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PROPOSED DEVELOPMENT OF A HARDENED WATER RESERVOIR AND ASSOCIATED PIPING AT THE KOEBERG NUCLEAR POWER STATION LOCATED ON THE FARM DUYNEFONTYN NO.1552, MELKBOSSTRAND

ENVIRONMENTAL MANAGEMENT PROGRAMME

In terms of the National Environmental Management Act (Act 107 of 1998, NEMA) as amended and the Environmental Impact Assessment Regulations, 2014

April 2017

Prepared for:
Eskom Holdings SOC Ltd.

Prepared by:
Doug Jeffery Environmental Consultants

DJEC Ref: 2015/31

ENVIRONMENTAL ASSESSMENT PRACTITIONER

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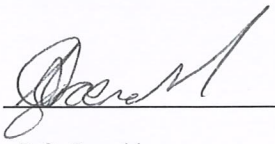
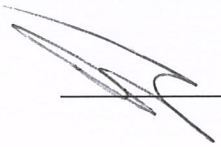
Signature:		**Signature:**	
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PURPOSE OF THIS REPORT

This report is available for public comment and review as part of the Basic Assessment process undertaken in terms of NEMA as amended and the EIA Regulations, 2014.

GENERAL INFORMATION

Applicant:	Eskom Holdings SOC Ltd
Purpose of this report:	This report is for public comment and review as part of the Basic Assessment process undertaken in terms of NEMA as amended and the EIA Regulations, 2014.
Departmental Reference:	To be added.
DJEC Ref:	2015/31

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GLOSSARY

DEFINITIONS &ACRONYMS

Alternatives	Different mechanisms for achieving the general purpose and need of the proposed activity or development. Alternatives may be in terms of location, activity, processes, timing, or "do nothing" (i.e. "no-go" option).
Assessment	The evaluation, judgement, organising, rating, interpreting and communicating information which is relevant.
Biota	The animal and plant life of a particular region, habitat or ecosystem.
Construction activity	Any action taken by the Contractor, his subcontractors, suppliers or personnel in undertaking the construction work, otherwise referred to as "Works"
Construction area(s)	All areas used by the Contractor in order to carry out the required construction activities. This includes all offices, accommodation facilities, testing facilities / laboratories, batching areas, storage & stockpiling areas, workshops, spoiling areas, access roads, traffic accommodation (e.g. bypasses), etc.
Applicant/Employer	The person applying for Environmental Authorisation or carrying out the activity. The person or legal entity that has made application to the competent authority for environmental authorizations and who will have the overall responsibility to adhere to the relevant legislation and comply with the environmental authorization.
Ecosystem	A biological community of interacting organisms (plants and animals) and their physical environment.
Endangered species	A species of plant or animal which has been categorised by the International Union for Conservation of Nature (IUCN) Red Data List as likely to become extinct.
Endemic	A plant or animal species that is native or restricted to a certain area or range.
Environment	The surroundings within which humans exist and that are made up of – • land, water and atmosphere; • micro-organisms, plant and animal life; • any part or combination of the above and the interrelationships among and between them; • the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.
Environmental Authorisation	The permission required from the competent authority for an activity as listed according to the NEMA regulations.
Environmental Impact	Any change to the environment, whether desirable or undesirable, that would result directly or indirectly from any construction activity.
Environmental Management	Ensuring that environmental concerns are included in all stages of development in order to ensure that the proposed activity or development is

	done in a sustainable manner and does not exceed the carrying capacity of the surrounding local environment.
Hazardous material / substances	Any waste that contains organic or inorganic elements or compounds, that may, owing to its inherent physical, chemical or toxicological characteristics, have a detrimental impact on health and the environment.
Indigenous	A “native” species of plant or animal that occurs naturally in a particular place or region, and was not artificially or intentionally introduced.
Invasive Alien Plants	All undesirable vegetation, defined as but not limited to, all declared category 1 and category 2 plants in terms of the National Environmental Management: Biodiversity Act 2014 (Act 10 of 2004), as amended.
Local Authority	Otherwise referred to as the “Council” – the local municipal authority that operates or is responsible in said area.
Rehabilitation	Returning an area impacted by activities/works to its original or better condition prior to the impacts from the activities/works having occurred.
Significant impact	An impact that may, but its magnitude, duration, intensity, or probability, have a notable effect on one or more aspects of the environment.

ABBREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
CEC	Cation Exchange Capacity
DEA&DP	Department of Environmental Affairs and Development Planning
DEA	Department of Environmental Affairs
DW&S	Department of Water & Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ER	Employer's Representative
HWC	Heritage Western Cape
I&AP	Interested and Affected Party
IAP	Invasive Alien Plants (please see definition above)
LUPO	Land Use Planning Ordinance
MS	Method Statement
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act (Act No. 107 of 1998) as amended
NEM:WA	National Environmental Management Waste Act (Act No. 59 of 2008), as amended
NHRA	National Heritage Resources Act (Act No. 25 of 1998)
NWA	National Water Act (Act 36 of 1998), as amended
PPC&E	Personal Protective Clothing and Equipment
SDF	Spatial Development Framework
SLM	Stellenbosch Local Municipality
RDB	Red Data Book
WUL	Water Use Licence - in terms of the National Water Act 1998 (Act 36 of 1998)

ENVIRONMENTAL MANAGEMENT PROGRAMME DOCUMENT INFORMATION

This document is submitted in partial fulfilment of the required Environmental Assessment Process being undertaken to obtain an Environmental Authorisation issued by the Department of Environmental Affairs.

Environmental Authorisation is required to be obtained from the competent authority for activities as detailed and specified under the National Environmental Management Act, 1998 (Act 107 of 1998), as amended, Government Notices R983, R984 and R985.

NEMA is a National Act, which is enforced by the Department of Environmental Affairs (DEA), who is also the Competent Authority.

Should DEA issue a favourable Environmental Authorisation (EA) for the proposed activities and accepts the Environmental Management Programme (EMPr) as part of the process; this will confer a legal obligation to comply with the specifications of the EMPr on the Applicant. This EMPr includes all relevant documentation contained or referred to within it, along with any amendments or annexures to this document. The Department of Environmental Affairs (DEA) must approve any changes to the EMPr.

It is then the responsibility of the Applicant to undertake the following:

- Ensure that all requirements of the EMPr are met for the duration of the construction works and during the operational phase of the development. The Applicant or holder of the EA always has the ultimate responsibility to ensure compliance in South African law.
- Appoint an Environmental Control Officer (ECO) to monitor the implementation of the construction phase of the EMPr, where required to do so by DEA. Appoint and ECO to monitor any other aspects covered in this document or its annexures that expressly calls for an ECO to be involved.
- Bind any and all contractors undertaking work on these sites, to the specifications in this same Environmental Management Programme, as well as annexures and any amendments thereto.

The above being noted, the EMPr document in principal is intended to be a living/organic document with some flexibility. This having been said any significant changes or updates must undergo the prescribed amendment application process. It must be noted that this process will involve an administration fee from DEA and may also require a public participation process if deemed necessary by the DEA.

This EMPr comprises of three main sections and annexures:

Section 1 – General Information & Background

This section provides the relevant background to the project. This insures that an overall understanding of the site and the activities required is achieved for all relevant parties.

Section 2 – Construction Phase EMPr

This section addresses all issues relating to the physical construction, preparation for construction, monitoring during construction, decommissioning of non-permanent items on the site as well as the landscaping and rehabilitation directly after construction is completed. This section will have most relevance to any appointed contractors.

Section 3 – Operational Phase EMPr

This section details the environmental requirements for the project/activity in the long term, listing the management guidelines to be used during the operational or functional phase.

Annexures

The annexures attached to this EMPr are referred to in the Sections 1, 2 and 3 of this document. All three sections must be read in conjunction with the Annexures.

Although section 2 and 3 are implemented at different stages of the project the sections of this EMPr cannot be read in isolation to one another. The document and its annexures must therefore be distributed and viewed as a whole.

At the time of drafting this EMPr some document that are intended by the author to become part of the EMPr may not have as yet been available and therefore blank annexure pages have been left open with the intention that as soon as the required documents are available these will be inserted into the EMPr without the need to amend the entire EMPr itself.

SECTION 1

GENERAL PROJECT BACKGROUND INFORMATION

1.1. GENERAL BACKGROUND

The Applicant, Eskom Holdings SOC Limited, proposes to develop a hardened water reservoir split between two tanks with associated piping, here after referred to as the Hardened Water Supply, at the Koeberg Nuclear Power Station (KNPS) located on the Farm Duynefontyn No.1552, Melkbosstrand.

The purpose of the proposed hardened water supply is to ensure that there is adequate water inventory at the KNPS to provide core cooling and spent fuel pool make-up, to cope with an extended beyond design basis Loss of Ultimate Heatsink and/or Station Black-out, which could be precipitated by an extreme seismic and/or flooding event(s).

1.2. SITE INFORMATION & DESCRIPTION

1.2.1. SITE LOCATION

The proposed development site is situated on the Farm Duynefontyn No. 1552, Melkbosstrand at the KNPS site.

The coordinates for the site are: 33°40’21.33’’S; 18°25’51.60’’E

KNPS is located on a sandy coastline of the West Coast, approximately 27 km north of the Cape Town Central Business District and 1.5 km north of the residential area of Duynefontein. Access to KNPS is via the R27 which runs along the property’s eastern boundary or alternatively via Otto du Plessis Drive.

Two sites have been investigated for the positioning of the proposed hardened water reservoir (see Figure 1), with Site A being the technically preferred option. Site A (Alternative 1 – preferred alternative) is located North of the Low Level Waste area, and Site B (Alternative 2) is located South of the existing Potable Water Distribution (SEP) reservoir at the KNPS.

Figure 1: Location of the Site Alternatives.

Figure 2 illustrates the routes and lengths of the proposed pipelines associated with each site option, as well as the water conveyance system associated with the Hardened Water External Connection Points (ECP) project. The solid green line indicates the water conveyance system. The solid blue line (± 550m) is the proposed piping from Site A to the water conveyance system. The solid and dashed red lines (± 610m) indicate the proposed piping from Site B to the water conveyance system. The solid white lines indicate the proposed piping to supply either Site A or Site B with water to fill the reservoir.

Figure 2: Illustration of the proposed piping options.

1.2.2. BIOPHYSICAL ENVIRONMENT

a. Climate and Hydrology

The study area, as with most of the southern Western Cape, falls within the Mediterranean climate, where most of the mean annual precipitation is received in winter (April – August). It receives its lowest rainfall in February and the highest in June. The average daily maximum temperature ranges from 14.3°C in July to 26.7°C in February.

b. Geology and Soil

The site is located on a dune within the KNPS site around 340 meters from the shore. The unconsolidated to semi-consolidated sediments underlying the proposed development site belong to the Sandveld Group, which is subdivided into the Elandsfontyn, Varswater, Velddrif, Langebaan, Springfontyn and Witzand formations.

c. Vegetation

The KNPS is located within the City of Cape Town Metropolitan Municipality and within the Fynbos biome and the Western Strandveld bioregion. The vegetation type indicated by Mucina and Rutherford (2009) is Cape Flats Dune Strandveld which is considered to be Endangered within the region (National list of threatened ecosystems for South Africa, 2011).

At least 90% of vegetation on site is secondary, and has re-established since the development of the KNPS. Most of Site B (Alternative 2) is used as a storage area for machinery, and partly natural vegetation occurs on only 15% of this alternative site. Site A (Alternative 1) has more natural vegetation (about 75% cover) and has probably not been disturbed since construction of the power station.

There is no significant woody alien invasive vegetation on either of the alternatives, but various alien herbs and annuals are likely, given the soil disturbance, including *Senecio burchellii* (indigenous, but invasive in disturbed

areas), *Brassica tournefortii, Raphanus rapistrum* (wildemostert), *Eucalyptus* spp. (gums), *Lolium* sp. (ryegrass), *Avena sp*. (wild oats), *Bromus diandrus* (ripgut brome), *Lupinus spp* (lupin), *Vicia spp*. (vetch), *Pennisetum clandestinum* (kikuyu), *Echium plantagineum* (Patterson's curse) and *Conyza bonariensis*.

d. Aquatic Features

The KNPS is located inside the Berg Water Managements Area. No watercourses flow through the KNPS or the surrounding Koeberg Nature Reserve.

There are no wetlands located in within 250 metres of Site Alternative 1, but a wetland can be found approximately 200m from Alternative 2.

1.2.3. **DESCRIPTION OF ACTIVITIES**

Refer also to the Site Layout Diagram (Annexure 1).

The activity involves the construction of two interconnected hardened water tanks, with a total usable volume of approximately 9 500 cubic metres of potable water, with an elastomeric lining. The two individual tanks will be approximately 27 metres in diameter with a total footprint area of approximately 1953 square meters (63m X 31m).

Figure 3: Representation of scaled reservoir on Site A.

Figure 4: Representation of scaled reservoir on Site B.

The length and route of piping associated with the proposed reservoir depends on where the reservoir will be located. The length of the piping required from Site A to the water conveyance system is approximately 550m, and the length of the piping required from Site B to the water conveyance system is approximately 610m. The proposed piping to supply either sites with water to fill the reservoir will be connected to the conventional municipal water supply.

Figure 5: Illustration of the proposed piping options.

1.3. PROJECT / ACTIVITY LIFECYCLE

1.3.1. PLANNING STAGE

There are many facets to the planning stage of the project. Despite the fact that the EMPr is not intended to be implemented at the planning stage, a number of the planning process (layout design and basic assessment process, planning approvals, specialist studies etc.) that have taken place feed information directly into the EMPr. It must also be borne in mind that the environmental basic assessment process (of which this EMPr forms part) is in itself intended to be an iterative part of the planning process, considering constrains, impacts and mitigations and providing suitable proposals based on this process for approval.

In certain circumstances however there are pre-construction aspects that must be considered by the applicant, contractors and future property owners as required.

1.3.2. CONSTRUCTION STAGE

It is at this stage at which the implementation of the EMPr begins. The best and most appropriate alternative has been selected and approved through the interactive basic assessment process and are at a stage when the practical process can begin.

The construction stage can be further divided into two parts:

a. ***Construction Preparation*** – all aspects that are required to be in place in terms of the EMPr prior to construction are addressed at this point.

b. ***Construction*** – the actual physical activities related to the EA commence.

1.3.3. OPERATIONAL STAGE

This stage begins when the reservoir has been installed and is in operation. The EMPr considers this the start of the operational phase where Eskom will then undertake the ongoing upkeep of the facility.

1.3.4. DECOMMISSIONING STAGE

No demolishing or removal of any of the development is planned. With correct action, the proposed facility can be maintained in full working condition indefinitely. However, if, at some distant date, there is to be a decommissioning, material must be removed in accordance with the principles described in this EMPr.

Where possible, materials, etc. should be re-used or recycled. Alternatively, if this is not possible, they should be disposed of at an appropriately licensed waste facility. The areas affected by activities should be rehabilitated and re-vegetated if no alternative development or land use is being proposed.

1.4. ENVIRONMENTAL LEGISLATION IDENTIFIED AS TRIGGERED

1.4.1. NEMA

The current basic assessment process is being undertaken in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended.

NEMA makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority based on the findings of an environmental assessment.

In terms of Section 24(5) and 44 of NEMA as amended, the following Listed Activities require Environmental Authorisation:

GN No. R. 327 Activity No(s):	Describe the relevant Basic Assessment Activity(ies) in writing as per Listing Notice 1 (GN No. R. 327)	Describe the portion of the development as per the project description that relates to the applicable listed activity.
19A	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from — (i) the seashore; (ii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater; or (iii) the sea; — but excluding where such infilling, depositing , dredging, excavation, removal or moving — (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	The installation of the piping associated with the hardened water reservoir will require excavation and removal of more than 5 cubic metres of soil within 100 metres inland from the high-water mark of the sea.

