The Contractor shall:

- Be responsible for the finalisation of the EMPr in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein and the relevant requirements contained in the environmental authorisation, if issued by DWEA;
- Be responsible for the overall implementation of the EMPr in accordance with the requirements of the Applicant and the environmental authorisation, if issued by DWEA;
- Ensure that all third parties who carry out all or part of the Contractor's obligations under the Contract comply with the requirements of this EMPr;
- Sign the Pro-Forma: Protection of the Environment (attached as Annexure A).
- Be responsible for obtaining any environmental permits (refer to Section 4.2.1) which are required for the design, construction and operation of the development.
- Ensure that the appointments of the ECO and DEO are subject to the approval of DWEA and the Applicant respectively.

5.1.3 Environmental Control Officer

For the purposes of implementing the conditions contained herein, the Applicant shall appoint an independent Environmental Control Officer (ECO) for the contract. The ECO shall be the responsible person for ensuring that the provisions of the EMP as well as the environmental authorisation are complied with during the construction period. The ECO will be responsible for issuing instructions to the contractor and where environmental considerations call for action to be taken. The ECO shall submit regular written reports to the Applicant, but not less frequently than once a month.

The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMPr and conditions of the environmental authorisation by the Contractor. The ECO's duties in this regard will include, *inter alia*, the following:

- Confirming that all the environmental authorisations and permits required in terms of the applicable legislation have been obtained prior to construction commencing.
- Monitoring and verifying that the EMPr, Environmental Authorisation and Contract are adhered to at all times and taking action if specifications are not followed.
- Monitoring and verifying that environmental impacts are kept to a minimum.
- Reviewing and approving construction method statements with input from the DEO and Project Manager, where necessary, in order to ensure that the environmental specifications contained within this EMPr and environmental authorisation are adhered to.
- Inspecting the site and surrounding areas on a regular basis regarding compliance with the EMPr, Environmental Authorisation and Contract.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel on site.
- Ensuring that activities on site comply with all relevant environmental legislation.
- Ordering the removal of, or issuing spot fines for person/s and/or equipment not complying with the specifications of the EMPr and/or environmental authorisation.
- Undertaking a continual internal review of the EMPr and submitting any changes to the Applicant and/or DWEA (in case of major changes) for review and approval.
- Checking the register of complaints kept on site and maintained by the DEO and ensuring that the correct actions are/were taken in response to these complaints.
- Checking that the required actions are/were undertaken to mitigate the impacts resulting from non-compliance.
- Reporting all incidences of non-compliance to the Applicant.
- Conducting annual environmental performance audits in respect of the activities undertaken relating to the project. The ECO shall also submit compliance audit reports to DWEA, in accordance with the requirements of the environmental authorisation. Such reports shall be reviewed by the Applicant, prior to submission.
- Keeping a photographic record of progress on site from an environmental perspective. This can be conducted in conjunction with the DEO as the DEO will be the person that will be on site at all times and can therefore take photographic records weekly. The ECO would need to check and ensure that the DEO understands the task at hand.
- Recommending additional environmental protection measures, should this be necessary.
- Providing report back on any environmental issues at site meetings.

The ECO must have:

- A good working knowledge of all relevant environmental policies, legislation, guidelines and standards;
- The ability to conduct inspections and audits and to produce thorough, readable and informative reports;
- The ability to manage public communication and complaints;

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- The ability to think holistically about the structure, functioning and performance of environmental systems; and
- Proven competence in the application of the following integrated environmental management tools:
 - Environmental Impact Assessment.
 - Environmental management plans/programmes.
 - Environmental auditing.
 - Mitigation and optimisation of impacts.
 - Monitoring and evaluation of impacts.
 - Environmental Management Systems.

The ECO must be fully conversant with the Environmental Impact Assessment, Environmental Management Programme, Environmental Authorisation and all relevant environmental legislation.

The Applicant shall have the authority to replace the ECO if, in their opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the EMPr or this specification. Such instruction will be in writing and shall clearly set out the reasons why a replacement is required and within what timeframe.

5.1.4 The Project Manager

It refers to the engineer for the development, or any other person authorized by the Developer, to be responsible for the management of all technical and contractual implementation of the works to be undertaken.

The responsibilities of the Project Manager include but are not limited to:

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

5.2 Reporting

5.2.1 Administration

Before the contractor begins each construction activity, the contractor shall give to the ECO and Project Manager a written method statement.

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

The ECO and/or Project Manager may provide comment on the methodology and procedures proposed by the Contractor but he/she 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.

5.2.2 Good Housekeeping

The contractor shall undertake "good housekeeping" practices. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

5.2.3 Record Keeping

The Project Manager and the ECO will continuously monitor the contractor's adherence to the approved impact prevention procedures and the engineer shall issue to the contractor a notice of non-compliance whenever transgressions are observed. The ECO should document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the engineer in the monthly report. These reports shall be made available to DWEA when requested.

The Contractor shall ensure that an electronic filing system identifying all documentation related to the EMPr is established.

A list of reports likely to be generated during all phases of the project is provided below, and all applicable documentation must be included in the environmental filing system catalogue or document retrieval index.

- Final Basic Assessment Report.
- Final design documents and diagrams issued to and by the Contractor.
- All communications detailing changes of design/scope that may have environmental implications.
- Daily, weekly and monthly site monitoring reports.
- Complaints register.
- Medical reports.
- Training manual.
- Training attendance registers.
- Incident and accident reports.
- Emergency preparedness and response plans.
- Copies of all relevant environmental legislation.
- Permits and legal documents, including letters authorising specific personnel of their duties as part of emergency preparedness teams e.g. fire teams, etc.
- Crisis communication manual.
- Disciplinary procedures.
- Monthly site meeting minutes during construction.
- All relevant permits.
- Environmental Authorisation on the EIA from the DWEA.
- All method statements from the Contractor for all phases of the project.

5.2.4 Document Control

The Contractor and Project Manager shall be responsible for establishing a procedure for electronic document control. The document control procedure should comply with the following requirements:

- Documents must be identifiable by organisation, division, function, activity and contact person.
- Every document should identify the personnel and their positions, who drafted and compiled the document, who reviewed and recommended approval, and who finally approved the document for distribution.
- All documents should be dated, provided with a revision number and reference number, filed systematically, and retained for a five year period.

