

**BRAAMHOEK INTERNAL AND EXTERNAL ACCESS ROADS  
PROJECT**

**CONSTRUCTION AND OPERATIONAL PHASE  
ENVIRONMENTAL MANAGEMENT PLAN**

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PREPARED FOR  
Eskom Holdings Limited  
Generation



PREPARED BY  
Africon  
Environment and Sustainability Consulting



**AFRICON**

DRAFT CONSTRUCTION AND OPERATIONAL PHASE ENVIRONMENTAL  
MANAGEMENT PLAN FOR THE PROPOSED CONSTRUCTION AND UPGRADING  
OF INTERNAL AND EXTERNAL ACCESS ROADS FOR THE PROPOSED  
BRAAMHOEK PUMPED STORAGE SCHEME

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I

## TERMS AND DEFINITIONS

**Audit:** Regular inspection and verification of construction activities for implementation of the EMP

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

**Batch plant:** A concrete or plaster mixing facility and associated equipment and materials.

**Contractor:** The principal persons / company undertaking the construction of the roads

**Development site:** Boundary and extent of development works and infrastructure.

**ECO (Environmental Control Officer):** Person retained by Eskom tasked with implementing and controlling the environmental management plan during construction and operation of the road upgrade and construction project.

**Emergency situation** – An incident, which potentially has the ability to significantly impact on the environment, and which, could cause irreparable damage to sensitive environmental features. Typical situations entail amongst others the:-

- Spill of petroleum products and lubricants into the aquatic system;
- Potential damage, erosion and slumping of unstable river embankments or drainage channels;
- Potential event of impeding the continuous flow of water to downstream water users dependant on the flow; and
- Dangerous situation where livestock and small children can be injured by any activity emanating from the construction or rehabilitation of the project implementation.

**Project/Site Manager** - A person who represents Eskom and is responsible for enforcing the technical and contractual requirements of the project.

**Environmental Forum:** A forum or working group to be established by Eskom and the surrounding stakeholders, whose members will represent various stakeholders during the construction and operational phases, and will ensure adherence to the EMP, good corporate and environmental governance by Eskom during the Roads construction project.

## **1 MANAGEMENT PLAN CONTEXT AND INSTITUTIONAL MATTERS**

### **1.1 INTRODUCTION**

This document describes mitigation measures and is partly prescriptive, identifying specific people to undertake specific tasks, in order to ensure that impacts on the environment are minimised during the construction of the proposed roads. The same Environmental Management Plan (EMP) will be applicable on all alignments requiring upgrade or maintenance to ensure similar environmental control on these sites. The responsibility for the implementation of this EMP on site rests with the appointed Contractor, but must be enforced on behalf of Eskom by both the Environmental Control Officer (ECO) and Site Manager

### **1.2 Environmental Control Officer**

The Environmental Control Officer (ECO) is the person responsible for the monitoring of the implementation of the EMP.

This person will be appointed directly by Eskom, and must have adequate knowledge of the principles of Integrated Environmental Management as well as sound environmental legislative knowledge to understand and implement this management plan. The ECO may not be appointed by the Contractor, and should ideally report to Eskom only.

The ECO has the authority to stop works if in his/her opinion there is/may be a serious threat to or impact on the environment caused directly by the construction operations. This authority is to be *limited to emergency situations* (see definitions) where consultation with the Site Manager is not immediately possible. In all such work stoppage situations the ECO is to inform the Site Manager of the reasons for the stoppage within 24 hours.

Upon failure by the Contractor or his employees to show adequate consideration to the environmental aspects of this contract, the ECO may recommend to the Site Manager to have the Contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be granted in the case of such suspensions and all costs will be borne by the Contractor.

### **1.3 Environmental Forum**

Eskom will be responsible for the establishment of an Environmental Forum, which will comprise representatives of stakeholder or stakeholder groups identified either during

the scoping process or once construction has commenced. The following stakeholder groups must be represented:-

- Skeurklip conservancy;
- Farmers associations (Swinburne and Besters);
- Municipalities;
- Landowners;
- Conservation groups (such as Ezemvelo KwaZulu Natal); and
- Community representatives (i.e. van Reenen, Besters etc).

The core function of this forum will be to provide feedback to stakeholders regarding the implementation of the EMP, highlight stakeholder concerns regarding implementation and to address stakeholder concerns. Principally, the findings of external audits will be presented at Forum meetings for discussion and possible areas of improvement may be suggested.

