



Bohlweki Environmental (Pty) Ltd



**DRAFT ENVIRONMENTAL MANAGEMENT
PLAN FOR THE PROPOSED PUMPED
STORAGE POWER FACILITY IN THE
STEELPOORT AREA, LIMPOPO AND
MPUMALANGA PROVINCES**

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TABLE OF CONTENTS

	Page
CONTACT DETAILS OF RESPONSIBLE PERSONS	vi
GLOSSARY OF TERMS AND ABBREVIATIONS	vii
1. INTRODUCTION	1
1.1. Overview of the Proposed Project	1
1.2. Applicable Documentation	1
1.3. Structure of the Environmental Management Plan	2
1.4. Objectives of the EMP	3
2. MANAGEMENT PROCEDURES	4
2.1. Organisational Structure and Responsibility	4
2.1.1. <i>Functions and Responsibilities for the Construction Phase</i>	4
2.1.2. <i>Functions and Responsibilities for the Operational Phase</i>	6
2.2. Awareness and Competence	7
2.3. Monitoring	7
2.4. Non-Conformance and Corrective Actions	8
2.4.1. <i>Compliance with the Environmental Management Plan specifications</i>	8
2.5. Documentation and Reporting	9
2.5.1. <i>Environmental Register</i>	9
2.6. Public Communication and Liaison with I&APs	10
3. ENVIRONMENTAL GUIDELINES, STANDARDS AND PERMITS	12
3.1. Legal Summary	12
3.2. Environmental Guidelines and Standards	12
3.2.1. <i>Air Quality Guidelines</i>	12
3.2.2. <i>Blasting Regulations and Standards</i>	13
3.2.3. <i>Control of Alien Vegetation</i>	13
3.2.4. <i>Waste Disposal</i>	13
3.3. Environmental Permitting Requirements	14
3.3.1. <i>Protected Plants</i>	14
3.3.2. <i>Abstraction of Water</i>	14

3.3.3.	<i>Heritage Sites</i>	15
3.3.4.	<i>Public Health</i>	15
3.3.5.	<i>Traffic and Transport</i>	15
4.	CONSTRUCTION ACTIVITIES	16
4.1.	Contractor Selection and Performance	16
4.2.	Legal and other Requirements	16
4.3.	Social Interaction	16
4.4.	Labour	17
4.5.	Employment	17
4.5.1.	<i>Local Preference</i>	17
4.6.	Safety and Security	18
4.6.1.	<i>General Procedures</i>	18
4.6.2.	<i>Health and Safety</i>	18
4.7.	Hazard Risk and Emergency Response	20
4.8.	Fire Control	21
4.9.	Site Establishment and Management	22
4.9.1.	<i>Construction Site Layout Plan</i>	22
4.9.2.	<i>Construction Camp and Construction Staff</i>	23
4.9.3.	<i>Sanitation</i>	24
4.9.4.	<i>Site Management</i>	24
4.9.5.	<i>Site Access</i>	25
4.9.6.	<i>Site Clearing</i>	26
4.9.7.	<i>Plant Repair, Maintenance and Clearing</i>	26
4.10.	Noise	27
4.11.	Visual	28
4.11.1.	<i>Visual Quality</i>	28
4.11.2.	<i>Visibility</i>	28
4.11.3.	<i>Observer Proximity</i>	28
4.11.4.	<i>Viewer Incidence and Perception</i>	28
4.11.5.	<i>Visual Absorption Capacity</i>	28
4.11.6.	<i>Visual Impact Index</i>	28
4.11.7.	<i>Lighting</i>	28
4.12.	Vegetation	29
4.12.1.	<i>Vegetation Clearing</i>	29
4.12.2.	<i>Protection of Vegetation</i>	30