Documents shall be periodically reviewed and revised, where necessary, and that current versions are available at all locations where operations essential to the functioning of the EMPr are performed.

5.3 Environment and Health Training and Awareness

The ECO 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 ECO 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 significant environmental impacts, actual or potential, as a result of their work activities.
- The environmental benefits of improved personal performance.
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures, 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.
- The importance of not littering.
- The need to use water sparingly.
- Details of, and encouragement to, minimise the production of waste and re-use, recover and recycle waste where possible.
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.
- The procedures which should be followed should a grave be encountered, or unearthed during the construction phase.
- Details regarding fauna and flora of special concern, including protected/endangered plant and animal species, and the procedures to be followed should these be encountered during the construction phase.

In addition to the above, the Contractor will in consultation with local HIV/AIDS organizations and government structures ensure that an HIV/AIDS and STD awareness and prevention programme is implemented at the project site at the very minimum. As a minimum requirement, the programme will include appropriate visual awareness material and a readily available supply of prophylactics. Weekly or monthly HIV/AIDS awareness topics will be identified and broadcast to all employees.

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 Project Manager when and how he intends concluding his environmental training obligations.

A training needs analysis shall be conducted by the ECO to identify the appropriate environmental and health training programmes, and the appropriate target groups amongst the employees. The results of the environment and health training needs analysis shall be filed with the environmental records and used to set objectives and targets.

Environment and health awareness training programmes should be targeted at three distinct levels of employment, i.e. the executive, middle management and labour. Environmental awareness training programmes should contain the following information:

- The names, positions and responsibilities of personnel to be trained.
- The framework for appropriate training plans.
- The summarised content of each training course.
- A schedule for the presentation of the training courses.

The Contractor shall ensure that records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMPr (refer to Sections 5.3.3 and 5.3.4 above). The training records shall verify each of the targeted personnel's training experience. The ECO shall monitor the records and listed and undertake regular follow ups.

5.4 Emergency Preparedness

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will cause environmental impacts, throughout the life cycle of the project. Such activities may include, *inter alia*:

- Accidental discharges to water and land.
- Accidental exposure of employees to hazardous substances.
- Accidental veld or forest fires.
- Accidental spillage of hazardous substances.
- Accidental toxic emissions into the air.
- Specific environmental and ecosystem effects from accidental releases or incidents.

These plans should include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel.
- Details of emergency services applicable to the various areas nearby (e.g. the fire department, spill clean-up services, etc.).
- Internal and external communication plans, including prescribed reporting procedures where required by legislation.
- Actions to be taken in the event of different types of emergencies.
- Incident recording, progress reporting and remediation measures required to be implemented.
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.
- Training plans, testing exercises and schedules for effectiveness.

The Contractor shall comply with the emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act, 1993 (Act No 85 of 1993), the National Environmental Management Act, 1998 (Act No 107 of 1998), the National Water Act, 1998 (Act No 36 of 1998) and the National Veld and Forest Fire Act, 1998 (Act No 101 of 1998) as amended and/or any other relevant legislation.

5.5 Checking and Corrective Action

5.5.1 Non-Compliance

Non-compliance with the specifications of the EMPr and/or conditions of the environmental authorisation, both of which will be present on-site at all times, constitutes a breach of Contract for which the Contractor may be liable to pay penalties (see Annexure A). The Contractor is deemed not to have complied with the EMPr if:

- There is evidence of contravention of the EMPr specifications within the boundaries of the construction site, site extensions and haul/access roads;

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- There is contravention of the EMPr specifications which relate to activities outside the boundaries of the construction site.
- Environmental damage ensues due to negligence;
- Construction activities take place outside the defined boundaries of the site; and/or
- The Contractor fails to comply with corrective or other instructions issued by the Engineer and/or ECO within a specific time period.

The contractor shall act immediately when a notice of non-compliance is received and correct whatever was the cause for the issuing of the notice.

Any non-compliance with the agreed procedures of the EMPr 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 reported to the Applicant for further action, prior to contacting the 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.

5.5.2. Monitoring

A monitoring programme will be implemented for the duration of the construction phase of the project. This programme will include:

- Performance Audits: Monthly inspection reports which are performance based compiled by the ECO. This must also incorporate monitoring of compliance issues as well as permits, licenses, the EMPr, Environmental Authorisation, and all contract documentation's conditions. These audits can be conducted randomly and do not require prior arrangement with the project manager.
- Compliance Audits: The ECO will undertake compliance audits every 6 months. Compilation of an audit report with a rating of the compliance with the EMPr and the environmental authorisation. This report will be submitted to the applicant and other relevant authorities as and when required. However, it is important to note that the environmental authorisation will specify the duties of the ECO and the frequency of reporting to DWEA.

The following will also assist with monitoring:-

Complaints Register

The Contractor will ensure that a dedicated Complaints Register is kept on site at all times (see Annexure C). The register will contain the details of the person who made the complaint, the nature of the complaint received, the date on which the complaint was made and the response noted with the date and action taken. The Complaints register will be kept in accordance with the requirements of the ECO. This record shall be submitted with the monthly reports and an oral report given at the monthly site meetings.

Inspections

Ongoing visual inspections will be conducted daily by the ECO. The ECO will spend the bulk of his/her time on site on the lookout for any unsafe acts and activities that transgress the requirements as specified in the EMPr. He/she will then compile the site register and also maintain the complaints register and any other records required in the environmental authorization.

Penalty Fines

Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the EMPr, the Contractor shall be liable to pay a penalty fine. The ECO shall recommend the issuing of penalties for contravention of the EMPr, Environmental Authorisation, Contract, or environmental legislation. This aspect is always controversial and if not clearly addressed and included within the appointment letters or contract documentation at tender stage could cause a conflict.

Note that the following is applicable:

- In terms of the Conventional Penalties Act (1962) a creditor is not entitled to recover both the penalty and damages,
- Accordingly, where a Contractor causes damage, the Applicant can either enforce a penalty or make the Contractor make good the damage, but not both.