#### **1.4 Environmental Awareness Training for Site Personnel**

All Contractor teams involved in construction work are to be required to undergo some form of environmental induction on their obligations towards environmental controls and methodologies in terms of this EMP, prior to commencing of the works. Environmental inductions may take the form of on site talks and demonstrations by the Contractor and the ECO. Induction report will be signed by the Contractor as well as the Employee undergoing Induction, and records kept for auditing purposes and copies given to the ECO for filing. The education / awareness programme should be aimed at all levels of management and staff within the Contractor's team, and particularly labour drawn from surrounding communities. Refer to the "Do's & Don'ts" summary sheet, included as **Appendix A**.

#### **1.5 Communication Procedures on Site**

Copies of the documents described below must be maintained on site at all times, available to both the Site Manager and ECO, to be provided on request to authorities or stakeholders for inspection. Contractors meeting minutes must reflect environmental queries, agreed actions and dates of eventual compliance. These minutes will form part of the official environmental record.

##### *1.5.1 Site Instruction Entries*

The Site Instruction book entries will be used for the recording of general site instructions as they relate to the works on site and EMP measures. It will also be used for the issuing of stop work orders issued by the ECO for the purposes of immediately

halting any particular activities of the Contractor in lieu of the environmental risk that they may pose.

### 1.5.2 *ECO Diary Entries*

The purpose of these entries will be to record the comments of the ECO as they relate to activities on the site including infringements, possible changes to the EMP or work stop orders.

### 1.5.3 *Method Statements*

Method statements from the Contractor will be required for specific sensitive actions on request of the authorities or ECO. A method statement forms the base line information on which sensitive area work takes place and is thus considered a “live document” in that modifications can be negotiated between the Contractor and ECO if or as required. All method statements will form part of the EMP documentation and are subject to all terms and conditions contained within the EMP main document. A standard method statement sheet included as **Appendix B**.

A method statement describes the scope of the intended work in a step-by-step description in order for the ECO or Site Manager to understand the Contractor’s intentions. This will enable them to assist in devising any mitigation measures, which would minimise environmental impact during these tasks. The method statement should also clearly stipulate mitigation methods of the intended works, against which the contractor’s performance will be measured. For each instance wherein it is requested that the Contractor submit a method statement to the satisfaction of the ECO, the format should clearly indicate the following:-

- **What** - a concise, description of the task/work to be undertaken;
- **How** - a detailed description of the process of work, methods, materials and mitigation strategies;
- **Where** - a description/sketch map of the locality of work (if applicable); and
- **When** - the sequencing of actions with due commencement dates and completion date estimates.

The Contractor must submit the method statement two weeks before any particular construction activity is due to start, especially with respect to impacts on sensitive ecosystems. Work may not commence until the method statement has been accepted by the ECO and clearly communicated to the workforce.



## 1.6 Record Keeping

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

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

## 1.7 Environmental Completion Statement

An Environmental Completion Statement will be prepared by the ECO for submission to the Department of Environmental Affairs and Tourism, FS Department of Tourism, Environment and Economic Affairs and KZN Department of Agriculture and Environmental Affairs indicating completion of the project and compliance with the EMP and conditions. This statement will be prepared after the final audit after the rehabilitation phase.

## 1.8 Institutional Arrangements

The ECO will be responsible for day-to-day monitoring of implementation of the EMP on site. Eskom will commission quarterly or biannual external audits for the duration of the construction period, followed by a final audit after rehabilitation. The external auditor will prepare an audit report for the client and for use on site after each audit. These audit reports will be maintained on site with the ECO diary, and presented at the environmental forum meetings.

## 1.9 Penalties

A system of penalties for offences in terms of this EMP is proposed as a guideline for use on site. The ECO may, after consultation with the Site Manager, adjust these fine values, based on the severity, actual or potential impact and environmental risk involved at the time of the offence.

<b>Minimum fine for minor offences</b>	<b>R 500.00</b>
e.g. littering, failure to use ablutions provided	

<b>Minimum fine applicable to moderate offences</b>	<b>R 1000.00</b>
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e.g. Collection of firewood, small oil spills spilling of oil and any offence in an area declared as an ECO

**Minimum fine applicable to serious offences**

**R 5 000.00**

e.g. Large oil spills, accidental removal or damage of indigenous vegetation, hunting or capturing of wildlife, or any other offence related to the exclusion zones on site

**Fine applicable for damage to significant features**

**R 10 000.00**

e.g. Pollution of water resources

These will be subtracted from payments due to the Contractor by the Site Manager, and will be recorded in the ECO's diary and the Site Instruction book.