4.12.3.	<i>Threatened and/or Protected Plant Species</i>	30
4.12.4.	<i>Alien Vegetation</i>	30
4.12.5.	<i>Herbicide Use</i>	32
4.12.6	<i>Risk of Fire</i>	32
4.13.	<i>Biodiversity</i>	33
4.14.	<i>Heritage</i>	33
4.15.	<i>Air Pollution Management</i>	34
4.15.1.	<i>Air Quality</i>	34
4.15.2.	<i>Dust Control</i>	35
4.16.	<i>Geohydrology</i>	36
4.16.1.	<i>Borehole Loss</i>	36
4.16.2.	<i>Dewatering of Surge Shaft Decant</i>	36
4.16.3.	<i>Dewatering of Machine and Transformer Halls</i>	36
4.16.4.	<i>Dewatering of Pressure Tunnel</i>	37
4.16.5.	<i>Dewatering of Tailrace, Access and Emergency Tunnels</i>	37
4.16.6.	<i>Groundwater Quality associated with Waste Water Treatment</i>	37
4.16.7.	<i>Groundwater Quality associated with Seepage from Waste Disposal</i>	37
4.16.8.	<i>Groundwater Quality associated with Fuel/Oil Spillages</i>	38
4.16.9.	<i>Groundwater Losses due to Borrow Pit Areas</i>	38
4.17.	<i>Water Management</i>	38
4.17.1.	<i>Water for Domestic use</i>	38
4.17.2.	<i>Water Consumption</i>	39
4.17.3.	<i>Water Pollution management</i>	39
4.17.4.	<i>Water Flows across Construction sites</i>	40
4.17.5.	<i>Waste Water</i>	40
4.18.	<i>Surface Water and Drainage</i>	41
4.18.1.	<i>Ecological Instream Flow Requirements</i>	41
4.18.2.	<i>River Diversions</i>	41
4.18.3.	<i>Stream/Drainage Line Crossings</i>	41
4.18.4.	<i>Permanent Stream Crossings</i>	41
4.18.5.	<i>Spillway Erosion</i>	41
4.18.6.	<i>Borrow Areas</i>	42
4.18.7.	<i>Risk of flooding of the Steelpoort River</i>	42
4.18.8.	<i>Reservoir Breach</i>	42

4.18.9.	<i>Sewage Impacts</i>	42
4.18.10.	<i>Taking of Surface Water for the Construction Camp</i>	43
4.18.11.	<i>Flooding of the Construction Site by Surface Water Bodies</i>	43
4.18.12.	<i>Sewage Return Flows from Permanent Buildings</i>	43
4.19.	Wetlands	43
4.19.1.	<i>Impact on Wetlands adjacent to the Upper Reservoir site</i>	43
4.20.	Soil Management	43
4.20.1.	<i>Topsoil</i>	43
4.20.2.	<i>Spoil Material</i>	44
4.20.3.	<i>Excavation, Backfilling and Trenching</i>	45
4.20.4.	<i>Erosion Control & Land Management</i>	46
4.21.	Waste Management	47
4.22.	Storage and Handling of Hazardous Substances	49
4.22.1.	<i>Cement and Concrete</i>	51
4.22.2.	<i>Fuel Storage</i>	52
4.23.	Traffic and Transport	54
4.23.1.	<i>Transport of Components</i>	54
4.23.2.	<i>Construction Traffic</i>	54
4.23.3.	<i>Road Safety during Construction</i>	54
4.24.	Site Clean-up	54
4.25.	Tourism	55
5.	OPERATION AND MAINTENANCE	56
5.1.	Labour	56
5.1.1.	<i>Conduct of Employees</i>	56
5.2.	Hazard and Risk	56
5.3.	Noise	57
5.4.	Biodiversity	58
5.4.1.	<i>Use of Herbicides in the Alien Control Programme</i>	59
5.5.	Air Pollution Management	60
5.6.	Geohydrology	60
5.6.1.	<i>Upper Reservoir Seepage</i>	60
5.6.2.	<i>Lower Reservoir Seepage</i>	60
5.6.3.	<i>Artificial Groundwater Recharge</i>	60

5.7.	Water Management	61
5.8.	Surface Water and Drainage	62
5.8.1	<i>Evaporation</i>	62
5.8.2	<i>Existing Irrigation Water Users</i>	63
5.9.	Wetlands	63
5.9.1.	<i>Streamflow Regulation – Functioning of Wetlands in the Catchment</i>	63
5.10.	Maintenance of Rehabilitated Areas	63
5.11.	Waste Management	63
5.12.	Storage, Handling and Management of Hazardous Substances	65
5.13.	Traffic and Transport	67
5.14.	Tourism	67
6.	DE-COMMISSIONING	69
6.1.	General Principals for Environmental Management during De-commissioning	69

Appendices

Appendix A	Summary of Relevant Environmental Legislation
Appendix B	The Safe Use of Pesticides and Herbicides
Appendix C	Oil Spill Clean-up and Rehabilitation
Appendix D	Waste Management Policy

CONTACT DETAILS OF RESPONSIBLE PERSONS

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GLOSSARY OF TERMS AND ABBREVIATIONS

EMP:

Environmental Management Plan. A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of a project. This EMP focuses primarily on the construction and operational phases of the proposed project. This Environmental Management Plan is not part of an Environmental Management System (EMS) and has not been compiled in terms of the ISO 14001 standard, although this may be incorporated into Eskom's EMS for the project at a later stage.