Possible transgressions which should be penalized include, but are not limited to the following:

- Hazardous chemical/oil spill
- Damage to sensitive environments
- Removal of trees without the required permit
- Non- use of, non-service of or insufficient toilets

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- Intrusion of workers into 'No Go' areas
- Litter on site associated with construction activities
- Erosion due to negligence/non performance
- Preventable contamination of water sources
- Damage to cultural and historical sites
- Unauthorized removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas
- Uncontrolled/unmanaged erosion
- Violation of environmental authorisation conditions

These activities, along with the appropriate guidelines to determining fines shall be agreed to by the Applicant, the Project Manager and the Contractor.

In addition to penalties, the ECO in consultation with the Project Manager, has the power to remove from site any person who is in contravention of the EMPr, and if necessary, the Project Manager can suspend part of or all of the works, as required.

Internal Audits

Where the monitoring data and the inspections highlight any problems, an internal audit will be initiated by the ECO. The purpose of the audit is to ascertain the source of the problem and to define what action shall be taken to rectify the problem and prevent its reoccurrence.

Incident Reporting and Remedy

If a leakage or spillage of hazardous substances occurs on site, the local emergency services must be immediately notified of the incident (within 24 hours).

Written records must be kept on the corrective and remedial measures decided upon and the progress achieved therewith over time. Such progress reporting is important for monitoring and auditing purposes. The written reports may be used for training purposes in an effort to prevent similar future occurrences. Annexure C provides an example of an environmental incidents register.

Verbal instructions

Verbal instructions are likely to be the most frequently used form of corrective action and are given in response to transgressions that are evident during routine site inspections by the ECO. Verbal instructions are also used to create further awareness amongst employees as often transgressions are a function of ignorance rather than vindictiveness. Workers must obey verbal instructions through formally recording the actions taken to resolve the matter so that the instruction could be successfully finalised and recorded.

Maximum allowable response time: 2 working days.

Written instructions

Written instructions will be given following an audit. The written instructions will indicate the source or sources of the problems identified on site and propose solutions to those problems. The implementation of solutions will be assessed in a follow-up audit and further written instructions issued if required.

Maximum allowable response time: 4 working days.

Public Communication and Liaison with Interested and Affected Parties

The Contractor shall comply with the requirements for public consultation as required by the Constitution Act, 1996 (Act No 108 of 1996) and the National Environmental Management Act, 1998 (Act No 107 of 1998).

During the construction phase of the project, the Contractor shall be responsible for erecting information boards, in the position, quantity, design and dimensions approved by the Engineer.

The information boards shall contain relevant information regarding the construction activity and the relevant contact details to assist persons who wish to submit complaints regarding construction activities.

Information distribution

Copies of the EMPr will be distributed to all senior contract personnel. All senior project personnel on the will be required to familiarize themselves with the contents of the document.

6. ENVIRONMENTAL SPECIFICATIONS: PRE- CONSTRUCTION, CONSTRUCTION AND OPERATION PHASES

This Chapter of the EMPr outlines the environmental specifications which are required to be implemented for the construction and operation phases for all the sites at the Oorlogskloof Nature Reserve. Some of the specifications contained here-in are based on the general environmental specifications detailed in the generic EMPr.

Comprehensive environmental audits are to be undertaken periodically during the construction and operation phases for the project, in order to verify compliance with the measures listed below, the recommendations contained within the EIA Report and all applicable environmental legislation. If compliance with any of these measures cannot be met, it will be the responsibility of the Contractor to motivate for this non-compliance.

Application

The Environmental Specifications comprise clauses that are generally applicable to the undertaking of civil engineering works in areas where it is necessary to impose pro-active controls regarding the extent to which the construction activities impact on the environment.

Method Statements

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

The Project Manager may request a Method Statement for any activity they believe may impact on the environment. The Project Manager in consultation with ECO may also require changes to a Method Statement if the proposal does not comply with the Specification or if, in the reasonable opinion of the Project Manager/ECO, the proposal may result in, or carries a greater than reasonable risk of, damage to the environment in excess of that permitted by the Specifications.

Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. The Contractor shall carry out the works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract.

6.1. PLANNING & DESIGN

Responsible Person (s): Applicant

Timeframes: Before appointment of Contractor

6.1.1. Obtain relevant authorizations

- Ensure Environmental Authorization is obtained and an appeal period has lapsed before construction commences;
- Ensure relevant Water Use Licenses are obtained for all prospective water uses
- Ensure Heritage approval is applied for where required
- Ensure that relevant approvals from other regulatory authorities are obtained if required.

6.2. PRE-CONSTRUCTION

Responsible Person (s): Applicant advised by Project Manager and ECO

Timeframes: Before construction commences

6.2.1. Site Plan

Construction camps, offices, workshops, staff accommodation and testing facilities shall be established in a manner that does not adversely affect the environment.

However, before construction can begin, the contractor shall submit to the Project Manager for his approval a site layout plan detailing plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the contractor proposes to put in place. In particular, this plan must include:-

- Site access (including entry and exit points).
- Access and haulage routes.
- All material and equipment storage areas (including storage areas for hazardous substance such as fuel and chemicals) - Only designated areas may be used for the storage of materials, machinery, equipment, site offices and accommodation facilities.

- Construction offices and other structures (accommodation for staff, where required and considered appropriate). The construction offices should not be placed in close proximity to steep areas. It is recommended that the offices be situated outside the nature reserve (preferably within town), and the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located as far away as possible from any water course (greater than 100m as per the National Environmental Management Act 107 of 1998).
- Areas where construction vehicles will be serviced.
- Security requirements (including temporary and permanent fencing, and lighting) and accommodation areas for security staff.
- Areas where vegetation will be cleared.
- The locality as well as the layout of the temporary waste storage facilities for litter, kitchen refuse, sewage and workshop-derived effluents. Waste storage facilities for sewage, grey water and workshop-derived effluents, where no formal facilities exist.
- Stormwater control measures.
- Provision of potable water and temporary ablution facilities.
- Potential pollution hazards and mechanisms to manage these.
- Intended mitigation measures regardless of the chosen site for approval by the ECO.

The site plan shall be submitted no later than the first site meeting. Detailed, electronic colour photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the Project Manager for consultation during rehabilitation of the site.