## 2 ENVIRONMENTAL MANAGEMENT PLAN

Mitigation of the significant construction and operational environmental impacts are provided below:

### 2.1 Fencing

- Fencing of the campsite and construction area (if applicable) shall be suitably secured to prohibit access by livestock and local fauna.
- Fences will be constructed around Heritage resources to prevent access into such areas during construction.
- No unauthorised pedestrian or vehicular access shall be allowed into fenced, off-limit areas.
- Fencing shall be kept neat at all times. The Contractor shall be responsible for the maintenance of all fences.
- If fencing is removed temporarily for the execution of work, the Contractor shall reinstate it as soon as practicable. Until re-instatement, the contractor shall demarcate the working area by surrounding it with danger-tape marking.
- Breaches in the fencing must be repaired immediately.
- The purpose of the fenced areas is to control construction and personnel activity within the designated areas, and limit unauthorised access.

### 2.2 Clearing and Grubbing

- The Contractor shall at all times carefully consider what machinery is appropriate to the task while minimising the extent of environmental damage.
- Topsoil shall be cleared of woody vegetation, and specifically exotic vegetation, before ripping and removing.
- The topsoil is regarded as the top 300 mm of the soil profile
- Topsoil is to be handled twice only – once during clearing and stockpiling & once during rehabilitation
- The topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process.
- Soil stockpiles shall not be higher than 2.5m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 vertical to 2.5 horizontal.
- No vehicles shall be allowed access onto the stockpiles after they have been placed.
- Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.

- The Contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This can include the use of erosion control fabric or grass seeding.
- If at any stage of the clearing operations archaeological artefacts are unearthed or identified, the South African Heritage Resources Agency (SAHRA) must be contacted immediately to conduct a thorough scientific investigation of the finds.
- All alien vegetation identified along the route alignments will be cleared by the Contractor. An effort must be made to remove the entire root system, and the plant left to dry out on a hard surface to prevent germination of seed.

### 2.3 Site Buildings / Construction Camp

- The planning and design for the Construction Camp must ensure that there is minimal impact on the environment.
- No construction camps will be allowed in sensitive areas such as wetlands, sensitive vegetation types or sensitive landscape units. The Construction Camp will be placed within an existing disturbed area as far as possible.
- The Construction Camp site will be identified by the Contractor in consultation with the ECO, and negotiated by the Site Manager with the relevant land owners.
- All site buildings to be of a container or prefabricated type. No permanent structures will be permitted.
- With the decommissioning of the structures all compacted platforms and slab foundations must be ripped and removed.
- All buildings will be soundly built and will not pose a danger to personnel.
- No fires are allowed outside the Construction Camp. Adequate and well maintained fire fighting equipment - according to the fire hazard strategies - must be maintained on site during the construction period (at least two all purpose 12.5 kg extinguishers).
- Welding, gas cutting or cutting of metal will only be permitted in a protected area inside the Construction Camp.
- The Contractor shall be liable for any costs related to extinguishing fires started by the Contractor's representatives / employees. Additional penalties for infringements (**Section 1.9**) will also be imposed by the ECO or Site Manager.

### 2.4 Initial Earthworks and Platforms

- The construction platform for the Contractor's camp, as well as the platform for the materials storage area must be appropriately planned.
- The Contractor shall take appropriate and active measures to prevent erosion resulting from his own works, operations and activities as well as stormwater control measures to the satisfaction of the ECO or Site Manager. Restoration

costs will be for the contractor's account, should these measures not be reasonably implemented. Aspects normally covered in construction contracts in terms of protection of works are standard and are not to be billed or confused with any details covered under environmental requirements.

- During construction the Contractor shall protect areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible. All such measures must be included within the design and layout phase, and any additional measures which may be required on site will require approval from the ECO or Site Manager.
- Measures can include cut off trenches, straw stabilising, brush packing etc.

## 2.5 Vehicle Parking Area

- All vehicles and plant will be allocated a dedicated parking area in the camp site.
- No storage of plant and vehicles will be allowed outside of the designated area.

## 2.6 Service Area / Wash Bay

- All vehicle and plant shall be well maintained to ensure that there are no oil or fuel leakages.
- The Contractor will provide a dished concrete floor slab to prevent infiltration of hydrocarbon products.
- Drip trays will be utilised during servicing
- Drainage from the service area will be channelled into a sump or oil-skimming tank, where it shall be treated to remove old hydrocarbons.
- Drainage from the wash bay platform will firstly be channelled into the skimming tank before being released by drain to the sedimentation pond.
- Soil contaminated by oil, fuel or chemicals shall be removed and disposed of at a registered Hazardous Waste Disposal Site or rehabilitated *in-situ*.
- The Contractor shall educate workers on the appropriate methods for workshop maintenance and fuel points to prevent fuel and oil being washed out of containment areas.
- Toxins and oil must be recovered from the system at least once a week, and if necessitated more regularly should the ECO require it.
- Toxins and oil recovered must be stored in sealed drums on a covered, bunded area and removed from site either for recycling or disposal at a registered waste Disposal Site.
- All spillage of oil onto concrete surfaces shall be controlled by the use of an accepted absorbent material such as Econosorb or Drizit.
- The servicing of plant and vehicles will only be allowed in the Construction Camp within the demarcated areas.