GN No. R. 324 Activity No(s):	Describe the relevant Basic Assessment Activity(ies) in writing as per Listing Notice 1 (GN No. R. 324)	Describe the portion of the development as per the project description that relates to the applicable listed activity.
2	The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres. **i. Western Cape** i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. In areas containing indigenous vegetation; or iii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use	The activity involves the construction of a reservoir, with a total volume of 9 500 cubic metres at the KNPS, within an area containing Cape Flats Strandveld vegetation and within the Koeberg Nature Reserve Protected Area in terms of NEMPAA.

GN No. R. 324 Activity No(s):	Describe the relevant Basic Assessment Activity(ies) in writing as per Listing Notice 1 (GN No. R. 324)	Describe the portion of the development as per the project description that relates to the applicable listed activity.
	in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose.	
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purpose undertaken in accordance with a maintenance management plan. **i. Western Cape** i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.	Upon development of the hardened water reservoir, more than 300 square metres of the endangered natural vegetation (Cape Flats Strandveld) will be removed, within 100 metres inland from the high-water mark of the sea.

1.5. POTENTIAL IMPACTS

All potential impacts, as listed below, identified by the Environmental Assessment Practitioner (EAP) and specialist studies conducted during the basic assessment process will be mitigated by measures identified in the broader EMPr.

1.5.1. POTENTIAL IMPACTS FORESEEN DURING THE DESIGN OR PRE-CONSTRUCTION PHASE

a. Loss of fossil-bearing deposits:

Excavating into potentially fossil-bearing deposits during the pre-construction phase might damage some fossils.

The risk of the proposed activities is considered to be negligible after the proposed mitigation measures are implemented.

1.5.2. POTENTIAL IMPACTS FORESEEN DURING THE CONSTRUCTION PHASE

a. Impact on Soil and Ground Water

There is potential for soil and ground water contamination from accidental cement spills or oil leaks from construction vehicles during the construction phase, as a result of accidental spills or leaks, resulting in product seeping into the ground.

The risk of the proposed activities is considered to be negligible after the proposed mitigation measures are implemented.

a. Possible impact on slope and surface stability:

Possible impact on the slope stability, footing, sub-surface and surface drainage due to construction activities.

The risk of the proposed activities is considered to be negligible after the proposed mitigation measures are implemented.

b. Impact on Vegetation

Potential loss of medium sensitivity vegetation on about 75% of the Alternative 1 and 15% of Alternative 2 site, due to site clearing, earth works and construction activities.

The risk of the proposed activities is considered to be of a low significance after the proposed mitigation measures are implemented.

c. Impact on Air Quality

There is potential for the air quality to be impacted through the construction activities that may generate dust through exposing soil and disturbing the ground. Fugitive dust is considered to be a nuisance factor for land users and occupiers. Construction vehicles will also emit exhaust fumes while in use.

The risk of the proposed activities is considered to be very low after the proposed mitigation measures are implemented.

d. Socio-economic Impact

The development is expected to generate temporary jobs during the construction phase.

The proposed activities are therefore expected to be of a positive nature since the local community will partially benefit from the from the employment opportunities during the construction phase.

e. Loss of heritage material:

Likely loss of heritage material and information during the construction phase.

The risk of the proposed activities is considered to be negligible after the proposed mitigation measures are implemented.

f. Discovery of fossil-bearing deposits:

Excavating into potentially fossil-bearing deposits during the construction phase.

The proposed activities are therefore expected to be of a positive nature since the proposed development will create an opportunity to gain new information and recover material.

g. Potential Noise Impact

Construction vehicles and other construction machinery will increase the noise levels during working hours. Increased noise levels may be a nuisance factor to occupiers of the land.

The risk of the proposed activities is expected to be low significance after the proposed mitigation measures are implemented.

h. Potential visual impact:

The views of the proposed development will be unsightly due to construction activities and the construction site.

The risk of the proposed activities is expected to be low significance after the proposed mitigation measures are implemented.

1.5.3. POTENTIAL IMPACTS FORESEEN DURING THE OPERATIONAL PHASE

a. Alien invasive vegetation:

Spread of alien invasive vegetation associated with the soil disturbance caused by construction.

The risk of spreading of invasive alien vegetation is expected to be very low significance after the proposed mitigation measures are implemented.

b. Potential visual impact:

Unsightly views of the reservoir.

The visual impact is expected to be low significance after the proposed mitigation measures are implemented.

1.5.4. SUMMARY OF POTENTIAL IMPACTS

Activity	Impact summary	Significance after mitigation	
		Alternative 1 (preferred alternative)	Alternative 2
Pre-Construction Phase			
Geotechnical assessments or testing	**Loss of fossil-bearing deposits:** Excavating into potentially fossil-bearing deposits during the pre-construction phase.	Negligible	Negligible

Activity	Impact summary	Significance after mitigation	
		Alternative 1 (preferred alternative)	Alternative 2
Construction Phase			
Site clearing, earthworks and construction activities	**Potential soil and ground water contamination:** There is potential for soil and ground water contamination from accidental cement spills or oil leaks from construction vehicles during the construction phase, as a result of accidental spills or leaks, resulting in product seeping into the ground.	Negligible	Negligible
Earthworks	**Possible impact on slope and surface stability:** Possible impact on the slope stability, footing, sub-surface and surface drainage.	Negligible	Negligible
Site clearing, earthworks and construction activities	**Loss of vegetation:** Loss of Medium sensitivity vegetation on site (about 75% of Alternative 1 and 15% of Alternative 2 site)	Low negative	Very Low negative
Earthworks and construction activities	**Dust nuisance and exhaust fumes:** There is potential for the air quality to be impacted through the construction activities that may generate dust through exposing soil and disturbing the ground. Fugitive dust is considered to be a nuisance factor for land users and occupiers. Construction vehicles will also emit exhaust fumes while in use.	Very Low negative	Very Low negative
Construction activities	**Job creation:** The development is expected to generate temporary jobs during the construction phase.	Low positive	Low positive
Earthworks and construction activities	**Loss of heritage material:** Likely loss of heritage material and information during the construction phase.	Negligible	Negligible
Earthworks and construction activities	**Discovery of fossil-bearing deposits:** Excavating into potentially fossil-bearing deposits during the construction phase. Opportunity to gain new information and recover material.	Medium positive	Medium positive

Activity	Impact summary	Significance after mitigation	
		Alternative 1 (preferred alternative)	Alternative 2
Earthworks, construction vehicle movement and construction activities	**Potential noise impact:** Construction vehicles and other construction machinery will increase the noise levels during working hours. Increased noise levels may be a nuisance factor to occupiers of the land.	Low negative	Low negative
Earthworks and construction activities	**Potential visual impact:** Unsightly views due to construction site.	Low negative	Low negative
Operational Phase			
Poor alien invasive vegetation management	**Alien invasive vegetation:** Spread of alien invasive vegetation associated with the soil disturbance caused by construction.	Very Low negative	Very Low negative
No specific activity	**Potential visual impact:** Unsightly views of reservoir.	Low Negative	Low negative
No-go Option			
No development - status quo remains	The Status Quo of the site will remain if no development is undertaken. The "No-Go" option is not regarded as a viable option since the primary purpose of the proposed hardened water supply is to ensure that there is adequate water inventory at the KNPS to provide core cooling and spent fuel pool make-up, to cope with an extended beyond design basis Loss of Ultimate Heatsink and/or Station Black-out, which could be precipitated by an extreme seismic and/or flooding event(s). This is an essential back up system required at the KNPS as part of an emergency response system. The Hardened Water Supply project is also considered to be a mandatory modification due to the NNR's directive.		

1.6. STAKEHOLDER ENGAGEMENT

This EMPr is presented to the authorities (Competent Authority, other State Departments and Organs of State) as well as Interested and Affected Parties (I&APs), as part of the Basic Assessment Process, where an opportunity to comment and give input is provided.

Once DEA, having taken the comments received into consideration, has approved the EMPr the Applicant will then adopt it for implementation during the construction phase, as well as throughout the maintenance, upkeep, running and management occurring during the operational phase.

The DEA must approve any significant revisions to the approved document via an amendment application process. DEA may require that notification of the revision must be made available to relevant stakeholders such as I&APs or other state departments such as the Department of Water and Sanitation during this amendment process.

1.7. ROLES AND RESPONSIBILITIES

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the construction phase.

The following stakeholders will be involved with the EMPr either during the construction phase, operational phase or both.

1.7.1. **COMPETENT AUTHORITY: DEA**

DEA is the National competent authority responsible for issuing environmental authorisations in term of NEMA, NEM:WA, NEM:BA. This Directorate has overall responsibility for ensuring that the Applicant complies with the conditions of its environmental authorisation as well as this EMPr once approved.

During the construction and operational phases of the EMPr the lead authority will have the following role to play:

- Conduct ad hoc compliance inspections.
- Read the ECO's performance reports and take action as deemed necessary.
- Whenever necessary, the authorities are to provide assistance in understanding and meeting the specified requirements.
- Ensure and timeously recommend suitable corrective measures are undertaken by the Applicant/ER where the applicant has reported non-compliance or when an audit report is received indicating any non-compliance.
- Enforcing compliance by the Applicant.

1.7.2. **APPLICANT: ESKOM HOLDINGS SOC LTD**

Under South African environmental legislation, the Applicant is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts, both in the construction and operational phases. The Applicant therefore has overall and total environmental responsibility to ensure that the EMPr is implemented and that both the EMPr and the EA are complied with at all times. The Applicant is also responsible for ensuring that all other environmental and water related legislation is complied with.

The Applicant is responsible for the development and implementation of the conditions of the Environmental Authorisation in terms of the planning and design of the development and construction thereof.

The Applicant remains fully responsible for the implementation of this EMPr, and compliance with the EMPr and EA until such time as an application for amendment indicating a **change in ownership or transfer of the EA** to another party is submitted to DEA. Only once this amendment application has been approved is this responsibility then shifted to the new holder of the EA.

Amongst the general responsibilities above the applicant is also completely and solely responsible for:

Ensuring that any changes to the project or aspects thereof, as approved during the EIA process by the issuance of an EA, are timeously communicated to DEA as these may require amendments to the EA via an amendment application process.

- Appointing an ECO, and where required an environmental auditor
- It is the Applicants responsibility to notify DEA within 24 hours of an occurrence of any non-compliance with the EA, EMPr or any other environmental and water related legislation.
- Take the necessary action in terms of non-compliances.
- Ensuring that all of the applicants, staff, representatives, contractors, consultants and any other agent operating under the employ of the applicant comply with the EA, EMPr and any other environmental and water related legislation.
- Ensuring that all the necessary authorisations and permits have been obtained.

- Considering the ECO's observations and recommendations, taking action where required.

1.7.3. **APPLICANTS REPRESENTATIVE**

The Employer's Representative (ER) would act as the Applicant's (Employer's) on-site implementing agent and has the responsibility to ensure that the Employer's responsibilities are executed in compliance with relevant legislation and the environmental authorisation.

Any on-site decisions/inputs regarding environmental management are ultimately the responsibility of the ER.

The on-site ER will have the following responsibilities in terms of the implementation of the Construction phase of this EMPr and assisting the applicant to ensure compliance with the EA, EMPr and any other environmental and water related legislation:

- Ensuring, in conjunction with the applicant, that the authorisations and permits have been obtained and conditions have been met.
- Ensure where required by the EA that a notice of commencement is submitted to DEA at least two (2) weeks prior to commencement.
- Assist the Applicant with the appointing of an ECO and, where specifically required by the EA an Environmental Auditor.
- The ER will ensure that the appointed ECO is paid timeously thereby ensuring an ongoing ECO service.
- Should the Applicant or the ER change ECO's, should the applicant or ER cancel the ECO's services (either verbally, in writing or implied due to non-payment of fees) or should the ECO terminate their services the ER must notify DEA of this in writing within 14 days.
- Take action in regards to any non-compliance that is reported on or noted.
- Ensuring that the Applicant is aware of any environmental non-compliance on site.
- Considering the ECO's observations and recommendations.
- Ensuring that ECO is made aware of any changes in terms of the project.
- Reviewing and approving the Contractor's method statements.
- Ensuring that all Contractor's and Sub-contractors are implementing the EMPr and meeting the necessary requirements of the EA.
- Ensuring that all works are occurring within the permitted areas.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Ordering the removal of person(s) and/or equipment not complying with the EMPr specifications.
- Ensure that the ECO is provided with any documentation required from the project team or contractors.
- Issuing fines for transgressions of site rules and penalties for contravention of the EMPr, with input from the ECO and providing proof in this regard.

1.7.4. **ENVIRONMENTAL CONTROL OFFICER**

The Environmental Control Officer (ECO) will be an independent environmental consultant appointed by the Applicant. The role of the ECO is to assist with the monitoring and where possible to provide guidance in terms of environmental matters.

The ECO will regularly monitor and review the on-site environmental management and implementation of the construction phase of this EMPr.

The ECO is not responsible for ensuring or enforcing compliance with the EA, EMPr or any other environmental and water related legislation. This is the responsibility of the applicant and authorities. The role of the ECO is that of a monitoring and supportive function and advising the Applicant of non-compliance with respect to the conditions of the EA.

The ECO's duties consist of the following:

- Where required, provide assistance in terms of the Notice of commencement to DEA.
- Conducting regular site inspections at the frequency as stipulated in section 2.2.1.
- Monitoring and verifying as far as possible adherence to the EMPr and the environmental authorisation.
- Monitoring and verifying that environmental mitigation measures are in place where necessary to facilitate keeping environmental impacts to a minimum.
- Reporting to the applicant and the applicant's representative any relevant observations made during site inspections.
- The ECO will report all noted/observed non-compliances with the EMPr and EA to the applicant's representative.
- As far as possible advise the applicants representative in regards to environmental matters that may become an issue.
- Reviewing the Contractor's construction method statements together with the ER.
- The ECO will make recommendations to the ER, with regards to the issuing of penalties in accordance with the EMPr.
- Facilitating the maintaining of open and direct lines of communication between the ER, Employer, Contractor and where necessary, the public, with regard to environmental matters.
- Assisting with the appointing of the relevant specialists (botanists, wetland specialists, etc.), as required, to advise the Engineer, Applicant or ER.
- Assist the contractor with basic awareness training of all construction staff, as to the requirements for working on the site.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Monitoring the undertaking by the Contractor of environmental awareness training for all personnel and subcontractors coming onto site and assisting with this where necessary.
- Advising on the removal of person(s) and/or equipment not complying with the specifications (via the ER).
- Recommending the issuing of fines for transgressions of site rules and penalties for contraventions of the EMPr to the ER for action.
- Reporting to the applicant on the implementation of the EMPr and compliance with the environmental authorisation on a regular basis.
- Where necessary, recommending additions and/or changes to the EMPr to the directorate.
- The ECO will draft an environmental performance report on a monthly basis (except during shutdown periods). This report will be submitted to the Contractor, ER and to the DEA. The ECO may submit this via email.

1.7.5. **THE CONTRACTOR**

The contractor is bound by the requirements of this EMPr. The Contractor will be subject to the issuance of penalties by the ER as stipulated herein. Any damage to the environment temporary or otherwise as a result of non-compliance with this EMPr will be made good at the contractors cost. In addition the Contractor will have the following responsibilities:

- The Contractor will ensure that all senior and management staff involved with the project are aware and familiar with the requirements of this EMPr.
- The ECO will assist with the environmental induction training of site staff. It is the contractor's responsibility however to ensure that all staff and sub-contractors attended and undergo the necessary environmental site inductions. The Contractor will maintain a register of all staff and sub-contractors that have undergone an environmental site induction.
- The contractor will adhere to and comply with all of the requirements and specifications of this EMPr. Any non-compliance will be reported to the ECO and ER immediately.