Throughout the period of construction, the Contractor shall restrict all activities to within the designated areas on the approved construction layout plan. Any relaxation or modification of the construction layout plan is to be approved by the ECO.

6.2.2. Demarcation of 'No Go' areas

- The following areas shall be clearly demarcated as 'No Go' areas before construction commences:
 - All wetlands at less than 50m from the working areas;
 - All species of special concern likely to be affected by the construction;
 - All heritage sites, including graves and rock art that are close to the construction sites;
 - All rehabilitated areas
 - Any other area declared by the Engineer in conjunction with ECO and/or Applicant.
- No stockpiling or activities may take place within a 'No Go' area.
- Physical demarcation to take place where reasonable and feasible (e.g. demarcation of each wetland would be unreasonable) and where required to guide construction activities. 'No Go' areas to be demarcated with fencing that must be maintained for the duration of the construction phase.
- All staff to be informed of the 'No Go' areas and of the penalties for working within such areas.

6.2.3. Protection of flora

- A search and rescue operation must be carried out to remove plants that need to be relocated and/or kept for replanting. The search and rescue operation must:
 - Take place before any construction occurs;
 - Be in accordance with any permit condition;
 - Be undertaken under the direct supervision of the ECO and Reserve Manager or his/her designated person;

6.2.4. Protection of fauna

- Prior to construction commencing, a search and rescue at all the camp sites must be undertaken. Animals found and rescued must be released unharmed elsewhere within the Nature Reserve.
- Poaching of any description will be strictly prohibited.
- Feeding of wild animals must be strictly prohibited and perpetrators will be prosecuted.

6.2.5. Protection of aquatic ecosystems

Pollution of the water bodies should be avoided at all times. Any person found to be in transgression of this condition will be liable to a fine.

6.2.6. Protection of heritage resources

The rock art and any other heritage resources should be declared 'No Go' areas for the construction personnel unless visited under direct consultation and supervision of the relevant person from the Nature Reserve.

Site specific identification of important heritage areas and graves may be necessary when construction begins. These areas may be demarcated if necessary.

6.3. CONSTRUCTION PHASE

Responsible Person (s): Contractor (overseen by Project Manager and ECO)

Timeframes: From appointment of Contractor to end of defects liability period

6.3.1. Water for Human Consumption

Water for human consumption should be available at the all the working areas. If no potable water source is available on site then drinking water shall be imported to the site. The use of raw water from the existing watercourses is not recommended.

6.3.2. Sewage Management

It is recommended that contractor's camp/office site be situated within or close to the town of Niewoudtville. All effluent water from the camp/office sites shall be disposed of or stored in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans, dams, etc.).

Sanitary arrangements should be to the satisfaction of the ECO, the local authorities and all applicable legal requirements whether the site camp is outside the construction area.

Ablution Facilities

- Existing toilet facilities will be used during construction period. These facilities only need to be refurbished in such that they are safe and clean at all times.
- Performing ablution outside the toilet facilities is strictly prohibited. Use of the veld for this purpose shall not, under any circumstances, be allowed.
- The toilets shall be secured, and provided with all the necessary hygienic products such as soap and toilet paper.
- No chemical toilets are necessary to be imported to the nature reserve.

6.3.3. Vegetation

- The Contractor has a responsibility to inform all staff of the need to be vigilant against any practice that will have a harmful effect on vegetation. This information shall form part of the Environmental Education Programme to be effected by the Contractor.
- The natural vegetation encountered on the site is to be conserved and left as intact as possible.
- Re-vegetation of disturbed areas must be undertaken with site indigenous species and in accordance with the instructions issued by the ECO.
- Only vegetation directly affected by the works and such others as may be indicated by the ECO in writing, may be felled or cleared.
- The ECO must undertake a targeted survey of protected trees to identify any individuals of protected species that may be affected. These must be marked with a red tape.
- A permit must be obtained from the relevant Department (DAFF) prior to the removal or damage of any indigenous tree.
- Sensitive areas adjacent to the sites, including all potential habitats, must be demarcated and no construction activities or impacts must be permitted to occur across these demarcations. Demarcated areas must be fenced off and no personnel or equipment must be permitted to enter these areas.
- The Contractor shall ensure that machinery and vehicles shall not be driven on any area other than the already existing access roads. Areas outside the impact zone are to be designated as sensitive and therefore no access to these areas by construction contractors or equipment will be permitted.
- The ECO must be present to monitor impacts and prevent undue damage.
- The project specification for the rehabilitation of grass cover should be strictly adhered to.
- Any proclaimed weed or alien species that germinates during the contract period shall be cleared by hand before flowering.
- Fires shall only be allowed in facilities or equipment specially constructed for this purpose.
- Ongoing monitoring and maintenance of re-vegetation works should be undertaken following construction phase of the project. Vegetation may only be cleared within demarcated work area and only when it is necessary;
- Re-vegetate exposed areas with a suitable grass seed mix of indigenous species upon completion of construction activities;

6.3.4. Fauna

- Feeding, Trapping, poisoning and/or shooting of animals is strictly forbidden. No domestic pets or livestock are to be permitted inside the nature reserve area. Any animal killed as a result of trapping or hunting or found in the possession of an employee of the Contractor will result in that employee being removed from site for the duration of the Contract and actions taken against that particular person.
- All areas outside the access routes and the working areas are to be treated as 'No Go' zones.
- A relocation plan of action should be established for important fauna species within the defined construction area to be taken in conjunction with the conservation authorities to protect or relocate any animal encountered during project implementation.
- Buffer zones shall be provided around sensitive habitats.
- The ECO will make the Contractor aware of any Ordinances, Acts, by-laws, or regulations pertaining to the protection of fauna on the site. Where applicable, the Contractor will apply for the necessary permits prior to removing any animals listed in the relevant schedules promulgated in terms of any relevant legislation.
- The use of pesticides must be avoided wherever possible. Herbicides will only be used during treatment of existing large alien trees only.

6.3.5. Solid Waste Management

For the purposes of these Environmental Specifications, solid waste includes all debris and waste (e.g. litter, food waste, wire and cable pieces, vegetation and tree stumps, building rubble, etc), including hazardous waste.