## 2.7 Separation Tanks

- The Contractor shall provide grease and oil separation tanks (if required) at all areas where oil spillage or collection will occur, i.e. workshops, oil storage, vehicle wash areas and fuel points.
- The Contractor shall provide a method for oil recovery. Recovered oil shall be collected in weather-proof drums for recycling or disposed of at a registered Waste Disposal site. These drums will be stored on site only on a covered, bunded area.
- The Contractor will test effluent discharged from the oil skimming tanks for conformance with relevant effluent standards if requested to do so by the ECO when pollution is suspected.

## 2.8 Aggregate Storage

- Materials will be stored inside the camp area as far as possible.
- Fine aggregate shall be stored on a compacted sub-base platform.
- The Contractor will ensure (and implement steps if required, e.g. bund walls) that no fine aggregate is washed from the storage area onto the rest of the site during high rainfall periods.
- Coarse aggregate will be stored as a minimum on a surface of compacted inert sub-base material.
- An approved borrow pit must be used for construction materials. The ECO will ensure that the necessary Mining Right/Mining Permits from Department of Minerals and Energy is maintained on site during the construction phase.
- Aggregate used shall be stored as compactly as possible so as to minimise the possibility of it spreading across a greater area than necessary and to prevent it from being washed away.

## 2.9 Fuel Storage Areas

- The Contractor shall provide and maintain bund walls around his fuel storage areas within the site with a sump. Such walls shall be of sufficient height to contain a minimum of 110 % of the capacity of his fuel storage facilities.
- This shall apply to storage above the ground. No underground fuel storage will be allowed.
- All drainage from fuel storage areas shall be treated to remove oil and fuel.

## 2.10 Dust Control

- The Contractor is to take appropriate measures to minimise the generation of dust as a result of construction works. Such measures include frequent

spraying during low rainfall periods or by other means approved by the ECO or Site Manager. Dust control by means of water-spraying would be sufficient on these sites.

- Speed limits must be enforced in all areas, including public roads and private property to limit the levels of dust pollution
- Dust must be suppressed on access roads and construction sites during dry periods by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that will not result in the generation of run-off.
- Dust dispersion from construction activities, unsurfaced roads, spoil dumps and other construction locations shall be limited and suppressed to the maximum extent practical.
- Spoil dumps shall be positioned such that they are not vulnerable to wind erosion.
- Spoil and other dust-generating dumps which are left unused for 28 days or longer shall be sprayed with water or chemically inert stabilisers to control dust, and treated with mulch and seeded.
- Untarred roads shall be sprayed with water from a water cart to limit dust generation by construction vehicles. Where spraying of water on roads is not adequate for dust control, environmentally benign binding agents shall be used to limit dust generation by construction vehicles.
- An appropriate freeboard shall be maintained in trucks hauling dirt, sand, soil and other loose material when leaving the road reserve.

## **2.11 Access Roads and Accommodation of Traffic**

- Existing roads will be used as far as possible. No temporary access roads will be permitted, unless negotiated with the ECO or Site Manager and affected land owners.
- Any temporary roads required shall be decommissioned by the Contractor and rehabilitated using stockpiled topsoil.
- Topsoil shall be removed as described under 'Clearing and Grubbing' prior to the construction of the road.
- During construction the Contractor shall protect all areas susceptible to erosion by installing all necessary temporary and permanent drainage works as soon as possible.
- The accommodation of traffic is an important aspect on the roads identified for upgrade / maintenance. Where required, temporary works to facilitate the accommodation of traffic during bridge construction, should be completed first as road closures will be avoided as far as possible.

## 2.12 Sanitation

- Adequate chemical latrines shall be provided for all staff.
- They shall be emptied / serviced on a regular basis to prevent overflowing.
- All latrines provided by the Contractor shall be efficient, sanitary and non-offensive.
- All fees payable to any local authority for removal of night soil (if applicable) shall be paid by the Contractor.
- A minimum of one toilet shall be provided per 20 persons at each working area such as the construction camp.