- The contractor is fully responsible for all sub-contractors and service providers and their compliance with this EMPr on site. The Contractor will ensure that all sub-contractors and services providers are made aware of the requirements of the EMPr and that they have a responsibility to comply with the EMPr.
- The Contractor is responsible for ensuring that all sub-contractors and service providers comply with this EMPr.
- The Contractor will read the ECO performance reports and take action as required.
- The Contractor is also required to comply with the EMPr and EA associated with the project at the PEE site (DEA Ref: 12/12/20/997). Should any conflict arise between this EMPr and the existing EMPr at the PEE site then this should be brought to the attention of the ECO for resolution.

1.7.6. **ENVIRONMENTAL AUDITOR**

Where required by the EA an environmental auditor will be appointed by the applicant. The auditor will be an independent environmental consultant. The auditor will carry out a compliance audit based on the EA and EMPr of all of the activities being undertaken.

The auditor will conduct and report audit findings based on the audit requirements stipulated in the EA. Any audit costs are for the Applicants account and are in addition to regular ECO services.

SECTION 2

CONSTRUCTION PHASE

2.1. GENERAL MATTERS

2.1.1. CONTRACTUAL CONSIDERATIONS AND COSTING ALLOWANCES

This EMPr must form part of the Contractual Document(s). The EMPr must be read in conjunction with the contractual documents including the Specifications, and where applicable, the Bill of Quantities.

Where a conflict exists between the Specifications and Bill of Quantities and the EMPr the matter shall be brought to the attention of the Applicant's representative for resolution. The applicant and the ER are responsible for the compliance of the contractor and any other appointees, staff agents, or similar role-players acting on their behalf with this document and the Environmental Authorisation.

The Applicant and ER will ensure that all rates quoted for each activity in the Bill of Quantities shall include for compliance with the EMPr.

The applicant and the ER will ensure that sufficient funding is available throughout the construction stage to comply with section 2 of this EMPr and all its requirements.

2.1.2. CONSTRUCTION STAGE EMPR ADMINISTRATION

Copies of this EMPr shall be kept at the site office and will be distributed to all senior contract personnel. The ER will ensure that all senior personnel (including the project team) are familiar with the contents of this document, its requirements and specifications.

All relevant and related documentation and records as set out in this EMPr or records as requested by the ECO/ER are to be presented for monitoring by the Contractor at the request of the ECO or ER. This should include, but is not limited to:

- Waste disposal certificates or similar record of responsible waste disposal
- Records of environmental inductions
- Approved Method Statements
- Incident reports
- Complaints register

The Contractor will ensure that all required records are gathered and maintained for the duration of the contract and all related works.

a. Method Statements

Method statements are written submissions by the Contractor to the ER (with input from the ECO) in response to the requirements of this EMPr or to a request by the ER or ECO. A minimum requirement will consist of the listed MS's below. Further MS's may be requested by the ER or ECO.

The Contractor shall be required to prepare method statements for several specific construction activities and/or environmental management aspects as specified. Annexure 2 provides an example for a method statement template. **It is the Contractors responsibility to ensure that the required method statements are drafted and submitted**.

The Contractor shall not commence the activity for which a method statement is required until the ER has approved the relevant method statement.

Method statements must be submitted at least seven (7) business days prior to the date on which approval is required (start of the activity). Should the method statement be rejected this will be done so with comment. The seven day submission period will commence once again on re-submission of the MS. Should the MS be submitted

and no response (acceptance or rejection) be obtained within 7 days from the ER or ECO the MS will be considered as having been accepted and work can commenced in line with the submitted MS.

Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

An approved method statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract. However, any damage caused to the environment through activities undertaken without an approved method statement shall be rehabilitated at the contractor's cost and to the satisfaction the ECO and ER.

The method statements shall cover relevant details with regard to:

- Construction procedures and location of the construction site.
- Start date and duration of the procedure.
- Materials, equipment and labour to be used.
- How materials, equipment and labour would be moved to and from the site as well as on site during construction.
- Storage, removal and subsequent handling of all materials, excess materials and waste materials of the procedure.
- Emergency procedures in case of any reasonably potential accident / incident which could occur during the procedure.
- Mitigation measure that will be employed.
- Compliance / non-compliance with the EMPr Specification and motivation if non-compliant.

Method statements required:

Based on the specifications in this EMPr, the following method statements are required as a minimum, and more method statements may be requested as required.

MS1: Site layout and establishment

MS2: Hazardous substances handling and spill response

MS3: Site clearing

MS4: Cement and concrete batching

MS5: Solid waste control system

MS6: Dust mitigation

MS7: Emergency procedures (fires and hazardous material spills)

MS8: Rehabilitation of disturbed areas

2.1.3. **ORGANISATIONAL STRUCTURE FOR CONSTRUCTION STAGE**

Details of the organisational structure are presented in the Figure 6. The structure illustrates the reporting procedures for stakeholders in the implementation of this EMPr.

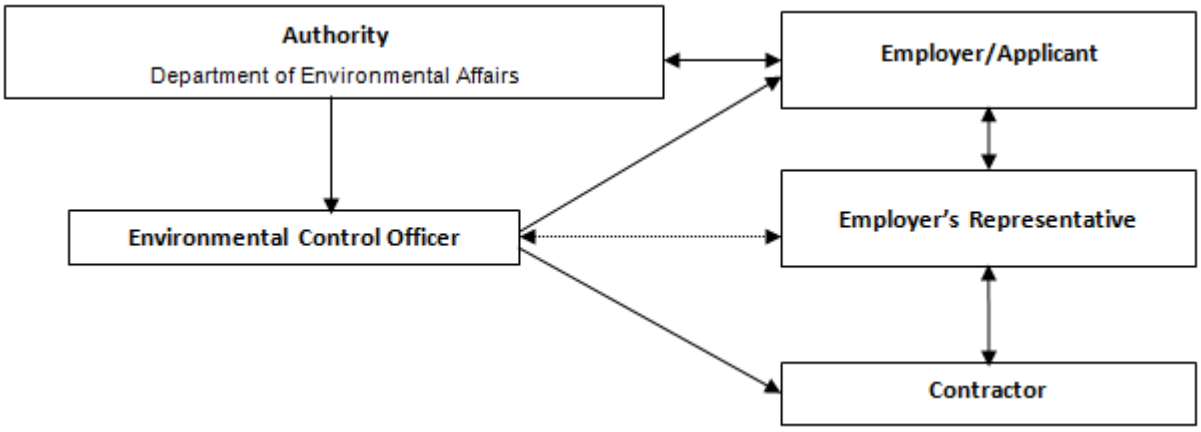


Figure 6: EMPr implementation organisational structure.

2.1.4. TEMPORARY SITE CLOSURE

In the event of a temporary site closure occurring such as the builder's holidays, temporary suspension of works or any period of inactivity longer than 7 working days the Contractor is to notify the ECO. The Contractor shall check the site according to the requirements of the ECO, and ensure that all items are addressed. The Contractor will provide a brief written report (refer to Annexure 3) on compliance to the ER and ECO prior to the temporary shutdown date.

2.1.5. COMPLAINTS AND INFORMATION

The Contractor shall erect and maintain information boards in the position, design and dimensions specified by the ER. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the ER.

The contractor shall also keep a "complaints register" on site. The register shall contain all contact details of the person who made the complaint and information regarding the complaint itself as well as any follow-up undertaken, if required.

2.1.6. OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall at all times observe the Occupational Health and Safety Act No. 85 of 1993 and ensure adequate safety precautions on the site.

Telephone numbers of emergency services, including the local firefighting service, shall be displayed conspicuously in the Contractor's office near a telephone.

No weapons (firearms, airguns, daggers etc.) are permitted on site.

2.1.7. SITE ENVIRONMENTAL INDUCTIONS

The ECO in consultation with the contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction on the importance and implications of the EMPr. The presentation shall be conducted, as far as is possible, in the employees' language of choice.

As a minimum, training should include:

- Explanation of the importance of complying with the EMPr.
- Discussion of the potential environmental impacts of construction activities.
- The benefits of improved personal performance.
- Employees' roles and responsibilities, including emergency preparedness.

- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this EMPr and its specification (no-go areas, etc.)
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr.

The Contractor shall keep records of all environmental training sessions, including names and dates.

Notwithstanding the specific provisions of this particular section it is incumbent upon the Contractor to convey the sentiments of the EMPr to all personnel involved with the works.

Annexure 3 contains some useful environmental awareness materials.

2.2. PRE-CONSTRUCTION REQUIREMENTS

2.2.1. APPOINTMENT OF AN ECO

The ER / applicant must appoint a suitable, experienced and independent ECO to monitor the implementation and compliance with the EMPr.

The ECO should be appointed a minimum of 3 weeks prior to commencement of site activities to ensure that the necessary notification can be made as required by the EA.

Depending on the speed and nature of the works being undertaken and the performance of the contractors on site the ECO will undertake between 1 to 4 site visits per month (excluding during shut down periods). Should less than one visit per month be required, this must first be agreed to by DEA.

The ECO will produce an environmental performance report once per month (excluding shut down periods). This report will be submitted to the contractor and the ER. The report will highlight environmental aspects relating to the construction phase of the project during the reporting period.

2.2.2. SITE ESTABLISHMENT PLANNING

Prior to the contractor taking handover of the site the contractor will submit to the ER a site layout plan. This plan must be approved and signed off by the ER with input from the ECO.

The site layout plan will indicate the placement and location of, *inter alia*, following:

- Site offices
- Stores, silos and stockpile areas
- Large plant and vehicle parking area
- Toilet facilities
- Haul routes
- Site access
- Temporary waste storage area
- Large volume fuel storage (tanks or mobile fuel trailers)

A copy of the approved site layout plan will be provided to the ECO prior to commencement of construction.

The Contractor shall establish construction camps and associated facilities and areas in a manner that does not adversely affect the environment.

The construction area shall be kept to a minimum necessary for construction activities.

The site layout shall take cognisance of access for deliveries and services. These activities should not result in environmental disturbance and avoid such disturbance.

The location of suitable areas for maintenance and refuelling, large volume cement/concrete batching etc. must be identified by the ER in consultation with the ECO. The ER will ensure that the ECO is involved in the decision prior to commencement of the proposed action. This must also be indicated on the site layout plan.

Before construction can begin, the Contractor shall submit to the ER for approval a site establishment method statement detailing:

MS1:	***A layout plan and the method of establishment of the construction camp, i.e. all offices, accommodation facilities, large volume cement batching areas, storage & stockpiling areas, workshops and all other areas/facilities required for the undertaking of activities required for completion of the project. The plan shall include the location and layout of waste storage, ablution facilities, stockpiling and spoil areas and hazardous material storage areas.***

Changes to the site layout must be approved by the ER and may also require the amending of various authorisations.

2.3. SITE BOUNDARY AND ESTABLISHMENT

The activities that fall under the following sub-sections must be undertaken prior to any other physical activities occurring on site.

2.3.1. DEMARCATION OF THE SITE BOUNDARIES

The “site” refers to all areas required for construction purposes and not necessarily the property boundaries. The boundary of the site will be agreed with and approved by the ER. To reduce disturbance, the site will be limited as far as possible.

The Contractor shall restrict all his activities, materials, equipment and personnel to within the area specified. The Contractor shall ensure that the approved construction area will be adequate to cover the project without further space adjustments being required at a later date. Changes must be approved by the ER.

The Contractor must demarcate the boundaries of the site in order to restrict his construction activities within the site. The method of demarcating the boundaries shall be determined by the Contractor and agreed to by the ER prior to any work being undertaken.

The use of danger tape for demarcation purposes is discouraged and must be limited as far as possible. Brightly coloured droppers and coloured nylon cord/fencing wire with markers must be considered as an alternative to danger tape.

The Contractor shall maintain the demarcations and ensure that materials used for construction on the site do not blow on, or move outside the site and environs. The boundaries of the site shall be demarcated prior to any work commencing on the site. The site demarcations shall be removed when the site is decommissioned.

Construction workers, vehicles or plant are forbidden access to any private property unless approval has been granted by the ER in writing after the land owner has given permission.

The Contractor shall ensure that all plant, labour and materials remain within the boundaries of the site, unless otherwise agreed in writing with ER. It will be the responsibility of the Contractor to decide on an appropriate system of protective fencing for the site, if required.

2.3.2. **DEMARCATION OF "NO-GO" AREAS**

All areas outside the demarcated site should be regarded as No-Go areas, unless approved in writing by the ER and with detailed input from the ECO or specialist; these areas may not be accessed or disturbed.

These areas may not be accessed by staff, plant or vehicles. Entry into these areas by any person, vehicle or equipment without the ER's written permission will be considered as a major non-compliance.

The ER may declare additional No-Go areas at any time during the construction phase as deemed necessary and/or at the request of the ECO.

No-Go area demarcation must be approved by the ER. Demarcation for No-Go areas will be clearly visible and will, as far as practicable, form a physical barrier such as strands of wire or cordage. Danger tape will not be considered suitable for this purpose.

2.4. SITE FACILITIES

The construction, layout and extent of the construction site and its components shall be planned, designed and managed in such a manner that environmental impacts are minimised. Temporary structures and facilities shall be decommissioned to the satisfaction of the ER and a clean up after construction shall be effectively undertaken.

2.4.1. **ABLUTION FACILITIES**

The Contractor is responsible for the erection and maintenance of adequate ablution facilities and washing areas and for enforcing the use of these facilities. Under no circumstances may the natural environment be used as a toilet or cleaning area.

The Contractor shall be responsible for ensuring that all ablution facilities are maintained in a clean and sanitary condition to the satisfaction of the ER. All temporary portable toilets shall be secured in such a manner so as to prevent them toppling due to wind or any other cause.

Plumbed toilets must have no leaks or malfunctioning valves. No chemicals, oils or similar construction related materials are to be disposed of via the toilets on site.

Ablution facilities (chemical toilets, etc.) must be provided at all construction camp areas where there will be a concentration of labour. Toilet paper must be provided. The contractor shall ensure that chemical toilets are emptied before the builders' holidays and that no spillage occurs when they are emptied. All contents must be removed from the site. Under no circumstances may waste be discharged into the environment or be buried on site.

2.4.2. **WATER PROVISION**

The Contractor shall make available safe drinking water fit for human consumption at the site offices and all other working areas.

All drinking water must be from a legal source and comply with recognised standards for potable use.

The Contractor shall comply with the provisions of the National Water Act and its Regulations for taking water from natural water resources. To this end no water may be abstracted from streams, rivers, wetlands or boreholes unless the necessary water use authorisations are in place.

If water is stored on site, drinking water and multi-purposed water storage facilities shall be clearly distinguished and demarcated.

No water is to be wasted on site. Any leaks are to be reported and repaired immediately. All pipes, taps and associated infrastructure are too maintained in good working order.

2.4.3. **EATING AREAS**

If none is available, the Contractor shall provide adequate temporary shade within the construction areas to ensure that site personnel do not move off site to eat.

The Contractor shall provide adequate refuse bins with lids at all eating areas to the satisfaction of the ER. The bins must be weatherproof and scavenger proof and approved by the ER.

If deemed necessary by the ER, the Contractor shall demarcate designated eating areas.

No feeding of wild animals shall be permitted. Food and food products are to be stored in such away so as not to attract scavenging animals.