The Contractor shall be responsible for the establishment of a waste control system that is acceptable to the Engineer and ECO, and a method statement is required in this regard.

General Waste

- Weatherproof and scavenger proof bins shall be provided at each working area and emptied when full or at least once a week, whichever comes first.
- No waste from construction or otherwise, may be disposed of on site. All waste generated on site, must be removed from the site and disposed of at a licensed waste disposal site.
- Solid waste shall be stored in a designated central area within the project area in covered, tip proof metal drums for later collection and disposal. As far as possible, general waste (including paper, glass, plastics, aluminium, etc.) shall be sorted for recycling.
- No waste shall be burned anywhere else on the site, including at the approved solid waste disposal site.
- No littering by construction workers must be allowed. During the construction period, the facilities shall be maintained in a neat and tidy condition, and the site is to be kept free of litter. Fines shall be implemented for persons found littering.
- Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse.
- General waste shall be disposed of at the registered municipal solid waste disposal site least once a month.

Hazardous waste

- Hazardous waste (contaminated soil, etc.) shall be stored in secondary containers which are properly labelled.
- Safe disposal certificates to be obtained for all hazardous wastes leaving the site.
- If potentially hazardous substances (such as hydrocarbon, oil) are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/ materials to be used, together with the storage, handling and disposal procedures of the materials.
- Hazardous waste shall be disposed of at a DWEA approved hazardous waste landfill site. Special care should be taken to avoid spillage of hazardous waste from entering the ground or contaminating water.
- Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery should be collected in a holding tank and returned to the supplier or oil recycling centre. Water and oil should be separated in an oil trap. Oils collected in this manner, should be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials.
- Hazardous waste shall not be stored or stockpiled in any area other than that designated on the construction site layout.
- Any contaminated soil should be removed and replaced. Bund made of plastic material covered with sand shall be used around hazardous waste storage facility.
- It is recommended that hazardous waste shall be transported to a suitable area outside the nature reserve to a storage area at the end of each working day.

- Hazardous waste shall be transported to a registered hazardous waste disposal site at least once every three months.

6.3.6. Fuel Storage

- Fuel shall be stored in a secure area. A plastic material covered with sand shall be used as bund underneath and around the fuel containers at all times.
- Storage of fuel will be confined to the demarcated secure area(s).
- Fuel tanks shall be located at least 3.5m from any combustible or flammable material.
- Leakage of fuel shall be avoided at all times and if found to occur shall be remedied immediately. Suitable and adequate supplies of absorbents shall be available at all times to control and absorb any spillages.
- Generators and fuel supply needed during construction must be placed on trays, which can rest on clean sand.
- Once construction has been completed, this sand must be removed from the site and disposed of at a registered hazardous waste site.

6.3.7. Clearing of the Site

In all areas where the contractor intends to, or is required to clear the natural vegetation and soil, a plan of action shall first be submitted to the engineer and ECO for approval.

The plan shall contain a photographic record and chainage/land reference of the areas to be disturbed. This shall be submitted to the engineer for records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during subsequent inspections.

The contractor shall be responsible for the re-establishment of grass within construction site boundaries for all areas disturbed during construction. This responsibility shall extend until expiry of the defects liability period.

6.3.8. Soil Management

Topsoil

- Topsoil shall be removed from all areas where physical disturbance of the surface would occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil for later re-use. Topsoil is considered to be the natural soil covering, and to include all organic matter. Depth may vary at each site, and must be determined on a site-specific basis and removed accordingly.
- All topsoil stockpiles shall be maintained throughout the contract period in a weedfree condition. Weeds appearing on the stockpiled topsoil shall be removed by hand. The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water such that damming or erosion is caused, or itself be eroded through the action of water.
- Stockpiles of topsoil shall not exceed a height of 2m.
- Soils contaminated by hazardous substances shall be disposed of at an approved Department of Water and Environmental Affairs (DWEA) hazardous waste disposal site. The Contractor shall ensure that minimal amounts of topsoil are lost due to erosion, either by wind or water. This can be facilitated through the grassing of topsoil stockpiles. Areas to be top-soiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The Contractor's programme shall clearly show the proposed rate of progress of the application of topsoil and re-vegetation. The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the progress plan approved by the ECO. The Contractor's responsibility shall also extend to the clearing of drainage or water systems that may have been affected by such negligence within and beyond the boundaries of the road reserve.

Subsoil

The subsoil is the layer of soil immediately beneath the topsoil. This layer of soil shall be removed to a depth instructed by the Engineer and ECO, and stored separately from the topsoil if not used for construction purposes. During rehabilitation, this subsoil shall be replaced in the excavation in the original order it was removed.

6.3.9. Drainage

The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities.

Before construction happens at each site, the effect on the drainage pattern as a result of this development shall be established.

No water source shall be polluted in any way due to proposed changes.

Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion, direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, and organic materials.

If it is intended to abstract surface water from any water resource for construction purposes, appropriate permits must be obtained from the relevant Regional Director of the Department of Water prior to the commencement of construction.

Bridges (for pedestrians and/or access road) and/or culverts must be constructed in such a way as to minimise impacts on water sources. The Contractor shall employ appropriate methods of installing bridge support structures (e.g. caisson method) to ensure that as little sediment as possible is released into the water column.

Storage containers must be regularly inspected so as to prevent leaks into the aquatic system.

The construction camp and necessary ablution facilities meant for construction workers must be out of the floodplain and well maintained.

Erosion control of all banks must take place so as to reduce erosion and sedimentation into river channels. Culverts shall be constructed and regularly maintained and cleared so as to ensure effective drainage.

Water diversion and erosion control structures shall be put in place. These must be capable of withstanding storm events with a probability of greater than 50% for the time of year during which construction takes place.

Weather forecasts from the South African Weather Bureau of up to three days in advance must be monitored on a daily basis to avoid exposing soil or building works or materials during a storm event and appropriate action must be taken in advance to protect construction works should a storm event be forecasted.