## 2.13 Temporary Storage of Waste

### 2.13.1.1 Construction Waste

- Temporary storage of construction waste will be limited to within the site, and within areas designated by the ECO.
- The Contractor will be responsible to remove and transport all waste material off site to a registered Waste Disposal Site.

### 2.13.1.2 Domestic Waste

- The Contractor shall dispose of all refuse generated by his staff and Sub-Contractors on a weekly basis at a registered Domestic Waste Disposal Site or *in situ*.
- The Contractor shall on a daily basis do site clean-ups (chicken runs) of litter other than construction spoil, and dispose of it in designated refuse bins provided on site.

## 2.14 Screening

- The process of separating rock material into acceptable grades for backfilling and layer works material will result in noise and dust.
- The Contractor shall suppress dust caused by the screening process.
- The screening process shall be positioned so as not to cause any disturbance to surrounding villages.

## 2.15 Spoil Material

- All suitable materials excavated shall be used in the construction of the works.



- All unsuitable and surplus spoil rock shall be removed from the site to a dumping site or sites, to be negotiated by the Contractor and accepted by the Project/Site Manager where it shall be dumped, spread and levelled, all to the satisfaction of the Project/Site Manager and ECO.
- No dumpsite shall be used without the prior written approval of the Project/Site Manager and the owner of the property.
- No spoil material shall be stockpiled in violation of any legal requirement or to obstruct any watercourse or drainage channel.

## 2.16 Shaping

- The soil surface shall be contoured, and the edges of all cut and fill areas rounded to fit into the natural landscape.
- Topsoil shall be spread in keeping with the natural topographical form of the site and immediate surroundings.

## 2.17 Topsoil Placement

- Topsoil shall be placed to a minimum depth of 150 mm over all areas that have been disturbed by the construction activity.
- Topsoil placement shall follow as soon as construction in an area has closed.
- All compacted areas shall be ripped parallel to the contours to a minimum depth of 300 mm.
- All areas onto which topsoil is to be spread shall be graded to the approximate original landform and shall be ripped prior to placement.
- Topsoil shall be placed in the same area from which it had been stripped. If there is insufficient topsoil available for a particular soil zone, additional topsoil may be brought from other soil zones at the approval of the ECO.
- Where topsoil that has been stripped by the Contractor is insufficient to provide the minimum depth, the Contractor shall obtain suitable substitute material from other accepted sources.
- No vehicles shall be permitted access onto the topsoil after it has been placed.

## 2.18 Revegetation

- Flat and gently sloping areas shall be ripped in lines 300 mm centre to centre and to a depth of at least 300 mm parallel to the contours prior to revegetation.
- Revegetation of disturbed and work areas shall be done with an indigenous grass mix; similar to what is found in the vicinity of the site and approved by the ECO. As a minimum, these could include:-
  - *Eragrostis curvula*;
  - *Cynadon dactylon*;

- *Hyparrhenia hirta*;
- *Digiteria eriantha*; and
- *Indigofera* sp

## 2.19 Storm water Management

- During construction, the Contractor will ensure that erosion control structures - either permanent or temporary - are installed prior to commencement of construction.
- Any erosion channels developing during the construction period or during the operational and maintenance period shall be backfilled and consolidated immediately and the area restored to the proper condition. All erosion damage shall be repaired as soon as possible. Displaced topsoil will be replaced from approved borrow pits.

## 2.20 Traffic and Plant on Site

- Adequate and appropriate traffic warning signage will be placed along the route to be used by the construction vehicles from the camp and the borrow pit to the site.
- Adequate and appropriate traffic warning signage will be placed along the route to warn public of construction work and heavy vehicle traffic.
- Transporters of fine materials must ensure that their operation does not pose a nuisance through the spillage of material or the creation of dust. The Contractor shall remedy, at his own expense, dust generation and spillage where it occurs to an acceptable level along the transport routes. It is recommended that the load haul of all transport vehicles be covered with tarpaulins.
- Deliveries shall be scheduled for off-peak hour traffic time schedules.
- All trucks and vehicles removing spoil from the site shall have the load areas covered by a tarpaulin to prevent rocks and spoil from falling onto the road surfaces, or causing a nuisance to persons in the vicinity.

## 2.21 Personnel

- Working hours should ideally occur only between 06:00 and 18:00 during week days, 07:00 to 14:00 on Saturdays with no work will be permitted on Sundays. Should the Contractor wish to work outside of these timeframes, negotiations must be conducted with the ECO and Site Manager in consultation with the local community.
- Warning signs must be placed on and around the site as per the occupational health and safety requirements.