2.4.4. **HAZARDOUS MATERIALS HANDLING AND SPILL RESPONSE**

All hazardous materials or substances (e.g. petrochemicals, oils, etc.) shall be stored on site only under controlled conditions. All hazardous material and substances shall be stored in a secured, designated area that has restricted entry. All storage shall take place using suitable containers to the approval of the ER. Hazard signs and data sheets indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Symbolic safety signs depicting “No Smoking”, “No Naked Lights” and “Danger” are to be provided, and are to conform to the requirements of SABS 1186.

Where there may be suitable storage infrastructure (existing yards and fuel tanks etc.), such as those used for current/existing agricultural activities these may be used provided this is approved by the ER. All necessary safety requirements in terms of bunds, spill kits and signage must however be in place.

Temporary fuel storage tanks are permitted to be temporarily established on site for construction purposes provided that the contractor ensures full compliance with the following:

- All local by-laws relating to community and fire safety must be complied with. Most local authorities require that a permit be obtained from the relevant Fire Department. This permit should be kept on file.
- The storage tank capacity may not exceed 9000 litres
- The storage tank may not be on the premises for a period exceeding that stipulated by the local authority. The tanks must be removed on completion of construction or the once the contractor responsible for the tanks has completed their work on site.
- A tank must be erected at least 3.5 metres from boundaries, buildings and other flammable substances or combustible materials.
- A temporary tank must have a bund wall with 110% capacity of the tanks total storage capacity.

The fuel tank shall be steel and maintained by the fuel suppliers and/or Contractor. The tank shall be located in a secure, demarcated area and an adequate bund wall (110% of volume as required above) shall be provided. The floor and wall of the bund area shall be impervious to prevent infiltration of any spilled / leaked fuel into the soil. The floor of the bund shall be sloped towards an oil trap or sump to enable any spilled fuel to be removed. The sump must have a lock off valve that can only be opened in an emergency.

Should a mini-mobile type trailer tank or bowser be used on site the tank will be maintained by the fuel suppliers and/or Contractor and is to be kept clean and leak free. The trailer is to be kept on site with a drip tray at all times and is to be removed from site at the end of every day unless it is kept in a bund area of 110% of the tank volume.

A hydrocarbon bioremediation product approved by the ER with input from the ECO must be stored on site and near the fuel stores for any emergencies. Once a purpose manufactured hydrocarbon spill remediation product has been used or has been used to treat contaminated materials (soil, rubble etc.) it must be disposed of, with the treated material, at a facility licensed to receive such waste.

Areas for storage of fuels and other flammable materials shall comply with standard fire safety regulations and may require the approval of a fire prevention officer. The contractor must ensure that there is adequate firefighting equipment at the fuel stores and that persons are adequately trained to use this equipment.

Only empty and externally clean drums may be stored on the bare ground. All empty and externally dirty drums shall be sealed and stored in the bunded area. If fuel is dispensed from 200 litre drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank shall be stored in a waterproof container or within the bund area when not in use.

The location of suitable areas for maintenance and refuelling must be identified by the ER in collaboration with the ECO. The ECO must be involved in the decision and must provide guidance from an environmental perspective prior to commencement of the proposed action.

a. Spills and Leaks

The contractor shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the, ER and ECO. The Contractor shall ensure that the necessary spill response / hydrocarbon remediation materials (e.g. chemcap, spill-sorb, drizzat pads, enretech, OilCap and peat moss) and equipment for dealing with spills and leaks are available on site at all times. The source of the spillage shall be isolated. The Contractor shall contain the spillage using sand berms, sandbags, pre-made booms, sawdust or absorbent materials. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the ER.

The Contractor shall submit his emergency procedure (to be detailed in MS2) prior to bringing on site any such substances.

All spills or accidents involving such materials are to be recorded by the Contractor. The Contractor is responsible for ensuring that these records are submitted to the ECO. The cleanup of spills and any damage caused by the spill shall be for the Contractor's account.

MS2: ***The Contractor shall provide a method statement detailing the hazardous substances / material that are to be used during construction, as well as the storage, handling, and disposal procedures for each substance as well as materials such as rubble soil and water contaminated with hazardous substances. The details of the disposal service providers (if required), supplier and suitable DEAT approved disposal sites that will be used by the contractor are to be included. In addition this MS will include an emergency procedure plan that will detail responses relating to the leaking or spillage of fuels oils or other hazardous substances. This method statement shall in no way override, replace, void or offer any exemption from any relevant legislation nor the requirements of the Occupational Health and Safety Act.***

2.4.5. **TRAFFIC ACCOMMODATION & TRANSPORTATION**

The Contractor shall be required to ensure that traffic along public roads is accommodated at all times and construction activities and deliveries do not interfere with the public road system. Should there be a need to undertake such work that may impact traffic the Contractor will ensure that all the required permissions have been obtained from the traffic authorities in writing. All the required signage and hazard warnings are to be put in place.

The contractor will ensure that all drivers must be in possession of an appropriate and valid driver's licence. The Contractor is responsible for ensuring that all vehicles are road worthy. All relevant permits for abnormal loads must be applied for and obtained from the relevant authority as required.

Access points to and from site as well as road ways in front of the site are to be kept clean and free from stone, sand and grit. These areas must be swept regularly.

All construction vehicles, when on site and on the surrounding property, will not exceed the speed of 30km per hour. This is to ensure safety of vehicles, personnel and the environment, and to lessen environmental degradation. Drivers who exceed the speed limit should be fined or dismissed by the Contractor or ER.

Access to the site must be gained at the designated areas as determined by the ER. As far as is possible use should be made of existing haul routes, tracks and roads. The creation of short-cut paths/routes or temporary vehicular tracks is to be strictly prevented.

The Contractor shall ensure that all suppliers and sub-contractors and their delivery drivers are aware of procedures and restrictions (e.g. "No-Go" areas) in terms of this EMP. The Contractor shall ensure that delivery personnel are supervised during offloading by someone with an adequate understanding of the requirements of the specifications.

Materials shall be appropriately secured to ensure safe passage between destinations during transportation. Loads shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to property secure transported materials.

2.5. SITE CLEARING

2.5.1. VEGETATION CLEARING

No vegetation clearing shall take place without approval of the method statement by the ER. No vegetation clearing shall take place until the site boundaries and "No-Go" areas are clearly demarcated or temporarily fenced off.

Before clearing of vegetation, the Contractor shall ensure that all litter and non-organic material is removed from the area to be cleared.

Vegetation clearing of the site shall be limited as far as possible. Clearing will not extend beyond the site boundary. If large areas are to be developed consideration should be given to a phased clearing approach to limit potential impacts resulting from large areas standing cleared for extended period of time.

Indigenous plant material can be removed from cleared areas and may be stockpiled for mulching. Alien vegetation may be used for mulching if it is not in seed. All remaining vegetation shall be removed and disposed of at an approved landfill site or should the estate have an approved burning permit the vegetable mater may be burned in accordance with this permit.

Permits may be required in order to remove or translocate protected plants or those of conservation concern and must be obtained prior to this happening.

2.5.2. TOPSOIL

Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter.

Sufficient top soil must be stripped and stockpiled separately for the rehabilitation purposes of disturbed areas or landscaping on site after construction. Any top soil stripped from the site must be stockpiled separately from other materials. If not enough topsoil is available after stripping, then additional topsoil must be acquired. Any acquired top soil

must be approved by the ER. Stripped topsoil shall be stockpiled in areas agreed with the ER for later use in re-vegetation and shall be adequately protected.

As far as is practicable topsoil should not be stripped or stockpiled when it is wet or raining, in order to prevent unnecessary compaction.

Topsoil stockpiles shall be convex and no more than 2m high. Stockpiles shall be shaped so that no surface water ponding can take place.

Topsoil stockpiles shall be protected from erosion by wind and rain by providing suitable stormwater and cut off drains and/or by establishing suitable temporary vegetation. Stockpiles shall not be covered with materials such as plastic that may cause it to compost or would kill the seed bank.

Topsoil stockpiles shall be monitored regularly by the contractor to identify any alien plants, which shall be removed when they germinate to prevent contamination of the seed bank.

Any topsoil contaminated by hazardous substances shall not be used and shall be disposed of as per hazardous waste requirements of this document.

The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil required for rehabilitation purposes due to his failure to work according to the approved method statements and the requirements of this EMP.

MS3: ***The Contractor shall submit a site clearing method statement for all areas where the Contractor is required to, or intends to, clear vegetation within the works area. The method statement shall clearly indicate what is to be cleared and how this will be done, where and how cleared material would be stored or disposed of, etc. This method statement will also detail the setting aside of top soil for rehabilitation.***

2.6. CONTROL OF CONSTRUCTION ACTIVITIES

2.6.1. WORK HOURS

Hours of work on the site shall be limited to 07:00 am to 05:00 pm or that accepted by Eskom and the local authority.

If construction is required outside of these times, written permission is to be obtained from Eskom.

2.6.2. NOISE CONTROL

The Contractor shall endeavour to keep noise generating activities to a minimum.

The Contractor shall attempt to, as far as possible, warn any local communities and residents that could be disturbed by noise generating activities, such as blasting or piling, well in advance and shall keep such activities to a minimum.

The Contractor shall be responsible for compliance with the relevant legislation with respect to noise. Construction processes and machinery/vehicles with the lowest noise emission values available must be utilised. A well planned and co-ordinated “fast track” procedure must be implemented to complete the total construction process in the shortest possible time. Noise levels must comply with the SANS 100103 – 0994 (recommended noise levels).

All plant, equipment and vehicles are to have effective silencers/mufflers fitted that would otherwise cause a noise level exceeding 85dB. Exhaust systems are to be in good repair with no holes in the piping. Regular check-ups and adequately maintained must be undertaken to keep all equipment and vehicles in good working order to reduce noise. Excessively noisy equipment, vehicles or machinery requiring repairs are to be removed from site.

No sound amplification equipment (hooters, loud music speakers, sirens etc.) is to be used on site except in emergencies.

All employees must be given the necessary ear protection gear.

2.6.3. **WORKSHOP AND EQUIPMENT REFUELING**

The contractor and all sub-contractors will ensure that the following specifications are complied with and mitigation measures implemented.

All vehicles and equipment shall be kept in good working order to maximise efficiency and minimise pollution. The contractor will ensure that plant operators check their machines daily. Any leaks or similar mechanical problems are to be reported and repaired immediately.

Refuelling of plant on site shall take place at designated locations approved by the ER. Drip trays must be used for all refuelling and similar activities, to prevent any spillage contaminating the environment. The contractor will ensure this is being done and that there are sufficient drip trays available.

All fuel tanks must have a secondary containment area to prevent subsurface leaks from seeping straight into the ground. All pipework must be double walled and comply with SANS 62- 1 and 2, SANS 1132 (pipework). Any fuel stored on site must be kept in bunded storage tanks.

Where practical, all maintenance of plant and equipment on site shall preferably be performed off site. If it is absolutely necessary to do maintenance on site the contractor shall obtain the approval of the ER prior to commencing these activities. The contractor will ensure measure are put in place to protect the environment such as using plastic sheeting to prevent contamination and completing the works as quickly as possible.

Drip trays shall be used to collect used oil, lubricants, etc. during maintenance. Drip trays shall be provided for all stationary plant, generators, pumps and compressors. Drip trays shall be inspected and emptied daily and closely monitored during rain events to ensure that they do not overflow. All waste (including rain water) material in bunds and drip trays are to be managed as hazardous waste. All static plant (stationary for longer than six months) shall be located within a bunded area with an impermeable surface.

2.6.4. **GENERAL AESTHETICS**

The Contractor shall not deface, paint, damage or mark any natural feature (e.g. rocks, etc.) situated on or around the site for survey or any other purposes unless agreed beforehand with the ER. Any features affected by the Contractor or his subcontractors in contravention of this clause shall be restored and rehabilitated to the satisfaction of the ER.

All construction areas must be kept neat and tidy at all times. Different materials and equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.

Site camp lighting must be minimal and cause the least visual impact at night. All light sources must be shielded so that only the area that needs to be lit is lit. No neon or backlit signage is to be allowed. No floodlights are permitted.

2.6.5. **MATERIALS HANDLING, USE AND STORAGE**

The potential environmental impact of the handling, use, storage and disposal of materials used during construction shall be minimised.

Environmental considerations shall be taken into account in the siting of any material storage areas. All manufactured and/or imported material shall be stored within the Contractor's Camp as far as possible and out of the rain if required. All lay down areas outside of the Contractor's Camp must be approved by the ER.

a. Stockpiling

The areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the ER for his approval together with the Contractor's proposed measures for prevention, containment and rehabilitation against environmental damage. This information should be submitted as part of MS1 in section 2.1.2.

Stockpiles shall be positioned and sloped to create the least visual impact. No stockpiling of materials that could leach out and cause pollution may occur. No foreign material generated/deposited during construction shall remain on site on completion. Areas affected by stockpiling shall be reinstated to the satisfaction of the ER.

As dealt with under the dust control section of this document stock piles may need to be covered as a dust control measure.

No stock piling will take place within 32m of any watercourse or from the boundary of any wetland buffer.

b. Cement / Concrete Batching

No concrete mixing or cement batching will take place on bare ground. All mixing shall take place on an impermeable surface to the satisfaction of the ER.

Any large volume concrete batching activities shall be located in an area of low environmental sensitivity to be identified and approved by the ER in collaboration with the ECO. The ECO must be involved in the decision and must provide guidance from an environmental perspective prior to commencement of the proposed action. Cement is a strong alkali and will seriously affect the natural vegetation on the site should contamination of the soils take place. Such residues, chunks, pieces and bits are to be cleaned and removed from the site at the end of the contract period.

All runoff from batching areas shall be strictly controlled, and cement-contaminated water shall be collected, stored and disposed of at a site approved by the ER. Settling tanks or sumps may also be used provided these do not leak and are impermeable. Once settling has occurred the top two thirds of the contaminated water can be, drained into a sewer line with the approval of the Engineer, reused for batching or allowed to evaporate. The remaining material can be stockpiled with the rubble and removed as waste from site.

Contaminated (waste) water storage facilities shall not be allowed to overflow and appropriate protection from rain and flooding shall be implemented. Please also refer to Section 2.8.1.4 on waste water.

Small volume batching is permitted on site provided mortar boards, 250 micron DPC plastic sheeting or similar impervious material is used to prevent contamination with the ground and soil.

Used (empty) cement bags shall be collected and stored in weatherproof containers to prevent windblown cement dust and rain water washing the cement dust onto the ground. Used cement bags shall not be used for any other purpose and shall be disposed of on a weekly basis via the solid waste management system.

All excess concrete/cement and concrete/cement residues shall be removed from site on completion of concrete works and disposed of.

All excess aggregate shall also be removed.

MS4: The Contractor shall submit a method statement detailing cement storage, concrete batching areas and methods, method of transport of cement and concrete, storage and disposal of used cement bags, etc.

2.7. WASTE MANAGEMENT

Waste management on site shall be strictly controlled and monitored. Only approved waste disposal methods shall be allowed.

The Contractor shall ensure that all site personnel and sub-contractors are instructed in the proper disposal of all waste. The site must be subject to a litter clean up at least twice per week or as often as required by the ECO or ER.

As far as is possible the contractor will ensure that waste is minimised by implementing the waste hierarchy concept:

i. ***Reduce*** – Waste generation must be reduced as far as possible. Wherever possible wastage should be avoided.

ii. ***Reuse*** – Wherever possible the contractor will endeavour to reuse materials and items rather than disposing of them.

iii. ***Recycle*** – Whatever can be recycled should be recycled by the contractor.