6.3.10. Cement Mixing

- No concrete mixing activities shall occur directly on the ground. Mixing trays shall be used at all mixing and supply point.
- All wastewater and runoff from concrete mixing areas shall be strictly controlled, and cement contaminated water shall be collected, stored and disposed of at a site approved by the ECO.
- Unused cement bags are to be stored so as not to be affected by rain or runoff events. Used bags shall be disposed of in the appropriate manner as approved by the ECO.
- All visible remains of excess concrete shall be physically removed on completion of the plaster or concrete pour section and disposed of. All excess aggregate shall also be removed.

6.3.11. Spillages

- Streams, rivers and dams shall be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, wash water, and organic materials;
- Spills are to be cleared and contaminated material disposed of at an appropriately permitted disposal site;
- Spills greater than 10L or which occur in areas where ground or surface water may be affected are to be reported to the Competent Authority within 24hrs;
- Spill kits should be made available at the working areas at all times;
- Responsibility for spill treatment lies with the contractor. The individual responsible for, or who discovers a hazardous waste spill must report the incident to the ECO or Project Manager;
- The Environmental Control Officer will assess the situation in consultation with the Project Manager and act as required. In all cases, the immediate response shall be to contain the spill.
- Areas of spill shall be rehabilitated according to the ECO's instructions.
- Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the engineer. The costs of containment and rehabilitation shall be for the contractor's account, including the costs of specialist input.

6.3.12. Archaeological Sites

- Heritage objects/features on site should be treated as 'No Go' areas for all the construction personnel. These areas should only be visited under strict supervision of the Reserve Manager or any other designated person. These areas may be demarcated during construction if necessary.
- If a heritage resource (e.g. burial site, archaeological or palaeontological artefact) is discovered during construction the following will apply:
 - Work at the point of the discovery is to cease immediately;
 - The point of discovery is to be clearly demarcated to prevent unauthorized removing or damage to the resource;
 - The South African Heritage Resources Agency (SAHRA) is to be informed immediately or within 24 hours of the discovery;

- Work shall not recommence until such time as guidance from SAHRA has been received.

6.3.13. Noise Control

- Modern low noise emission vehicles and equipment shall be favoured on site. The details of all construction machinery and vehicles must be determined prior to construction in order to identify potentially noisy machinery and to seek possible alternatives.
- Vehicles and machinery shall be fitted with silencers yielding a maximum ambient noise level of 80 dB;
- A well planned and co-ordinated “fast track” procedure is to be implemented to complete the total construction process in any area in the shortest possible time.
- Construction activities will be restricted to normal daytime working hours (07:00 – 17:00). No construction activities will take place during weekday evenings and night-time (after 17:00), on Saturdays after midday (12:00) and the entire day on Sundays.
- All noise-making equipment shall be turned off when not in use.
- All equipment shall be kept in good working order.
- All equipment shall be operated within specifications and capacity (i.e. do not overload machines).
- Compliance with the appropriate legislation with respect to noise is mandatory.
- The project personnel will familiarise themselves with, and adhere to, any local by-laws and regulations regarding the generation of noise.

6.3.14. Dust and Air pollution Control

- Appropriate dust-suppression techniques as approved by the Project Manager and ECO shall be implemented on all exposed surfaces during periods of high wind. Only wet suppression and revegetation of open areas will be allowed to control dust problems.
- Water used for dust suppression must be applied in quantities small enough not to generate run-off and result in soil erosion.
- Mitigation actions such as the reduction of vehicle speed and proper signage shall also be implemented.
- Vegetation cover should be maintained and vegetation cover only removed until such time as soil stripping is required.
- Exposed soil that has the potential for generating dust shall be re-vegetated or stabilised as soon as possible after construction work is completed, or kept damp until re-vegetation occurs.
- Excavation and handling of topsoil shall be avoided during periods of excessive wind.
- Construction vehicles and machinery shall be inspected for excessive emissions. Vehicles are to be maintained in good working order and must be regularly serviced so that emissions are within the permitted standards.
- Construction vehicles shall comply with speed limits of 30km/h.

6.3.15. Control and Management of Alien Vegetation

- Alien plants must be removed as soon as they are detected.
- Removed alien vegetation must be disposed of in a manner approved by the ECO, or should be disposed of in accordance with the appropriate methods developed by the Working for Water Programme, and advice from this organisation shall be obtained.
- Removal of alien vegetation within these areas must be undertaken by hand wherever possible.
- Re-vegetation of disturbed areas must be undertaken with site indigenous species. Translocating stockpiles of topsoil from one place to another shall be avoided in order to avoid translocating soil seed banks of alien species.
- Depending on the variation in soil types on the micro-scale, it shall be important to differentiate different soil characteristics during rehabilitation from the point of view of separating soil types. The correct soil types must be replaced in the areas from which they were originally removed. This is important as it relates to rehabilitated plants which may only grow in specific soil types.

6.3.16. Erosion Control Measures

The following areas should also be regarded as being of high erosion risk:

- Slopes > 20°
- Bare surfaces (either as a result of construction or by natural processes)

The above areas, particularly steep slopes in soft or erodible material, will require appropriate erosion control measures (e.g. use of gabions) and appropriate re-vegetation methods as listed below.

General

- The removal of the natural vegetation cover must be avoided and where this cannot be done, minimised.
- Agricultural drainage methods must be used in fill materials to remove water that could trigger slumping.
- The disturbance of the natural soil structure must be prevented and excavations planned carefully.

No-Go Areas:

- Steep slopes with gradients greater than 28 degrees must be avoided where-ever possible.

Particularly sensitive areas:

- All fill material (as in the case of box culverts) must be very well compacted and innovative use of geo-textile materials in the retention of soil fill areas made.
- Rainwater runoff from disturbed areas must be prevented as far as possible.
- Do not EVER allow stormwater to exit onto unprotected slopes.
- Any disturbed surfaces must be vegetated as soon as possible using local indigenous materials.
- Only local indigenous vegetation shall be used for mulching.

6.3.17. Landscape and Visual

- Reasonable measures should be taken to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.
- Existing tents and ablutions within the sites should be used wherever possible and necessary to avoid visual impacts of temporal structures on site. This can be done in such that the adjacent site is used as a camp site when constructing another site.
- The proposed structures shall be as 'transparent' as possible to 'melt' / integrate into the surrounding landscape.