- Cooking facilities shall be provided for the construction staff within the confines of the construction camp. No trees may be removed for the making of fires and no collection of wood will be allowed. Harvesting of firewood from outside of the construction camp will result in the imposition of penalties (**Section 1.9**).
- Fires will only be permitted in the confines of the construction camp.
- Where there is a potential for a particular fire hazard at any point in the construction works the contractor shall ensure that his employees are properly trained in the use of the appropriate fire fighting equipment and that such equipment is on hand at all times.
- The Contractor shall refrain from harming or clearing trees, timber and shrubs to any extent other than that indicated by the Site Manager for the execution of the contract.
- The Contractor shall take all measures necessary to prevent his staff from hunting, capturing or killing animals and birds during the construction phase.
- The Contractor shall take all necessary precautions against trespassing on adjoining properties and will ensure that all livestock, game or crops are not interfered with.
- The Contractor shall comply with all safety regulations regarding electricity supply and shall take every precaution to ensure the safety of all the people on site.
- The Contractor shall ensure that as far as practical, suitable arrangements are made on the site for the maintenance of health, the prevention and overcoming of outbreaks of disease. Adequate first aid services will be provided by the Contractor at the Construction Camp.
- The Contractor shall be responsible for his own security arrangements and shall comply with any security instructions, which the Site Manager may issue from time to time.
- The Contractor shall ensure that suitable safety regulations and precautions are established and brought to the attention of the personnel. Approved safety helmets and other protective clothing shall be worn where deemed necessary by the Supervisor. Such protective equipment shall be provided by the Contractor to the employees.
- The Contractor shall, at his own cost provide for a constant supply of potable water for human consumption to the Construction Camp and other domestic use on site. The Contractor shall allow for chemical testing of water samples on a monthly basis, or more frequently if pollution is suspected by the ECO.
- The Contractor is responsible for the behaviour and discipline of all personnel while they are present on the site and shall exercise strict supervision over them at all times.

## **2.22 Personnel Education**

- The Contractor shall ensure that his personnel are inducted on the requirements of the EMP. This will be in the form of presentations and demonstrations to be conducted by the contractor's representative on SHE issues and the ECO.
- The Contractor shall ensure that his personnel have a clear understanding of the Health and Occupational Safety aspects of the contract works.
- The Contractor shall ensure that his staff complies with the EMP requirements for best practice as described by this document.

## **2.23 Crossing of the Rivers**

- The Contractor, after consultation with the ECO, will be required to notify the Department of Water Affairs and Forestry in writing of the proposed commencement of construction and provide the department with a construction programme, prior to any work commencing in proximity of the water courses or drainage features.
- Extreme caution shall be taken during construction owing to the high erodability river embankments. The ECO shall assess any preventable damage caused by the Contractor and prescribe rehabilitation measures to be completed at the Contractor's expense.
- No construction materials or pollutants, such as cement, shall be allowed to fall/flow into water features.
- No washing of clothes or vehicles will be allowed in the watercourses.
- A laundry facility will be provided in the construction camp. The effluent from this facility (grey water) will drain into a French drain system to be constructed for this purpose.
- Only environmentally friendly bio-degradable detergents will be allowed in the construction camp.
- Any activity which brings about the run-off of sediments into any natural watercourse shall be forbidden. Penalties for infringement will be imposed on the Contractor, as well as cost of remediation.
- The flow of the river may not be affected during construction and under no circumstances will watercourses be blocked.
- The construction of new roads, such as along the scarp, must be conducted along the watershed, to minimise impact on surface water runoff patterns.

## **2.24 Fauna and Flora**

- Natural vegetation shall be kept in as undisturbed a state as possible. Special attention shall be paid to preserve trees and plant communities such as

wetlands or montage forests associated with fluves in the scarp. Vegetation removals as part of the development requirements – such as along the proposed scarp road – are excluded.

- Indigenous plants or wild animals (including reptiles, amphibians or birds etc.) may not be damaged or harmed.
- All incidents of harm to any animal or natural vegetation (apart from the agreed vegetation areas) must be reported to the ECO, and the necessary penalties imposed (**Section 1.9**).

## **2.25 Embankments**

- No activity shall be allowed which shall, in any way, create unnecessary disturbance of any river embankment due to the extreme sensitivity of these zones.
- Care must be taken to ensure that machinery used does not erode the embankments further. Where embankments along the alignment are severely eroded, the ECO may request the Contractor to install erosion control measures at Eskom's expense.