2.7.1. SOLID WASTE MANAGEMENT

The ER is responsible for ensuring that the contractor implements and adheres to the waste management requirements and all relevant legislation.

The Contractor shall ensure that all facilities are maintained in a neat and tidy condition and the site shall be kept free of litter. Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work the Contractor shall provide litterbins, containers and refuse collection facilities for later disposal.

Solid waste may be temporarily stored on site in a designated area approved by the ER prior to collection and disposal. A containment structure may be created for this purpose, consisting of four ready fence panels covered with shade cloth, one panel to be movable for access and emptying. The structure will have a roof (plastic covered ready fence panel or similar to protect from the rain). The floor is to be lined with DPC plastic to prevent ground or soil contamination from waste residue. If a waste skip is to be used for this purpose it must be kept covered with shade cloth.

Solid waste must be removed as often as required (when the containment area is full) or as instructed by the ER or ECO to a licensed waste disposal site. Recyclable waste should be separated and recycled if at all possible and opportunities provided on site to facilitate the collection of recyclable waste products. Staff should be trained in waste segregation and storage. Arrangements should be made with the relevant recycling companies for the transportation or collection for various wastes.

Bins shall be covered, tip-proof, weatherproof and scavenger proof.

No burning, on-site burying or dumping of waste shall occur. Used (empty) cement bags shall be collected and stored in weatherproof containers to prevent windblown cement dust and water contamination. Used cement bags shall not be used for any other purpose and shall be disposed of on a weekly basis via the solid waste management system.

The contractor is responsible for ensuring that any sub-contractors on site manage and dispose of their waste in line with this EMP. The contractor will instruct all sub-contractors to follow waste management procedures.

MS5:	***The Contractor shall submit a method statement detailing a solid waste control system (storage, provision of bins, site clean-up schedule, bin clean-out schedule, rubble disposal/reuse, rubble removal freequecy etc.) to the ER for approval.***

a. Domestic Waste

The Contractor shall provide refuse bins with lids to the satisfaction of the ER, for all construction areas. Refuse shall be collected and removed from all areas at least twice per week or as requested by the ER or ECO. Domestic waste shall be transported to the approved refuse disposal site in covered containers or trucks.

b. Construction Rubble / Waste

Inert construction rubble shall be disposed of at a site approved by the ER. The ER will be responsible for ensuring that rubble is disposed of by the contractor at the site approved, and that the rubble can be legally disposed of at said site. Rubble stockpiles will be kept consolidated and at a reasonable size. Rubble will be removed regularly and/or at the request of the ECO.

Clean building rubble free from plastic, wood, wire metal, tar, asphalt or similar may be crushed and reused for specific purposes (eg. road sub-base, concrete etc.) within the parameters set in the National Environmental Management Waste Act. Rubble may not be buried on site for the sake of easy disposal.

All other solid waste or contaminated materials shall be disposed of offsite at an approved landfill site. The Contractor shall supply the ER with certificates of disposal or similar proof to indicate legal disposal. Copies of these will be provided to the ECO.

Any crushing and reuse of clean building rubble must fall within the thresholds allowed in terms of the National Environmental Waste Act. All local by laws must be adhered to. Should the volumes and area required exceed these parameters a Waste Licence will be required in terms of the Act.

c. Hazardous Waste

All hazardous waste (including bitumen, old oil etc.) shall be disposed of at a DEADP approved hazardous landfill site (such as Visserhok), or hazardous waste facility, which is licensed to receive such waste. Alternatively the contractor may appoint a reputable (the contractor must take steps to ensure that the waste contractor is legitimate and reputable) waste management service provider to remove and dispose of hazardous waste. The Contractor must provide disposal certificates to the ER copies will be provided to the ECO. The ER will ensure that this process is followed by the contractor.

Under no circumstances shall the spoiling of tar or bituminous products on the site, over embankments, or any burying, be allowed. Unused or rejected tar or bituminous products shall be returned to the supplier's production plant or reputable recycler where practicable as an alternative to disposal.

Used oil, lubricants, cleaning materials, etc. from vehicles, machinery or bund areas shall be collected in holding tanks and sent back to the supplier or removed from site by a specialist oil recycling company as an alternative to disposal.

Once a purpose manufactured hydrocarbon spill remediation product has been used or has been used to treat contaminated materials (soil, rubble etc.) the resulting waste must be disposed of at a facility licensed to receive such waste.

d. Wastewater

The contractor must ensure that waste water is correctly managed on site to the satisfaction of the ER. The contractor will ensure that all sub-contractors comply with the requirements to manage waste water on site.

The list below provides some environmentally responsible options in which waste water can be addressed by the contractor on site. This list is not exhaustive;

- Waste water from activities such as washing tools, batching and similar, will be collected in a drum or conservancy tank. This water may then be re-used for batching or for wetting and compacting sub-base material during road surfacing.
- An impermeable sump lined with thick DPC plastic may be constructed by the Contractor in order to collect waste water from batching and tool washing. The sump will be open to allow the water to evaporate. Care must be taken to ensure that input does not exceed the evaporation rate and that no overflow from the sump occurs. This is of particular importance during the wet season. Once the sump is dry the remaining material at the bottom of the sump will be disposed of with the general waste and rubble.
- Small volume waste water collected from washing and other small volume cement work activities will be disposed of on top of the general rubble pile where it will be absorbed. This will be done in such a way as to ensure that there is no run-off from the rubble pile to surrounding areas. The waste water shall not be of such volume that it will saturate the entire body of rubble or will soak through the rubble pile.

Runoff from fuel depots / bunds / workshops / machinery washing areas and water contaminated with petro-chemicals and hydro-carbons shall be addressed as indicated in the hazardous waste section of this document.

Water from kitchens, showers, sinks and toilets etc. shall be discharged into a conservancy tank for removal from the site or be plumbed into a sewer line if this is available.

The ER's approval must be obtained by the contractor prior to the discharge of any contaminated water into sewer systems.

At no point will waste water from tool washing, batching, grouting, cleaning, showers, kitchens or similar sources be permitted to enter or be disposed of, *inter alia*, in the following manner:

- Into a storm water system.
- Directly onto bare soil.
- Within 50m of a wetland
- Into a water course or on the bank of a water course

2.8. DUST CONTROL

The creating of nuisance/precipitant dust is controlled by the National Dust Control Regulations (R.827 1 November 2013) promulgated under the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004). The contractor will ensure that the specifications of these regulations are met at all times.

The Contractor shall ensure that the generation of dust is minimised and shall implement a dust control programme to maintain a safe working environment, minimise nuisance for surrounding areas and dwellings and protect damage to natural vegetation, crops, etc. by, and not limited to:

- Construction vehicles shall comply with speed limits and haul distances shall be minimised. Material loads shall be suitably covered and secured during transportation.
- During high wind conditions, the ER will evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or weather working will cease altogether until the wind speed drops to an acceptable level.
- Exposed soil and material stockpiles shall be protected against wind erosion and the location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors.
- The Contractor shall implement dust suppression measures (e.g. water spray vehicles (must be used in line with the Water Use By-Laws), covering of material stockpiles, chemical soil binders, shade cloth erected on fencing etc.) if and when required. Straw, brush packs and chipping must be considered prior to the use of water spray vehicles.

- Plastic, shade cloth or other suitable material may be used for covering stockpiles. Top soil stock piles are not to be covered with plastic or shade cloth but hessian or similar to prevent composting occurring.

MS6: The Contractor shall submit a method statement to the ER detailing how potential dust. The contractor will consider the recommendations above while bearing in mind that these are not the only available solutions.

2.9. SOIL EROSION AND SEDIMENTATION CONTROL

2.9.1. DURING CONSTRUCTION

The Contractor shall, as an ongoing exercise, implement erosion and sedimentation control measures to the satisfaction of the ER.

During construction, the Contractor shall protect all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent stormwater from concentrating in streams and scouring slopes, banks, etc.

The use of water on the site (especially at concrete batching plants and road construction where large water bowsers may be used) must be carefully monitored to ensure that the start of erosion on any slopes does not take hold.

Any runnels or erosion channels developed during the construction or maintenance period shall be backfilled and compacted and the areas restored to a proper condition.

Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be actively managed. The method of stabilisation shall be determined in consultation with the ER. Consideration and provision shall be made for the following methods (or combination thereof): brushcut packing, mulch or chip cover, straw stabilising, watering, planting/sodding, soil binders and anti-erosion compounds, mechanical cover or packing structures (including the use of geofabric, log/pole fencing, etc.).

Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised areas shall be repaired and maintained to the satisfaction of the ER.

In areas where construction activities have been completed and where no further disturbance would take place, rehabilitation and re-vegetation should commence as soon as possible.

2.9.2. STORMWATER CONTROL

The Contractor shall take reasonable measures to control the erosive effects of stormwater runoff. The Contractor shall use silt screens to prevent overland flow from causing erosion.

Point source discharge of storm water must be prevented on slopes as this will lead to erosion of the unstable slope with loss of vegetation and resultant deep donga erosion. Any stormwater outlets must be constructed in such a manner as to ensure no soil or bank erosion takes place.

The use of straw bales as filters, which are placed across the flow of overland stormwater flows, shall be used as an erosion protection measures. The ploughing-in of straw offers limited protection against storm water runoff-induced erosion and shall be used as an erosion protection measure. The Contractor shall be liable for any damage to downstream property caused by the diversion of overland storm water flows.

Drip trays shall be used for all pumps, generators, etc. in order to prevent water contamination as a result of fuel spills or leaks.

2.10. PROTECTION OF NATURAL FEATURES AND SYSTEMS

2.10.1. PROTECTION OF NATURAL VEGETATION

The Contractor shall be responsible for informing all employees about the need to prevent any harmful effects on natural vegetation to be retained on the construction site or beyond the site boundaries as a result of their activities.

Clearing of natural vegetation shall be kept to a minimum. Site boundary demarcations and No-Go areas must be adhered to.

2.10.2. PROTECTION OF FAUNA

The Contractor shall ensure that no hunting, trapping, shooting, poisoning or otherwise disturbance of any fauna takes place.

The feeding of any wild animals is prohibited. No food or food products will be stored in such away so as to attract scavengers.

The use of pesticides is prohibited unless approved by the ER.

No domestic pets are permitted on site.

Drainage structures (e.g. gutters, drains, sumps, ditches) must be designed, as far as possible, so that they do not act as pitfall traps for small creatures. They should either have gently sloping edges or be adequately covered to prevent creatures from falling into them.

2.11. PROTECTION OF HERITAGE RESOURCES

A series of test pits must be dug across the proposed footprint area prior to construction work commencing. This could also form part of a geotechnical investigation of sub-surface sediments / formations. Excavations that extend into light orange coloured sands of the Springfontyn Formation may encounter undisturbed fossils (bone and shell), and Stone Age artefacts. It is important to establish the archaeological significance of buried sub-surface deposits before bulk earthworks commence, as it will enable the archaeologist and palaeontologist to develop an appropriate mitigation plan.

Fossils and Stone Age artefacts are protected by law. Should anything of a paleontological / palynological nature be found on site by the contractor (or any other party), e.g. bones not previously visible, work is to be stopped in that area immediately, and the Environmental Control Officer (ECO) notified. Failure to do so will result in a penalty and this must be carefully explained to workers during the Environmental Education Induction Programme undertaken by the ECO. The archaeologist must also assist with the induction programme. No paleontological or archaeological material may be removed from the site without a permit from Heritage Western Cape, the Provincial Heritage Authority.

Permits to recover fossils and archaeological material should be applied for (by the monitoring heritage specialist) in advance of the Construction Phase commencing.

Excavations must be monitored by a palaeontologist or archaeologist with appropriate paleontological knowledge. The frequency of this to be worked out a priori with the contractor to minimize time spent on site.

If possible, geotechnical information should be provided prior to the commencement of construction. This may enable a better estimation of the time(s) when monitoring would be necessary.

Protocols for dealing with paleontological/palynological (fossil pollens) monitoring and possible further mitigation must be included in the EMPr.

Funds must be available a priori to cover costs of monitoring and any additional fieldwork and radiocarbon dates, should the opportunity/need arise.

Should paleontological and/or archaeological material be encountered, the ECO will advise on demarcation of this area and notify the specialist palaeontologist / archaeologist to view material and ascertain whether further study of the area will be required.

Should a specialist confirm a genuine fossil or sub-fossil and recommend further study of the area, work is the applicable area is to cease until further notice. Heritage Western Cape is to be informed immediately.

Should any human remains be disturbed, exposed or uncovered during excavation, work in that area must stop and the find shall immediately be reported to the South African Police Service and the monitoring heritage specialist. If it is suspected that the remains are older than 60 years, then the South African Heritage Resource Agency – SAHRA (021 462 4502) must be informed and established protocols followed.

The removal of discovered paleontological remains by a contracted specialist shall be at the applicant's expense.

All paleontological and archaeological material must be lodged in an appropriate Iziko Museums of South Africa collection.

2.12. EMERGENCY PROCEDURES

2.12.1. FIRE CONTROL/PREVENTION

The Contractor shall take all reasonable steps to avoid increasing the risk of fire through activities on site.

The Contractor shall ensure that basic fire-fighting equipment is available at all construction areas and facilities. The workforce should be appropriately trained in the use of all equipment.

Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include any workshop and fuel storage areas and areas where the vegetation or other material may promote the rapid spread of an initial flame. A fire extinguisher of the appropriate type must be present when welding or other "hot" activities are undertaken.

In terms of the Atmospheric Pollution Act, burning is not permitted as a disposal method.

The Contractor shall appoint a fire officer who shall be responsible for ensuring immediate and appropriate action in the event of a fire. The Contractor shall ensure that all site personnel are aware of the procedure to be followed in the event of a fire.

Any work that requires the use of fire or open flame may only take place at a designated area approved by the ER and must be supervised at all time. Serviced fire-fighting equipment shall be available.

It is recommended that, if cooking is to take place on site, purpose made gas cookers be considered before the use of cooking fires. No fires are to be made on site, unless situated in a designated and demarcated area approved by the ER away from high risk areas and in a contained fire place (not on the bare ground). Fire extinguisher will be in this area at all times. Under no circumstances will there be more than one fire on the site at a time, or for the fire to be left unattended. The contractor will also consider the prevailing weather conditions.

Wood and branches will not be harvested from site as fuel.

MS7: The Contractor shall submit to the ER for approval an emergency procedures plan that will detail responses to both fire emergencies as well as emergencies relating to hazardous substances as set out by this EMP. This method statement shall in no way override, replace, void or offer any exemption from any relevant legislation nor the requirements of the Occupational Health and Safety Act. The MS will include details regarding pre-determined, safe escape routes from the site as well as pre-arranged safe assembly as well as all relevant emergency numbers.

2.13. SITE CLEAN UP AND REHABILITATION

2.13.1. SITE CLEAN UP

The Contractor shall ensure that all temporary structures, equipment, materials, waste and facilities used for construction activities are decommissioned and removed upon completion of the activity. The Contractor shall clear and clean the construction site to the satisfaction of the ER upon completion of the project.

2.13.2. REHABILITATION AS RESULT OF NON-COMPLIANCE

The Contractor will be responsible for any costs resulting from rehabilitation required due to non-compliance with this EMPr.

It may be necessary to obtain specialist (Botanical, Horticultural etc.) input prior to undertaking the required rehabilitation.

2.14. VEGETATION REHABILITATION

No invasive plant species should be introduced to the site. All invasive alien species should be eradicated from the disturbed sites. Non-indigenous and non-endemic species are permitted.

MS8: Should vegetation rehabilitation be required as a result of disturbance, this must be addressed in this Method Statement. Rehabilitation details relating to plant species (all indigenous and suitable to the vegetation type), plant numbers, irrigation and establishment, planting methods etc. must also be detailed.