6.3.18. Community Relations

Information boards shall be erected and maintained in the position, quantity, design and dimensions specified. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the Engineer.

A Complaints Register shall be kept on site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself. Copies of all entries into the complaints register should be kept in the environmental site file.

Employment

Without compromising construction and operation activities and schedules, local labour should be employed as far as possible. Those successful in obtaining employment should be provided with the appropriate skills development and training.

Local Labour Recruitment and Employment Strategy

The project should involve all the communities around the Oorlogskloof Nature Reserve to ensure full participation in the project. The facilitation of employment in the areas should be done in consultation with the Municipality and other development committees in the area.

6.3.19. Access

Access to the construction camp and working areas shall utilize existing roads and tracks only. Entry/exit points onto public roads must take cognizance of traffic safety. Traffic safety measures shall include appropriate signage where relevant.

In addition such vehicles shall be so routed and operated as to minimise disruption to regular users of the routes on site. On gravel or earth roads on site all vehicles shall not exceed a speed of 20km/h.

6.3. 20. Fire control

- No fires are allowed to be lit on site. Any fires that occur shall be reported immediately.
- Smoking shall not be permitted in those areas where it is a fire hazard. "No-smoking" signs shall be visibly placed in areas where there may be fire risk (oil/fuel storage areas, near dry vegetation, etc.). Dedicated smoking areas should be set aside at all the construction sites.
- Penalties should be imposed to those found smoking outside smoking zones;
- Basic fire- fighting equipment shall be readily available on site at all times. This shall include at least rubber beaters and one fire extinguisher of the appropriate type.
- Employees to be made aware of the procedures in the event of a fire.

6.3.21. General Health, Safety and Security

General Health

Oorlogskloof Environmental Management Programme (EMPr)

- Workers should wear appropriate protective clothing at all times;
- Training of staff and workers on Occupational Health and Safety aspects will be mandatory and workers should be refreshed every three months, apart from every day 'Toolbox Talks';
- Ample signage including 'no smoking' zones, safe eating areas will be installed at the working areas.
- Human contact with wild animals will be avoided wherever possible. Only people with the necessary expertise may be allowed to get into contact with wild animals.

Safety

- All construction personnel should always wear protective clothing when entering the working area. Protective clothing should as a minimum include safety boots, gloves, helmet and overalls.
- Protective clothing must be uniform (i.e. workers issued overalls with company name/logo, etc.) so as to distinguish between construction workers and trespassers.
- Construction work must adhere to all requirements of the Occupational Health and Safety Act (Act 56 of 2004).
- The Project Manager shall take all necessary precautions against trespassing on private properties.
- Warning signs must be placed on and around the site as per the Occupational, Health and Safety requirements.
- Basic fire fighting equipment must be available on site.

Security

- Security measures should be put in place to avoid and to minimise vandalism and human-animal conflicts;
- Food should be always kept in locked areas to discourage the animals from visiting the working area;
- Animals should not be fed by any of the staff and general workers.

6.4. OPERATIONAL PHASE

The NEMA EIA Regulations 2010 require that an EMPr is submitted with every Basic Assessment Report to guide project implementation through the construction and operational phases of the project in order to:

- Minimise potential environmental damage during construction and operational phases of the activity ensure that the requirements of the National Environmental Management Act (Act 107 of 1998), with regard to the duty of care and remediation of environmental damage are met ensure that conditions of the Environmental Authorisation are adhered to, if granted.

This section of the EMP outlines the actions required to protect the natural, social and socio-economic environment during operation of the project.

The Environmental specifications contained in this section address the requirements for controlling the environmental impact upon the development site and surrounding environment during operational activities.

Responsible Person(s): Applicant

Contractor during defects liability period (1 year)

Timeframes:

From end of construction to decommissioning/closure

6.4.1. Vegetation

- Regular monitoring for alien invasive plants to be carried out, particularly in areas that have been disturbed by construction activities. Such plants to be removed prior to them setting seeds.
- Alien plant removal and disposal to conform to Working for Water requirements of (former) DWAF.
- Ensure that re-vegetation efforts are monitored during defects liability period and that re-seeding and other corrective measures take place if re-vegetation proves unsuccessful.

6.4.2. Management of aquatic ecosystems

- The water and sewer reticulation systems must be regularly maintained to prevent unnecessary wastage of water and leakage of the contents into the outside environment.
- Water is a scarce resource and water conservation measures must be taken as a continuous practice.

6.4.3. Erosion control

- Erosion control measures must be provided wherever erosion is likely to result as a consequence of the project. Control measures must be implemented at, but are not limited to:
 - Scour outlets (e.g. stone pitching at base of outlet or small reno mattress)
 - All river crossings (gabions to be provided to stabilize soil disturbed by river crossings)
 - Slope areas where soil erosion is likely to happen

- All access roads, visible paths and hiking trails

Note that in all cases, if existing vegetation is left intact then erosion risk is considerably reduced.

- Erosion protection measures installed during construction stage must be monitored during defects liability period for effectiveness.
- Any runnels or erosion channels developed during construction or during defects liability period shall be backfilled and compacted. Stabilization of cleared areas to prevent and control erosion shall be actively managed. Consideration and provision shall be made for various methods, namely, brushcut packing, mulch or chip cover, straw stabilising, watering, soil binders and anti –erosion compounds, mechanical cover or packing structures (e.g. Hessian covers).

6.4.4. Social issues

- Ensure maintenance of the project so as not to create disillusionment amongst the community.
- Make adequate provision for security to reduce the risk of theft and vandalism.

6.4.5. Maintenance

- Establish regular reporting procedures on maintenance.
- Undertake regular inspection and maintenance of all infrastructure to ensure it is working in order and to assess damaged/deficient equipment.

6.4.6. Energy

The provision of solar energy would be undertaken for all the sites at the Nature Reserve. Solar geysers will be provided and residents will be encouraged to save electricity where possible. Electricity saving measures will include:

- Adjust the thermostat setting on the geyser to 60°C;
- Insulate the geyser (geyser blanket) and hot water pipes and then adjust the geyser's thermostat setting to 60°C;
- Shower instead of bathing;
- Fix leaking water tap, pipe or any other water system as soon as possible;
- Don't use the hot water tap for small amounts of cold water;
- Fit a low-flow showerhead in the shower;
- Insulate the ceilings;
- Air-dry laundry outside;
- Switch off the lights in just one room when it is not occupied; and
- Use fluorescent lights in places that require long hours of light such as in the kitchen.