## **2.26 Site Clean Up and Rehabilitation**

- The Contractor must ensure that all structures, equipment, materials and facilities used or created on site for or during construction activities are removed once the project has been completed.
- The construction site shall be cleared, cleaned and rehabilitated to the satisfaction of the ECO, prior to revegetation.

## **2.27 Quality of discharged water**

The contractor is to ensure that the quality of the water discharged is compliant with the General Authorisations, with respect to the receiving environment.

## **2.28 Monitoring**

### *2.28.1 Monitoring Plan*

This section details what needs to be monitored in terms of this EMP, detailing monitoring frequency and reporting requirements.

#### 2.28.1.1 Monitoring Plan for the Construction Phase

Regular meetings will be held between Site Manager and the ECO. The purposes of the meetings shall be:-

- To establish the suitability of the Contractor's methods and machinery in an effort to lower the risk involved for the environment.
- To discuss possible non-conformance to EMP guidelines or environmental legislation
- To assess the general state of the environment on site and discuss any environmental problems which may have materialised.
- To act as a forum for input into the construction phase by the ECO representative and external environmental auditor.
- To accommodate the local community in the decision-making process regarding social and environmental issues on site.

Monthly reports and non-conformance reports should be compiled by the ECO for study by the external environmental auditor, and presented at the regular Environmental Forum Meetings.

The monthly report should include:-

- Results of all testing performed as per this EMP in the specific month. This testing will be conducted either by an outside Contractor or by the ECO with equipment acquired for the project by the Contractor;
- A description of exceptional conditions on site whether they be meteorological, personnel related, machinery related, or otherwise stipulated;
- A description of any environmental accident or developments which could potentially develop into a non-conformance event by the Contractor; and
- Minutes from the meetings.

Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor and could stand as evidence should legal action be required. A testing sheet with test results included for each infringement indicating the details of the event including position on site, date and time. If possible a photo should also be included in the report. This report will also suggest mitigation measures to correct the non-conformance (if necessary) and contemplate revisions to any of the strategies used in the construction phase, whether they pertain to monitoring or to construction methods used on site.

### 2.28.1.2 Testing Frequencies

Compliance monitoring and testing will be done as per this EMP to monitor EMP implementation and compliance, and corrective action initiated by the ECO or Site Manager if required. The ECO will develop sample sheets for regular monitoring and testing, as well as establish a proper filing system for record keeping purposes.

Testing will be done as per relevant national standards, such as the Department of Water Affairs and Forestry water quality guidelines or Department of Environmental Affairs and Tourism guidelines for nuisance dust fallout. Where no such standards exist, international standards will apply. Testing frequencies for different aspects are listed below:-

- Potable water quality monitoring: every 2 weeks and more often if specific complaints are received from personnel or labourers;
- Air quality monitoring only if specific complaints are received;
- Noise monitoring only when specific complaints are received;
- Surface water quality: first chemical and biological samples are to be taken prior to any construction activity to complete the baseline information and records kept, and thereafter on a quarterly basis to assess impact on the environment;
- Erosion monitoring: weekly with details on position, extent and volume recorded accurately;
- Unstable Slope monitoring: weekly with details on position, extent and volume recorded accurately;
- Potholing of completed sections of road: weekly with details on position, extent and volume recorded accurately; and
- Conditions of culverts (records of culverts damaged or blocked): weekly with details on position, extent and volume recorded accurately.

### 2.29 Operational Phase Guidelines

Regular monitoring along the various roads must be conducted by ECO during the roads operational phase (construction phase of the Braamhoek PSS), to ensure that rehabilitation measures have been successful and to observe whether unstable cut and fill areas need to be stabilised, especially after heavy rains. Eskom has undertaken to complete this regular maintenance during construction.

Eskom must ensure that the appropriate speed limit signage and traffic calming interventions are maintained during the BPSS construction phase to ensure the safety of all road users.

Eskom will be responsible for the maintenance and rehabilitation of stormwater control measures and erosion control structures associated with bridge structures during the BPSS construction phase, to ensure a safe crossing at all times during operation and ensure that erosion control structures are working and that flow within the watercourses is not impeded.

Noise pollution emanating from the road should be mitigated by Eskom where and if required, by constructing earth berms or planting suitable absorbent vegetation along the route.

Stormwater management structures must be maintained and cleaned to minimise erosion that could result in the siltation of aquatic systems. This requires regular inspection of the stormwater drainage system to confirm its functionality and instituting maintenance as and when required to remove any blockages and repair broken pipes.



## **APPENDIX A: DO'S AND DON'TS OF THE EMP**

## BASIC RULES OF CONDUCT

The following list represents the basic Do's and Don'ts towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid.