2.14.1. GENERAL

All areas disturbed by construction activities within the demarcated site, storage and stockpiling areas, etc. shall be rehabilitated and/or landscaped to the satisfaction of the ER.

The need for vegetation rehabilitation, resulting from the contractor's non-compliance with the EMP, will be for the contractors account and will be carried out to the satisfaction of the ER.

"No-Go" areas or areas outside of the approved demarcated site will be rehabilitated with the intention of restoring the area to the same or better condition that it was before the disturbance occurred. Only locally indigenous plants will be used. Where required the necessary specialist (botanist, ecologist etc) must be appointed to oversee and advise on the rehabilitation process.

Re-vegetation of site areas shall take place as soon as possible after completion of construction works. The timing of re-vegetation shall take cognisance of maintenance requirements and provision shall be made for any irrigation requirements.

No construction equipment, vehicles or unauthorised personnel shall be allowed onto areas that have been re-vegetated.

2.14.2. **GROUND SURFACE PREPARATION**

The ER will ensure during the planning phase that all rehabilitation required will be done in accordance with the EA and will be indigenous and water wise.

Prior to re-vegetation, the Contractor shall ensure that the area is clear of any building materials, residues and other foreign debris.

All visible weeds shall be removed from the area before replacing topsoil where required.

Compacted soil shall be ripped along the contour and hand-trimmed. Topsoil shall then be spread evenly over the surface if required.

The final prepared ground surface shall be furrowed to follow the natural slope contours of the land and not smooth.

2.14.3. **PLANTS/TREES**

All re-vegetation of disturbed areas will be done with locally indigenous plants.

Where the ER or Contractor is unsure of suitable plants to be used, input should be sought from a suitably experience horticulturist, aquatic ecologist or botanist for input in this regard.

The Contractor shall ensure that each plant / tree is handled and packed in the approved manner for that species or variety, and that all necessary precautions are taken to ensure that the plants arrive on site in a proper condition for successful growth.

Plants shall be protected from wind during transportation.

No plants or plants with exposed roots shall be subjected to prolonged exposure to drying winds and sun, or subjected to water logging or force-feeding at any time after purchase.

The Contractor shall ensure that the plants are in a good condition and free from plant diseases and pests. The Contractor shall immediately remove plants containing any diseases and/or pests from site.

All plants supplied by the Contractor shall be healthy, well formed, and well rooted. Roots shall not show any evidence of having been restricted or deformed at any time. The potting materials used shall be weed free.

There shall be sufficient topsoil around each plant to prevent desiccation of the root system.

2.14.4. **TIMING**

Re-vegetation of disturbed construction areas shall take place as soon as possible after construction work is completed.

As much as is possible, re-vegetation shall take place at the start of the winter rains to maximise water availability and minimise the need for watering.

If re-vegetation takes place during the dry season, irrigation of planted areas may be necessary.

2.14.5. **ESTABLISHMENT OF VEGETATION**

a. Irrigation

The Contractor shall be responsible for ensuring the establishment of the rehabilitated vegetation to the point at which it becomes self-sustaining.

b. Weed, Diseases and Pest Control

The Contractor shall be responsible for ensuring that all re-vegetated areas remain free of all invasive alien and indigenous weed species during the contract and establishment period.

2.15. NON-COMPLIANCE

The Applicant is responsible for, and required to, directly notify DEA within 24 hours of any non-compliance that has occurred on the site.

2.15.1. **PENALTY PROCEDURES**

The Contractor shall comply with the environmental specifications and requirements on an on-going basis and any failure on his part to do so will entitle the ER to impose a penalty.

Any avoidable non-compliance with the conditions of the EMP shall be considered sufficient ground for the imposition of a penalty.

Penalties may be issued per incident.

Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

In the event of non-compliance the following recommended process shall be followed:

The ECO will issue a formal warming to the contractor with a set rectification period and expected outcome. The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice. The ER will be provided with a copy.

Should the matter not be addressed satisfactorily the ECO will issue a recommendation of issuance of penalty to the ER. A copy will be provided to the contractor. The ER will then have 5 days to consider the ECO's recommendation. Should there be no extenuating or exceptional reason as to why the penalty should not be issued the ER shall uphold and issue the monetary penalty as recommended by the ECO.

The ER will inform the Contractor of the contravention and the amount of the fine, and will deduct the amount from monies due under the Contract. The money will be donated to an environmental organisation nominated the ER and approved by DEA&DP. Proof of these donations must be recorded and presented to the ECO by the ER.

In the case of non-compliance giving rise to physical environmental damage or destruction, the ER shall be entitled to undertake or to cause to be undertaken such remedial and rehabilitation works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so. Rehabilitation will be to the satisfaction of the ER.

In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP, etc. any party shall be entitled to require that the issue be referred to specialists for determination. The cost of which will be borne by the Applicant, contractor or both.

The ER shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

2.15.2. **OFFENCES AND PENALTIES**

Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications in this EMP, he shall be liable to pay a penalty fine over and above any other contractual consequence.

Possible offences, which may result in the issuing of a contractual penalty and guideline for penalty values, include, but are not limited to:

1	Unauthorised entrance into no-go areas.	R7 000 - R15 000
2	Unauthorised persons walking outside the demarcated boundaries of the site	R500 – R1 500
3	Activities unauthorised by the ER outside the demarcated boundaries of the site.	R5 000 – R10 000
4	Unauthorised damage (disturbance) to natural vegetation or damage to natural vegetation due to negligence or non-compliance with the requirements of the EMP (Please note rehabilitation may also be required)	R7 000 – R18 000
5	Failure to suitably demarcate and maintain demarcations of “No-Go” areas or to do so timeously	R1 500 – R5 000
6	Failure to suitably demarcate and maintain demarcations of the site boundaries as agreed with by the ER areas or to do so timeously	R1 000 – R3 000
7	Persons collecting firewood outside the demarcated boundaries of the site	R500 – R1 500
8	Any vehicle being driven, and items of plant or materials being parked or stored outside the demarcated boundaries of the site	R5 000 – R10 000
9	Catching, trapping, intentional killing, disturbing, feeding of wild animals reptiles or birds.	R1 000 – R3 000
10	Erosion due to negligence or non-performance or failure to control erosion. (Please note rehabilitation may also be required)	R1 500 – R5 000
11	Late method statements or failure to submit method statements.	R1 500 – R3 000
12	Failure to adhere to approved method statements	R2 500 – R7 000
13	Unauthorised camp establishment, including stockpiling, storage, etc.	R2 500 – R5 000
14	Insufficient fire control and unauthorised fires.	R2 500 - R20 000
15	Site environmental file not properly maintained: no copy of EA or EMP, approved method statements not on file, ECO reports not on file etc.	R1 500 – R3 000
16	Failure to maintain a complaints register on site or failure to address/respond to complaints	R1 000 – R1 500
17	Failure to follow temporary shutdown procedures	R6 000 – R8 000
18	Any vehicle driving in excess of designated speed limits	R500 - R1 000
19	Improper storage/stockpiling of materials on site, or storage/stockpiling in unsuitable areas.	R250 - R1 000
20	Hydrocarbons or hazardous materials: negligent spills or leaks and insufficient storage, no hydrocarbon remediation product on site.	R1 000 - R5 000
21	Persistent and un-repaired oil leaks from machinery. The use of inappropriate methods of refuelling such as the use of a funnel rather than a pump, no drip tray etc.	R2 000 - R10 000
22	Litter on site	R500 – R4 000

23	Insufficient solid waste management, unauthorised dumping, poor waste containment etc.	R2000 – R8 000
24	Failure to supply proof (invoices, waybills) of correct waste disposal on request	R2 000 – R7 000
25	Excessive cement or concrete spillage or contamination.	R2000 – R5 000
26	Cement / concrete mixing being done on bare soil and failure to manage water runoff from batching areas	R1 500 – R5 000
27	Wastage of water: leaking pipes and taps, proper taps or valves not fitted to pipes, taps or hoses left running, irrigating outside of permitted hours etc.	R500 – R2 000
28	Poor or improper wastewater management, washing of tools directly onto the ground.	R500 – R3 000
29	Failure to mitigate activities resulting in pollution or sedimentation of water resources (Please note rehabilitation may also be required)	R8 000 – R35 000
30	The eating of meals on site outside the defined eating area.	R200 - R1 000
31	Excess or unnecessary noise on or emanating from site	R500 - R1500
32	Failure to implement sufficient dust control measures.	R4 000 – R6 000
33	Any person, vehicle, item of plant, or anything related to the Contractors operations causing a public nuisance	R1 000 - R9 000
34	Ablution facilities: non-use, insufficient facilities, insufficient maintenance	R500 - R1 000
35	Unauthorised activities outside of permitted working times	R2 000 - R10 000
36	Failure to notify ER / ECO of activities or impacts that may affect the environment	R2 000 - R4 000
37	Any other contravention of a EMP specification or any condition of an environmental nature or instruction from ER.	Variable – Up to R50 000

For each subsequent similar offence the fine may be doubled in value to a maximum value of R100 000. The ER may also stop works.

Penalties for removing or damaging trees:

Girth of trunk (1m above ground level)	Replacement value per tree
0 – 15 mm	R500
16 – 30 mm	R800
31 – 50 mm	R1 900
51 – 75 mm	R3 000
76 – 100 mm	R5 000
101 – 150 mm	R15 000
150 – 300 mm	R20 000
Larger than 300 mm	R25 000 to R100 000

SECTION 3

OPERATIONAL PHASE

3.1. SECTION AIMS

Section 3 of the Environmental Management Programme (EMPr) is required to address the protection and ongoing management of the natural resources on the site. The overarching goal is to ensure that undue or reasonably avoidable impacts of the proposed activities are avoided and that positive impacts are enhanced. This Operational Environmental Management Plan (OEMP) has been compiled to fulfil such requirements.

This will ensure that the greater objective of Integrated Environmental Management (IEM) which aims to promote the concept of sustainable development and that underpins environmental process in South Africa will be upheld throughout the project. The controls set out in this EMPr are to ensure that the recommendations made by specialists regarding the development have and are being implemented and upheld.

The OEMP details the environmental goals objectives, management actions, monitoring requirements, and criteria for long-term management and monitoring, as well as remedial actions where actions are ineffective.

3.2. ASSUMPTIONS AND LIMITATIONS

This operational management plan has been compiled during the environmental authorisation process of the project. The management strategies in this section of the report have been made based on the assumption that the recommendations made by the specialists have been completed and that the conditions of approval in the Environmental Authorisation, should approval be granted, have been met. This section of the EMPr may have to be amended following on any approvals made, to ensure that all the recommendations are captured as management strategies, as well as any other conditions that may be made.

3.3. RELEVANT LEGISLATION

The following is a list of the legislation that may be pertinent to the development and its long term management. All activities on site must ensure compliance with the provisions of the, various legislation, as applicable.

- National Environmental Management Amendment Act, 1998 (Act 107 of 1998), as amended.
- National Environmental Management Waste Act, 2008 (Act 59 of 2008), as amended.
- National Environmental Management: Biodiversity, 2004 (Act 10 of 2004)
- National Environmental Management: Protected Areas (Act. 57 of 2003).
- National Nuclear Regular, 1999 (Act 47 of 1999)
- National Water Act, 1998 (Act 36 of 1998).
- Natural Heritage Resources Act, 1999 (Act 25 of 1999).
- The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996).
- The Land Use Planning Ordinance, 1985 (Ordinance 15 of 1985).
- Local Municipal By-Laws.

3.4. REVIEW OF SECTION 3 OF THE EMPR

It is envisaged that a review of this OEMP will not be required. However it may be undertaken should the applicant wish to, or by way of instruction from DEA.

3.5. RECORD KEEPING

The applicant will keep records of, but not limited to, the following:

- Routine implementation and management schedules, budgets and costs.

- Monitoring reports of maintenance and repairs.
- Complaints received and responses made.
- Audit reports and reviews of the OEMP.
- Changes to the OEMP (with subsequent approvals for changes).

Records should be kept with all the documentation. These must be made available for review on request, based on adequate motivation.

3.6. NON-COMPLIANCE

Allegations of non-compliance by members of the public, stakeholders, visitors to the site and Authorities, must be reported to the estate manager for investigation. All such allegations should be recorded in written format, together with the findings of the investigation. These records must be stored for consideration during the audit process. All acts of non-compliance must be reported to the estate manager. The action to remediate acts of non-compliance must be identified in consultation with a suitable specialist or environmental consultant and a cost attached to this.

The individual responsible for the act of non-compliance must be financially responsible for the remediation of any damage to the environment. The instruction to remediate must come from the estate manager.

3.7. FUNDING

The cost for the any operational phase audits, required monitoring or similar must be provided by the Estate once operational.

3.8. OPERATIONAL MANAGEMENT GOALS

The operational management goals set the procedures for Applicant to achieve its operational environmental policy and goals. This is broken down into the following components, which detail the various goals and objectives set to meet certain targets set. It also describes the various management activities that can achieve these objectives, together with the monitoring and target criteria.

The following have been set as Operational Management Goals to ensure responsible and environmentally sustainable long-term management of the site:

GOAL 1: Maintenance of Infrastructure

To ensure that the reservoir and amenities on site are maintained in good order.

GOAL 2: Invasive Alien Vegetation Clearing

To control and reduce invasive alien vegetation on the site.

GOAL 3: Soil and Groundwater Preservation

To prevent any incidents that could lead to soil and groundwater pollution.

GOAL 4: Fire Risk

To prevent fire outbreaks.

Refer to **Section 4** hereafter, which describes the environmental management and mitigation measures that must be implemented during the operational phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof.

SECTION 4

IMPLEMENTATION

4.1. IMPLEMENTATION OF THE EMPR

The following tables are provided to assist the developer, design team, engineer and contractor with the effective implementation of this EMPr. The table below serves as a quick reference guide to the EMPr, but must be read in conjunction with the entire document.

4.1.1. DESIGN & PRE-CONSTRUCTION PHASE

Aspect & Activity	Associated Impacts	Objective & Target	Management Action	Monitoring Action	Responsible Party & Monitoring Frequency
Aspect: Legislative requirements **Activity:** Familiarisation with the contents of the EMPr & EA.	• Non-compliance with environmental legislation. • Job creation during construction.	**Objective:** Ensure compliance with environmental legislation. **Target:** Commence site establishment with all permits on hand.	Pre-construction induction to ensure compliance with the EA and EMPr. Refer to **SECTION 2.1.7** of this EMPr.	• Copies of all authorisations and management plans are present on site. • ECO to provide proof of compliance in the first environmental control report.	**Responsibility:** ECO, Engineers, Contractor & Project Management **Monitoring Frequency:** Once off - prior to commencement of site clearing & earthworks.
Aspect: Site establishment **Activity:** Demarcation of development areas and no-go areas.	Disturbance to no-go areas.	**Objective:** Ensure that the disturbance footprint is limited to the demarcated site area. **Target:** Contain all construction activities inside the demarcated site area.	All areas outside of the construction / development area to be clearly demarcated. Vegetation outside development area is considered no-go areas. Refer to **SECTIONS 2.2 – 2.4** of this EMPr.	• ECO to maintain photographic record of demarcation.	**Responsibility:** ECO, Contractor & Project Management **Monitoring Frequency:** • Prior to commencement of site clearing & earthworks • Monitor weekly
Aspect: Environmental Awareness **Activity:** Environmental Induction Training	• Unnecessary impacts to environmental aspects. • Employment opportunities and skills development opportunities during the construction and operational phases.	**Objective:** Ensure that all relevant parties and workers understand the EMPr requirements. **Target:** No environmental incidents recorded.	As defined in the EMPr. Refer to **SECTION 2.1** of this EMPr.	• Contractor to provide details to ECO. • ECO to provide details in monthly reports.	**Responsibility:** ECO & Contractor **Monitoring Frequency:** • Prior to commencement of site clearing & earthworks.