6.4.7. Sewerage

- All sewage will feed into the Specialist Water Treatment Systems that will be installed at each log cabin site;
- Use of the natural surround as ablutions will be forbidden;
- The sewage system and its pipeline should be maintained according to the Supplier's Maintenance Plan.

6.5. REHABILITATION

Responsible person(s): Contractor during construction and defects liability period

Applicant (for rehabilitation after defects liability period)

Timeframes:

From end of construction to beyond decommissioning phase

6.5.1. General rehabilitation

The guiding principle for rehabilitation is to restore the disturbed areas to at least the same (but preferably better) level of ecological functioning as they were before the disturbance.

- All temporary facilities and waste materials must be removed and disposed of in accordance with the Environmental Authorization and EMPr requirements.
- Stockpile topsoil must be replaced and reseeded if necessary.
- The necessary drainage works and anti –erosion measures must be implemented and maintained.
- Disturbed areas must be landscaped (i.e. profiled so that they blend in with the existing topography) and revegetated with appropriate, indigenous vegetation. Sterile vetiver grass may be considered for steep slopes that require stabilization and where the indigenous grass may initially provide sufficient cover to prevent erosion.

- Prior to re-vegetation structures and materials not forming part of the permanent works, including remnants of building materials, concrete foundations, timber and other foreign debris, shall be removed and disposed of via the solid waste management system. The area shall be re-vegetated as follows;
 - The surface shall be leveled by hand as practically as possible.
 - Alien vegetation shall be cleared in accordance with an accepted alien plant removal protocol.
 - Water used for irrigation of re-vegetated areas shall be free of pollutant that will have a detrimental effect on the plants. Watering should be carried out using a fine nozzle spray to avoid erosion and disturbance of vegetation.
- The re-vegetated area shall be declared a 'No Go' area until the vegetation has fully recovered.

6.6. CLOSURE

Responsible person: Applicant

Project Manager during construction and defects liability period

Timeframes: From end of construction period to beyond decommissioning/closure

For shutdown period in case of temporary shutdown

6.6.1. Temporary site closure

- If the site is to be closed for a period exceeding one week (e.g. during Christmas shutdown period), the ECO, in consultation with the Project Manager, shall ensure that the temporary site closure environmental checklist is completed and that the following actions have been taken:

Hazardous material stores

Outlet secure/locked

Bund empty

Fire extinguisher serviced and accessible

Secure area from accidental damage

Emergency and management contact details displayed

Adequate ventilation

Safety

All trenches and manholes are secured

Fencing and barriers in place as per the Occupational Health and Safety Act

Emergency and management contact details displayed

Material stockpile wedged/secured

Erosion

Wind and dust mitigation in place

Slopes and stockpiles at stable angle

Re-vegetated areas water schedules and supply secured

Water contamination and pollution

Cement and material stores secured

Toilets emptied and secured

Refuse bins empty and secured

Structures vulnerable to high winds secured

No stockpiles, equipment or machinery left within 100m of any watercourse.

7.6.2. Permanent Site Closure

Should decommissioning –of all or part of the operations –be required, then the applicant must submit a decommissioning EMPr for the approval of the Environmental Authority prior to such decommissioning taking place.

ANNEXURE A
PROFOMA: PROTECTION OF THE ENVIRONMENT
To be signed by Contractor

Employer:
Contract Number:
Contract Title:

PROTECTION OF THE ENVIRONMENT

The contractor will not be given the right to access the site until this form has been signed.

I.....as Contractor, record as follows:

1. I, the undersigned, do hereby declare that I am aware of the increasing requirement by society that construction activities shall be carried out with due regard to their impact on the environment.
2. In view of this requirement by society and a corresponding requirement by the Employer with regard to this contract, I will, in addition to complying with the letter of the terms of the contract dealing with protection of the environment, also take into consideration the spirit of such requirements and will, in selecting the appropriate employees, plant, materials, and methods of construction, in so far as I have the choice, include the analysis not only the technical and economic (both financial and with regard to time) aspects but also the impact on the environment of the options. In this regard, I recognize and accept the need to abide by the 'precautionary principle' which aims to ensure the protection of the environment by the adoption of the most environmentally friendly construction approach in the face of uncertainty with regard to the environmental implications of construction.
3. I acknowledge and accept the right ofto deduct, should they so wish, from any amounts due to me, such amounts (herein referred to as fines) as the Project Manager and Environmental Control Officer shall certify as being warranted in view of my failure to comply with terms of the Contract dealing with protection of the environment subject to the following:
 - 3.1. The Project Manager and Environmental Control Officer, in determining the amount of such fine, shall take into account, inter alia, the nature of the offence, the seriousness of the impact on the environment, the degree of prior compliance/non-compliance, the extent of the Contractor's overall compliance with environmental protection requirements, and in particular, the extent to which he/she considers it necessary to impose a sanction in order to eliminate/reduce future occurrences.
 - 3.2. The Project Manager shall, with respect to any fine imposed, provide me with a written statement giving details of the offence, the facts on which the Resident Engineer and Environmental Officer has based his assessment and the terms of the Contract (by reference to specific clause) which has been contravened.

SIGNED.....
Contractor

DATE:

**ANNEXURE B
METHOD STATEMENT TEMPLATE**

METHOD STATEMENT

CONTRACT:.....**DATE:**.....

PROPOSED ACTIVITY (Title of Method Statement and Reference Number from the EMPr):

WHAT WORK IS TO BE UNDERTAKEN (A brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date

End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated sketches/plans where possible):

DECLARATIONS

1). ENVIRONMENTAL CONSULTANT

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

.....
(Signed) (print name)

Dated:.....

2). PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the Project Manager will audit my compliance with the contents of this Method Statement:

.....
(signed) (print name)

Dated:.....

3). APPROVING AUTHORITY (i.e. Project Manager)

The works described in this Method Statement are approved.

.....
(signed) (Print name)

Dated:.....