**NOTE: ALL new site personnel must** attend environmental induction training. Induction reports, which are signed by both the Contractor and Employee to indicate that the induction has been conducted, will be maintained on site. Induction forms for all contractor employees on site will be retained on site by the Contractor.

### **DO:**

- USE THE TOILET FACILITIES PROVIDED – REPORT DIRTY OR FULL FACILITIES
- CLEAR YOUR WORK AREAS OF LITTER AND BUILDING RUBBISH AT THE END OF EACH DAY – use the waste bins provided and ensure that litter will not blow away.
- REPORT ALL FUEL OR OIL SPILLS IMMEDIATELY & STOP THE SPILL CONTINUING.
- DISPOSE OF CIGARETTES AND MATCHES CAREFULLY. (Littering is an offence.)
- CONFINE WORK AND STORAGE OF EQUIPMENT TO WITHIN THE IMMEDIATE WORK AREA.
- USE ALL SAFETY EQUIPMENT AND COMPLY WITH ALL SAFETY PROCEDURES.
- PREVENT CONTAMINATION OR POLLUTION OF STREAMS AND WATER CHANNELS.
- ENSURE A WORKING FIRE EXTINGUISHER IS IMMEDIATELY AT HAND IF ANY "HOT WORK" IS UNDERTAKEN e.g. welding, grinding, gas cutting etc.
- REPORT ANY INJURY OF AN ANIMAL.
- DRIVE ON DESIGNATED ROUTES ONLY.
- PREVENT EXCESSIVE DUST AND NOISE.

### **DO NOT:**

- REMOVE OR DAMAGE VEGETATION WITHOUT DIRECT INSTRUCTION.
- MAKE ANY FIRES.
- INJURE, TRAP, FEED OR HARM ANY ANIMALS – this includes birds, frogs, snakes, lizards etc.
- ENTER ANY FENCED OFF OR MARKED AREA.
- ALLOW CEMENT OR CEMENT BAGS TO BLOW AROUND.
- SPEED OR DRIVE RECKLESSLY
- ALLOW WASTE, LITTER, OILS OR FOREIGN MATERIALS INTO THE STREAM
- SWIM IN THE DAM.
- LITTER OR LEAVE FOOD LAYING AROUND

Notes:

1. Should any animals such as tortoises, chameleons or snakes be encountered then do not harm them. The ECO or Supervisor should be contacted to remove these safely. The harming of any animal will result in penalties for the Contractor.
2. Construction and heavy machine operators must be particularly sensitive to staying within access routes and prevention of unnecessary damage. Dust and noise is also of particular concern. Ensure that vehicles and machinery do not leak fuel or oils. Refuelling, maintenance, servicing or washing must be done within the designated area in the construction camp area only.
3. Alien plant clearing and control work teams must be closely supervised.

## **APPENDIX B: EXAMPLE OF A METHOD STATEMENT SHEET**

## ENVIRONMENTAL METHOD STATEMENT

(If the space provided is insufficient then attach additional sheets)

<b>WHAT:</b>	Subject of M/Statement			
<b>WHO:</b>	Site Foreman/contact person:			
	Submitted to (e.g. ECO):		Approved by:	
	Date Submitted on:		Date Approved:	
<b>WHEN:</b>	Date works start		Date works complete	
	Rehabilitation period:		Programme restrictions (critical path, season restrictions etc.)	
	Split work Phasing:	Item	start date	end date
	Phase 1			
	Phase 2			
	Phase 3			
<b>WHERE</b>	Area of works – submit plan or sketch if appropriate – stockpile, detention ponds, boundaries / restriction of works, special features or mitigation works landscape specials etc:			
<b>HOW:</b>	Route/site layout pegged:	Date available to inspect		Inspection persons required:
	<b>Landscape concerns: (Specify items not covered in EMP. Refer to EMP items if required.)</b>			
	Existing features & services affected (e.g. paths, curbing, irrigation etc.)			
	Trees (protection or removal methods).			
	Special vegetation			
	Reinstatement methods			
	Maintenance			
	Restricted areas			
	Access:			

HOW	General Environmental: (specify items not covered in EMP. Refer to EMP items if required.)
(cont.)	Machinery:
	Earthworks & dust control:
	Concrete works:
	Storm-water control:
	Stockpiles:
	Refuse/rubble:
	Water quality – pumping, source & discharge points, settlement, filtration, duration etc:
	Hydrocarbon control measures:
	I&AP notifications:
	Fire/emergency contingencies:
Special conditions / mitigation measures (e.g. stream crossings, live sewer proximity etc.):	
Comments:	