Aspect & Activity	Associated Impacts	Objective & Target	Management Action	Monitoring Action	Responsible Party & Monitoring Frequency
Aspect: Heritage **Activity:** Geotechnical assessments or testing	• Potential loss of fossil-bearing deposits:	**Objective:** Prevent unnecessary loss of fossil discoveries. **Target:** No loss of fossils.	As defined in the EMPr. Refer to **SECTION 2.11** of this EMPr.	• Contractor to provide details to ECO. • ECO to provide details in monthly reports.	**Responsibility:** ECO & Contractor **Monitoring Frequency:** • During geotechnical assessments or testing, prior to commencement of site clearing & earthworks.

4.1.2. CONSTRUCTION PHASE

Aspect & Activity	Associated Impacts	Objective & Target	Management Action	Monitoring Action	Responsible Party & Monitoring Frequency
Aspect: Soil & groundwater **Activity:** Site clearing, earthworks and construction activities	Potential soil and ground water contamination	**Objective:** Avoid soil or groundwater contamination. **Target:** No environmental incidents recorded.	• All construction vehicles must be properly maintained to prevent leaks. • Cement mixing must be confined to a designated area and must be done on an impervious surface, or pre-mixed cement must be used. • Any fuel stored on site must be kept in bunded storage tanks. • Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants. • Drip trays are to be inspected on a weekly basis for leaks and effectiveness, and emptied when necessary. This is to be closely monitored during rain events to prevent overflow.	• Contractor to provide details to ECO. • ECO to provide details in monthly reports.	**Responsibility:** ECO & Contractor **Monitoring Frequency:** • Throughout the construction phase.
Aspect: Vegetation **Activity:** Site establishment, earthworks and construction vehicles	Disturbance to and loss of Medium sensitivity vegetation.	**Objective:** Prevent unnecessary vegetation loss. **Target:** No loss of vegetation beyond the immediate site, in other words the	• Demarcate and fence off the construction site boundaries upon site establishment and limit all activities to inside these boundaries. • Limit the footprint area of the construction activity to the immediate site.	• Contractor to record any incidents of vegetation loss in the No-Go areas. • Contractor to provide details to ECO.	**Responsibility:** ECO & Contractor **Monitoring Frequency:** Throughout the construction phase.

Aspect & Activity	Associated Impacts	Objective & Target	Management Action	Monitoring Action	Responsible Party & Monitoring Frequency
movement.		No-Go areas.	• Designate areas outside the construction footprint as No Go areas. • Contractors must drive on existing access roads as far as possible to prevent formation of unnecessary tracks for access roads. • Prohibit temporary storage of building material or soil within areas of natural vegetation falling outside of the construction footprint. • Remove all alien and weed species encountered within areas disturbed by construction activities. Removal of species should take place throughout the construction and operational phases of the development. • Rehabilitate the development footprint and areas disturbed during construction with species indigenous to the vegetation type during the decommissioning phase of the development. Refer to **SECTION 2.5.1** of this EMPr.		
Aspect: Surface water	Although no surface water features occur on or near the site, some wetlands	**Objective:** Control surface run-off to	• Refuelling and servicing of vehicles must be undertaken at designated service areas	• Contractor to record any findings of erosion.	**Responsibility:** Contractor

Aspect & Activity	Associated Impacts	Objective & Target	Management Action	Monitoring Action	Responsible Party & Monitoring Frequency
Activity: Earthworks and construction activities	occur in the surrounding areas and could be affected as a result of uncontrolled surface run-off from the construction site.	avoid surface water pollution. **Target:** No impacts on surface water recorded.	and on an impermeable surface. • Make use of a drip tray when refuelling vehicles or equipment on site. • Place drip trays under engines of vehicles or equipment when parked or stored overnight or longer. • Spill kits to clean up accidental spills from vehicles or equipment must be well marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. • Immediately clean oil and fuel spills and dispose of contaminated material (soil, etc.) at licensed waste disposal sites. • Do not release any pollutants, including sediment, sewage, cement, fuel, oil, chemicals, hazardous substances, waste water, etc., into the environment. • Compile a procedure for the storage, handling and transport of different hazardous materials and	• Contractor to provide details to ECO.	**Monitoring Frequency:** Throughout the construction phase.

Aspect & Activity	Associated Impacts	Objective & Target	Management Action	Monitoring Action	Responsible Party & Monitoring Frequency
			ensure that it is strictly adhered to. • Ensure vehicles and equipment are in good working order and drivers and operators are trained with respect to actions to be taken in the case of a spill or leak. Refer to **SECTION 2.9.2** of this EMPr.		
Aspect: Air Quality **Activity:** Excavations, construction activities and construction vehicles movement.	• Generation of dust as a result of construction related activities. • Emission of exhaust fumes by construction vehicles.	**Objective:** • To avoid dust from excavated materials and construction activities. • To avoid excessive emissions from construction vehicles. **Target:** Minimise the incidence of dust or emission related complaints.	• Dust suppression methods, such as wetting or laying straw, should be applied where there are large tracts of exposed surfaces. If wetting is used, consideration in the use of non-potable water must be considered. • Stock piles and spoil heaps must be covered with tarpaulins or straw to prevent fugitive dust. • All construction vehicles must be appropriately maintained to minimise exhaust emissions • All mitigation measures described in the EMPr relating to dust and vehicle emissions must be adhered to.	• All spills or accidents involving such materials are to be recorded by the Contractor. • Contractor to provide details to ECO.	**Responsibility:** Contractor **Monitoring Frequency:** Throughout the construction phase

Aspect & Activity	Associated Impacts	Objective & Target	Management Action	Monitoring Action	Responsible Party & Monitoring Frequency
			Refer to **SECTION 2.8** of this EMPr.		
Aspect: Noise **Activity:** Noise nuisance from construction related activities.	• Construction vehicles and other construction machinery will increase the noise levels during working hours. • Increased noise levels may be a nuisance factor to occupiers of the land.	**Objective:** To avoid excessive noise generation from site operations. **Target:** Minimise the incidence of noise generation.	• Construction activities as well as the use of construction vehicles on the road must only occur between 07:00am and 05:00pm. • All construction vehicles must be fitted with silencers to avoid excessive noise. • All equipment to be adequately maintained and kept in good working order to reduce noise. • All employees must be given the necessary ear protection gear. • Noise levels must comply with the SANS 100103 – 0994 (recommended noise levels). • All mitigation measures relating to noise control as described in the EMPr must be adhered to. Refer to **SECTION 2.6.2** of this EMPr.	ECO to provide details in monthly reports.	**Responsibility:** Contractor **Monitoring Frequency:** Throughout the construction phase.
Aspect: Heritage resources	• Potential loss of fossil-bearing deposits.	**Objective:** Prevent unnecessary	• Refer to **SECTION 2.11** of this EMPr.	• Contractor to provide details to ECO.	**Responsibility:** ECO & Contractor

Aspect & Activity	Associated Impacts	Objective & Target	Management Action	Monitoring Action	Responsible Party & Monitoring Frequency
Activity: Earthworks and construction activities	• Discovery of fossil-bearing deposits.	loss of fossil exposed. **Target:** No loss of fossils.		• ECO to provide details in monthly reports.	**Monitoring Frequency:** • During excavations and trenching.

4.1.3. OPERATIONAL PHASE

Aspect & Activity	Associated Impacts	Objective & Target	Management Action	Monitoring Action	Responsible Party & Monitoring Frequency
Aspect: Vegetation / invasive alien species **Activity:** Removing, clearing and management of invasive alien vegetation.	• Increased fire risk. • Spread of invasive alien plants to other areas. • Loss of biodiversity. • Environmental degradation resulting from the change of vegetation structure and possible soil chemistry.	**Objectives:** To control and reduce invasive alien vegetation on site. **Target:** • To reduce the number of invasive alien plants on site. • To reduce the spread of invasive alien vegetation on the site and to the surrounding areas.	• After the clearing of any invasive alien vegetation, follow-up clearances must be undertaken twice a year for three years, with a view to becoming standard practice. • Any disturbed areas must be rehabilitated with suitable indigenous flora as soon as possible. • Removal of weedy or invasive plant material is to be done by hand and in accordance with applicable and recognised methods. No machinery may be used. • Areas that have been cleared must be considered for replanting with the locally indigenous species. Clearing must take place before invasive alien plants flower and set seed. All cleared material is to be removed from site to a suitable refuse facility. • If herbicides are to be used, the following should be taken into account: o Only registered herbicides are to be used. o Herbicide application must	Monitoring for and removal of weeds, invasive aliens and other non-desirable vegetation must take place regularly, as once alien or weedy seedlings are established, their control will become more difficult.	**Responsibility:** Applicant **Monitoring Frequency:** Throughout the operational phase.

Aspect & Activity	Associated Impacts	Objective & Target	Management Action	Monitoring Action	Responsible Party & Monitoring Frequency
			be done in such a way as to prevent over-spray and spray drift. Herbicide application should not be undertaken during windy conditions. o All equipment must be suited to the task at hand and be in good working order. o No water will be collected from any natural sources for mixing of herbicide or cleaning of equipment.		
Aspect: Soil and Groundwater **Activity:** Refuelling of tanks, vehicles and equipment during the operational phase.	Potential soil and groundwater contamination.	**Objective:** Prevent soil and groundwater pollution. **Target:** No significant spills or leak incidents or signs of soil or groundwater pollution recorded.	• Any significant spills or leak incidents must be reported in terms of the National Environmental Management Act, 1997 (Act 107 of 1998) and the Water Act, 1998 (Act 36 of 1998). • Tanker delivery drivers must be present during delivery of fuel with the emergency cut off switch. • In the event of the pump dispenser or the hoses being knocked over or ripped off, the fuel supply must be cut off by shear-off valves. • An Emergency Response Plan must be in place for the site, this must clearly describe	The Applicant must report any significant incidents that could potentially lead to soil or groundwater pollution.	**Responsibility:** Applicant **Monitoring Frequency:** Throughout the operational phase.

Aspect & Activity	Associated Impacts	Objective & Target	Management Action	Monitoring Action	Responsible Party & Monitoring Frequency
			emergency procedures and include emergency contact numbers.		
Aspect: Visual **Activity:** No specific activity	Unsightly views of the reservoir.	**Objective:** No unnecessary disturbance to the view. **Target:** The reservoir blends in with to the vista.	• Re-vegetation and landscaping with plant species indigenous to the Cape Flats Dune Strandveld biome must be undertaken, where possible, to minimise the visual effects of the reservoir.	The Applicant must ensure that the vegetation is reinstated and monitor vegetation growth to ensure regrowth until its fully established.	**Responsibility:** Applicant **Monitoring Frequency:** Throughout the operational phase.

ANNEXURES

Annexure 1: Locality Map

Annexure 2: Method Statement - Example Template

Annexure 3: Environmental Awareness Material

Annexure 4: Temporary Shutdown Checklist

Annexure 5: Concise Curriculum Vitae of Author

Annexure 6: Environmental Authorisation

Annexure 1: Locality Map

Refer to Appendix A1 of the Draft Basic Assessment Report for the Locality Map.

Annexure 2: Method Statement
Example Template

METHOD STATEMENT (MS)

PROJECT:
METHOD STATEMENT:
NUMBER:
DATE DRAFTED:

DATE REQUESTED BY ER:		DATE SUBMITTED	
DATE RESPONSE REQUIRED BY:		DATE WORK START	

REVIEW SCHEDULE		
DATE	AUTHORITY	COMMENTS

CONTRACTOR NOTE: METHOD STATEMENTS SHOULD ADDRESS THE FOLLOWING

WHAT	Brief description of the work to be undertaken
HOW	Detailed description of the process of work, methods and materials
WHERE	Description/sketch/map of locality of work (where applicable)
WHEN	Due commencement date and completion date estimate (day/night work)

NB! Contractor to ensure method Statements are submitted at least 7 business days prior to work commencing on site. It is the Contractors responsibility to submit the required MS timeously to the ER.

APPROVALS			
	ECO	ER	CONTRACTOR
Signature			
Date			

Construction Activity & Location:
Materials & Equipment to be Used:

Storage / Removal of materials, Waste & By-Product:
Additional Pages to be attached if required. (E.g. Site layout plans, diagrams, drawing, additional text)

Annexure 3: Environmental Awareness Material

Environmental Management during Construction.

The why, what and how…

BUT WHY…

… should we care about the environment?

The environment provides us with everything we need to survive – food, water, fuel, air, etc. Human activity uses resources and has an impact on those resources. Managing our resource use and ensuring that our impact is minimised will ensure that these resources are not depleted.

The Constitution says that all people in South Africa have the right to a healthy environment. If you damage the environment, you are taking away that basic right of others as well as future generations – your children and grandchildren!

…environmental management if there is already conservation?

Historically, development and environmental conservation have been in conflict, because conservation was understood as the protection of resources, and development as the use, or exploitation of resources. The two competed for the same resources, but both are needed! Enter: *SUSTAINABLE DEVELOPMENT.*

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable development thus aims to improve the quality of human life while living within our ecological means = the wise use of resources!

…environmental management of construction?

South Africa's effort to attain sustainable development is based on the concept of Integrated Environmental Management (IEM). The purpose of IEM is to resolve or lessen any negative environmental impacts and to enhance positive aspects of development.

IEM is designed to ensure that the environmental consequences of development proposals are understood and adequately considered in the planning, implementation and management of all developments.

It is intended to guide, rather than impede the development process by providing a method of gathering, analysing and utilising information about the environmental impacts of development. IEM and other principles of Environmental Management are set out in the National Environmental Management Act (No. 107 of 1998) & National Environmental Management Amendment Act (No. 62 of 2008)

BUT WHAT…

…exactly is the 'environment'? What if we're not working near rivers or fynbos or leopard toad habitat?

The environment is not only the 'conservation-worthy' such as rare plants and endangered animals. The environment is everything around you!

It is made up of living things (e.g. people, plants & animals) and non-living things (e.g. soil, water, buildings & cars). People and man-made things are also important parts of the environment.

Protection of the environment means that all living and non-living things are protected. During construction, Environmental Management Programmes (EMP's) are implemented not only to protect fynbos or leopard toads but also to protect people (both on site and off), property (houses, cars, etc.) as well as natural resources such as water, air and soil.

…do Environmental Management Programmes (EMP's) do? What does this mean for my contract?

EMPs are tools to facilitate environmental management during the construction phase of development projects and thereby avoid *unnecessary* impacts to the environment.

In the past, the functionality and efficiency of EMPs was hampered by resistance from contractors and engineers, the difficulties of costing for compliance and the lack of legal enforceability.

Now Environmental Management Programmes (EMP's) are stipulated in the Environmental Authorisations (ROD) as a condition of the approval to go ahead with the development, in other words it is *legally binding.*

When you sign a contract do work on a project with an EMP, you are legally bound to comply with that EMP!

Methods of implementing EMPs are becoming more and more stringent and issues of enforceability are being addressed. Those individuals and companies that are familiar with compliance with EMPs will be at a competitive advantage!

…do EMPs consist of?

EMPs usually contain an environmental policy statement, organisational structure detailing the responsibilities and authorities involved in the project, procedures for communication and record-keeping and environmental specifications.

EMPs are adapted to the scale and sensitivity of the construction project. They can be thick documents detailing specifications for every eventuality specifically adapted to the project, or they can be short and brief documents setting out standard environmental procedures and controls. Sometimes EMPs include extensive penalty and incentive schemes.

A WORD ON METHOD STATEMENTS:

A method statement can be requested or proposed when an activity is either not included in the EMP at all, if the EMP specifications for an activity is not deemed adequate, if an activity is required that is not allowed by the EMP, etc. In other words, when the EMP does no give enough information to manage the environmental impact of a specific activity.

A method statement is defined as a written submission by the Contractor setting out the plant, materials, labour and method proposed to carry out an activity. Method statements must provide enough detail that the environmental impact of the activity can be assessed. Method statements must therefore be submitted well in advance of the activity (usually at least 5 days but sometimes more).

Method statements are therefore an extension of the EMP, are also legally binding and are intended to ensure that the environmental implications of an activity outside of the EMP can be addressed.

Method statements usually require the approval by the engineer, the ECO/ESO/DEO, etc. before the activity can take place. If such an activity takes place without approval and result in environmental damage, the contractor is responsible for the cost of rehabilitation/clean-up/etc.

…is an ECO, ESO, DEO, etc.?

EMPs usually require the appointment of an ECO, ESO, DEO, etc. to oversee the implementation of and compliance with the EMP on behalf of the engineer or the contractor(s). Ultimate responsibility for compliance with the EMP lies with the contractor(s) and the engineer.

ESO = Environmental Site Officer – usually on site permanently or often. Can be independent consultant or from contractor/engineer.

ECO = Environmental Control Officer – usually visits site on a regular basis and audits compliance with the EMP. Usually independent consultant.

DEO = Designated Environmental Officer – usually on site permanently, usually member of contractor or engineer site staff.

Organisational structures and responsibilities differ from project to project and depend on environmental sensitivity of the project, scale of the project, etc. Increasingly nowadays, each party is required to appoint their own person responsible for environmental management on site, e.g. the engineer would have an ESO/ECO and the main contractor(s) would have an ESO/DEO etc.

It is therefore important to familiarise yourself with that part of the EMP that deals with organisation and responsibilities for each contract that you are involved in.

BUT HOW…

…do EMPs promote sustainable development?

They don't!

It is the people on site that protect the environment. The EMP, like any other plan or policy, is not worth anything if there isn't a commitment from those working on the project to compliance with the EMP.

…can I ensure my work comply with the EMP?

Environmental specifications in different EMPs can vary from vague to very detailed.

- Firstly, it is obviously important to know what those specifications are, vague or not, so READ THE DOCUMENT! Ignorance does not absolve you from your responsibility. A copy of the EMP must be kept at the site office at all times.
- It also helps to understand WHY those specifications are there – some things are obvious but others may not be. Some EMPs may have specifications that are not relevant. Don't be afraid to question the EMP; it can only increase its efficiency!
- Know where the sensitive areas on site are – watercourses, wetland areas, residential areas, etc. – and be extra vigilant when working in these areas.

Mostly environmental management of construction activities and compliance with EMPs require only common sense and with good housekeeping the battle is half won!

The enclosed environmental handout sets out the standard environmental specifications

DO'S AND DON'TS (1)

Workers & equipment must stay inside the site boundaries at all times.
Nobody may enter areas marked as No-go areas.

Why? Construction activities, equipment and people cause damage and disturbance to the area surrounding the site. As small an area as possible will be affected if all workers and equipment stay within the site boundaries. This is especially important if there are people who live around the site or natural areas around the site which should not be disturbed.

Do not swim in or drink from streams.
Do not throw oil, petrol, diesel, concrete or rubbish in streams.
Do not work in the stream without direct instruction.
Do not damage the banks or plants of streams.

Why? River water may be polluted which could make you sick.
Oil, petrol, diesel, concrete or rubbish will kill plants and animals living in the water. They may also make people who may drink the water downstream sick. Rubbish in the stream also makes it look ugly.
People and machinery working in the stream will damage it and kill plants and animals living in the stream. It may also cause erosion, which is expensive to repair.
The plants on the edge of the stream bind the soil together and prevent soil from getting washed away. Soil washed into a stream may affect people using the water downstream (e.g. for irrigation).

Protect animals on the site.
Ask your supervisor to remove animals found on site.

Why? Animals are an important part of the environment. All animals have a purpose, even snakes which catch mice and rats. Other important animals are owls, chameleons and frogs.

Do not damage or cut down any trees or plants without permission.
Do not pick flowers.

Why? Some plants are rare and may take a long time to grow back, if at all. Plants in the "no go" areas should not be damaged.
Some plants will die if their flowers are picked. Rare plants may be lost.

Put cigarette butts in a rubbish bin.
Do not smoke near gas, paints or petrol.
Do not light any fires without permission.
Know the positions of fire fighting equipment.
Report all fires.
Do not burn rubbish/ vegetation without permission.

Why? Leaving a burning cigarette butt on the ground may lead to runaway fires which are dangerous to construction workers, people living around the site, equipment, houses, plants and animals.
Smoking near flamable material is dangerous and may cause an explosion.
Lighting a fire without permission may cause a runaway fire (see above).
Reacting quickly to fires that break out will prevent them from spreading and causing damage.

DO'S AND DON'TS (2)

Work with petrol, oil & diesel only in designated areas.
Report any petrol, oil & diesel leaks or spills.
Use a drip tray under vehicles & machinery.
Empty drip trays after rain & throw away were instructed.

Why? Designated areas should have measures to protect against petrol, oil & diesel spills. Oil, petrol and diesel can drip onto the soil and soak into it. Plants will not grow and animals will not live in dirty soil. It also looks ugly to people living around the area.
Drip trays will prevent oil, petrol or diesel from soaking into the soil and killing plants and animals.
If drip trays are not emptied they may overflow and pollute the surrounding soil. If oil, petrol or diesel are put into a stream, plants and animals living in the stream will be killed. They may also make people who may drink the water downstream sick. Ask your supervisor where drip tray water may be disposed of on site.

Try to avoid producing dust – wet dry ground and stockpiles.

Why? Dust can be irritating to people and can reduce production on site. It can cause problems such as eye irritations and coughs. It also reduces visibility on and around the site, which can be dangerous to drivers and pedestrians, and can cause damage to the surrounding environment.
Soil should not be made too wet because that will cause safety problems and soil may be washed away.

Do not make loud noises around the site, especially near schools and homes.
Report or repair noisy vehicles.

Why? Loud noises are irritating to workers and people living around the site. Loud noise can also be harmful to people (especially children) and affect their hearing.
By keeping vehicles in good condition, loud noise can be prevented.

Use the toilets provided.
Report full or leaking toilets.

Why? Sewage attracts flies and other irritating pests. If the site is near a river or stream, sewage makes the water smell and people who swim in it or use it to wash their clothes will get sick. It also causes plants to grow too much which blocks the river, which may cause flooding of houses and property.
Regular emptying of toilets is hygienic and will also prevent overflows.

Make sure that you eat where there is a rubbish bin nearby.
Never eat near a river or stream.
Put packaging & leftover food into rubbish bins.

Why? Eating areas generate a lot of rubbish and litter (e.g. bottles and packets) which will pollute the site and surrounding areas. Therefore, eating must be done near bins which are placed in the eating.

Rubbish in a stream looks ugly and can be harmful to people's health. It may also kill the plants and animals living in the stream. Rubbish and food left lying around will attract pests (such as rats) which are dangerous to people and cause a health hazard. Also, rubbish left lying around is ugly and unpleasant to look at.

Do not litter–put all rubbish (especially cement bags) into the bins provided.
Ask your supervisor for a bin if there is none. Bins must be provided.
Report full bins to your supervisor.
The responsible person should empty bins regularly.

Why? Litter is ugly. It is also dangerous and unhealthy to adults, children and animals walking around the area. Not putting the lid back on the bin will cause rubbish to be blown away.
Regularly emptying bins will prevent litter and rubbish flying around the site.

Always keep to the speed limit.
Drivers - check & report leaks.
Ensure loads are secure & do not spill.

Why? Speeding is dangerous to people who live in the area, especially children. Speed kills!
Faulty vehicles are dangerous to the driver, pedestrians and other motorists. Leaks can also pollute the ground and water and smoke from vehicles can cause health problems.
This is a potential danger to other motorists. Also, do not overload vehicles.

Know all the emergency phone numbers.

Why? Prompt reaction to an accident, fire or spill will reduce the risk of serious damage to the environment and to workers.

<u>If rules are broken:</u>
- Spot fines
- Removal from site.
- Construction may be stopped.

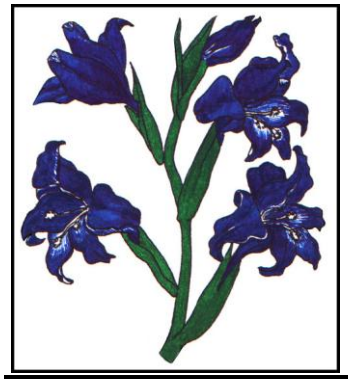
Why? Failure to adhere to the EMP may result in spot fines being issued to the company. It is then the Site Agent's responsibility to collect these fines from guilty individuals and he may even deduct fines off your wages.
The fines are meant to act as an incentive for workers to take the EMP seriously.
A person may be removed from site if they continually disregard the specifications in the EMP.
If the EMP is not adhered to, the local Environmental Authority may stop construction.

Report any breaks, floods, fires, leaks and injuries to your supervisor.

Ask questions!

Thank you for your attention.

Annexure 4: Temporary Shutdown Checklist



SITE TEMPORARY SHUTDOWN CHECKLIST

In the event of a temporary site closure for any period of inactivity longer than 7 business days the Contractor is to notify the ECO. The Contractor / DEO shall check the site, ensuring that the following items are addressed and provide a brief written report on compliance to the ER and a copy sent to the ECO. This must be returned prior to the shutdown period commencing. It is the contractor's responsibility to return the required documentation complete and on time.

	ITEM TO BE ADDRESSED	COMPLETE (Yes/No)	COMMENT
	Fuels / flammables / hazardous materials store		
1	Fuel stores are as low in volume as practicable.		
2	There are no leaks (vehicles, contains, bunds etc.).		
3	Fuel & hazardous materials stores and outlets are locked.		
4	Bund areas are emptied fire extinguishers are serviced and accessible.		
5	Emergency and management contact numbers are available and displayed.		
6	There are no stores or containers within the 1:50 year flood line.		
	Safety		
7	Site safety checks have been carried out in accordance with the Occupational Health and Safety Act No. 85 of 1993 prior to site closure.		
8	All trenches and manholes are secured.		
9	Security personal has been briefed and has the facilities to contact and be		

	contacted by the relevant management and emergency personnel.		
10	Night hazards such as reflectors, lighting, traffic signage, etc have been checked and are in place where required.		
11	Scaffolds and other structures vulnerable to high winds are secured.		
Erosion			
12	Dust mitigation measures as noted in the CEMP such as straw, binding agents, covering of stock piles or similar are in place. Sand and spoil stockpiles to be stabilised or covered with shade cloth. Please note only non-potable water from a legal source may be used for dust damping. Please list dust abatment implemented or to be implemented prior to site closure.		
13	Excavated slopes and stock piles are at stable angles and able to accommodate normal expected flows.		
14	Sand and other easily erodible materials are at the lowest volume possible on site.		
Water and pollution management			
15	Toilets to be emptied and secured. Plumbed toilets are to have no water leakages.		
16	Refuse bins are to be emptied and secured.		
17	Cement and materials store is secured.		
18	Works areas and camp site areas are clean and tidy. Litter and waste has been collected and removed from site.		

19	Plant remaining on site to have as little remaining fuel as possible and are to be checked for leaks. Suitable drip trays are to be placed and secured under all remaining plant.		
20	All other drip trays already in use are to be checked and emptied.		
Key Personnel Contact Details For Emergencies & Complaints			
21	Please provide details for at least three people that will be available at all times throughout the shutdown period to address any complaints or deal with any emergency situations that may arise.		*Name:* *Contact No.* *Name* *Contact No.* *Name* *Contact No.*

I the under signed confirm that I have read and under stood this document and that all the information provided above is true and correct.

Main Contractor: _____ . Date: _____ .
Company Name

Contractors Authorised Representative: _____ . Signature: _____ .
Name Signature

Annexure 5: Concise Curriculum Vitae of Author

Curriculum Vitae of Adél Groenewald
Environmental Consultant

Personal Profile

Name: Me. Adél Groenewald
Gender: Female
Nationality: South African
Email: Adel@dougjeff.co.za

Relevant Qualifications

B.Sc. Honours Environmental Management – University of South Africa (in progress)
B.Sc. Geography – University of the Free State (2012)
Business Administration – CTU Training Solutions Bloemfontein (2012)

Affiliation Membership

Member of the International Association for Impact Assessors (IAIA) South Africa

Experience

March 2016 – Present *Environmental Consultant at Doug Jeffery Environmental Consultants*

- Experience in applying the principles of Integrated Environmental Management (IEM), and in applying the NEMA Environmental Impact Assessment (EIA) Regulations to a number of development projects and initiatives in South Africa that trigger the National Environmental Management Act and/ or the National Environmental Management: Waste Act.
- Facilitation, co-ordination and management of all aspects of the EIA process.
- Liaising with specialists and all members of the project team to ensure a full understanding of the scope of work required throughout the process;
- The compilation of reports: Constraints Analysis, Basic Assessment Reports, Scoping and Environmental Impact Assessment Reports, and Damage Assessment Reports(24G Applications);
- Liaising with interested and affected parties and facilitating the public participation process required in terms of the EIA Regulations.

June 2013 – February 2016 *Environmental Consultant at Enviroworks*

- Preparation of an Environmental Scoping Assessment for the proposed development of a solar facility on Bloemdustria, Bloemfontein, Free State Province;
- Preparation of an Environmental Sensitivity Map for the proposed Solar Facility on Bloemdustria 2963, Bloemfontein, Free State Province;
- ECO for the construction of a 132kV substation and associated power lines in Botshabelo, Bloemfontein, Free State Province;
- EAP for the conducting of a Scoping and Full Environmental Impact Assessment for the proposed Solar Farm Thabong Development in Welkom, Free State Province;
- EAP for the conducting of a Scoping and Full Environmental Impact Assessment for the proposed Solar Farm Lebone Development in Welkom, Free State Province;
- EAP for the conducting of a Basic Assessment process for the proposed Centlec, Cecilia 132kv substation and 132kV power line, Kwaggafontein, Bloemfontein, FS Province;
- Conducting of a Basic Assessment process for the proposed Hartswater Retail and Commercial Centre, Hartswater, Northern Province;

- Preparation of an Environmental Baseline Assessment Report for the Proposed Wastewater Treatment Works in Kroonstad, Free State Province.
- Conducting of Basic Assessment processes for several proposed cellular base stations in the City of Cape Town, Western Cape Province;
- Conduction of a Basic Assessment Process for the proposed Neotel Optic Fibre Cable Route along the R102 and R328 from George through Hartenbos to Oudtshoorn, Western Cape Province;
- Conducting of Proposed development of a Dinosaur Interpretation Centre within Golden Gate Highlands National Park, Free State Province;
- EAP for the conducting of a Basic Assessment process for the Proposed borrow pit on Portion 1 of the Farm Groot Eerstegeluk No. 2884, Bloemfontein, Free State Province;
- ECO for the Repairs of Slip, Downchutes and Drainage at Theekloofpass near Fraserburg (Phase 2) on behalf of the client, Department of Roads and Public Works, Northern Cape Province;
- ECO for the Maintenance and Repairs of Roads in the Witzenberg Valley and Wolseley, Western Cape Province;
- Project management for a Mining Permit; and
- GIS & mapping.

Annexure 6: Environmental Authorisation

To be included once obtained.