ENVIRONMENT:

In terms of the National Environmental Management Act (NEMA) (No 107 of 1998), "environment" means the surroundings within which humans exist and that are made up of:

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

PROGRAMME MANAGER:

The person appointed by Eskom who is responsible for managing the construction of the entire project. The project may consist of a number of contracts.

PROJECT MANAGER:

The person appointed by the Programme Manager who is responsible for managing one or more contracts on site. His name and authority is stipulated in the contract between Eskom and the relevant contractor.

ENVIRONMENTAL CONTROL OFFICER:

An individual nominated through the Programme Manager to be present on site to act on behalf of the Programme Manager in matters concerning the implementation and day to day monitoring of the EMP and conditions of the Environmental Authorisation (or Record of Decision). The Environmental Control Officer is assumed to be the Environmental Practitioner appointed by Eskom to the project.

CONTRACTOR:

A person or company appointed by Eskom to carry out stipulated activities.

ENVIRONMENTAL IMPACT

A change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.

INCIDENT

An undesired event which may result in a significant environmental impact but can be managed through internal response.

EMERGENCY

An undesired event that does result in a significant environmental impact and requires the notification of the relevant statutory body such as a local authority.

NO-GO AREAS

Any drainage line, graves or heritage monuments, wetland areas, severely eroded areas, sensitive slopes, endemic species habitats, areas under rehabilitation or subject to salvaging operations, watercourses, etc. outside of the development footprint. Areas within the development footprint identified in terms of EIA impact significance will be appropriately mitigated and are included in the relevant sections that follow.

1. INTRODUCTION

Eskom Holdings Limited (Eskom) is responsible for the provision of reliable and affordable power to South Africa. Electricity cannot be stored and must be used as it is generated. Therefore, electricity must be generated in accordance with supply-demand requirements. Eskom's core business is in the generation, transmission (transport), trading and retail of electricity. In terms of the Energy Policy of South Africa, "energy is the life-blood of development". Eskom currently generates approximately 95% of the electricity used in South Africa. Therefore, the reliable provision of electricity by Eskom is critical for industrial development activities, related employment and overall long term sustainable development in South Africa.

As part of the increased electricity supply plan, Eskom proposes constructing a Pumped Storage Scheme (PSS) in the Steelpoort area, Limpopo and Mpumalanga Provinces.

1.1. Overview of the Proposed Project

The proposed project involves the construction and operation of a PSS in the Steelpoort area. The function of a pumped storage scheme is to store surplus power during off-peak periods and to supply the power during the time of peak demands. Electricity supply is thereby "shifted" from off-peak times, when there is surplus electricity, to peak times, when there is an increase in electricity demand on the National Grid. It is planned that the scheme will have an installed capacity of approximately 1520 MW.

The proposed scheme consists of the following components:

- Upper and lower reservoirs;
- Underground power house complex and associated waterways that link the reservoirs; and
- Ancillary works such as roads, transmission lines, two 45m high communication masts and housing for construction workers, and other associated infrastructure.

1.2. Applicable Documentation

The following environmental documentation is applicable for the project, and will be read in conjunction with this EMP:

- Environmental Scoping Report for the proposed pumped storage scheme in the Steelpoort area, Limpopo and Mpumalanga Provinces.
- Environmental Impact Assessment Report for the proposed pumped storage scheme in the Steelpoort area, Limpopo and Mpumalanga Provinces.

- Record of Decision issued by the Department of Environmental Affairs and Tourism - DEAT (once issued).

Cognisance of Environmental Authorisation must be taken once it has been issued. Where necessary, this EMP must be amended to comply with the conditions as stipulated in the Environmental Authorisation.

1.3. Structure of the Environmental Management Plan

The EMP provides mitigation and management measures for the following phases of the project:

- *Construction Phase*
This section of the EMP provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required within the construction phase are specified. These specifications will form part of the contract documentation and, therefore, the Contractor (or Contractors, including sub-contractors) will be required to comply with the specifications to the satisfaction of the Project Manager and Environmental Control Officer, in terms of the construction contract.
- *Operation and Maintenance Phase*
This section of the EMP provides management principles for the operation and maintenance phase of the project. Environmental actions, procedures and responsibilities as required from Eskom within the operation and maintenance phase are specified.
- *Decommissioning Phase*
This section includes principles for the decommissioning phase of the project. This section of the EMP will be required to be revisited and updated at the time of decommissioning.

Relevant environmental legislation pertaining to the project is listed within Appendix A. The Contractor is required to comply with this legislation for all phases of the project. This list is intended to serve as a guideline only for the Contractor and is not exhaustive.

This EMP is a dynamic document which will be updated as required on a continuous basis. Any amendments made, must be submitted to both the Environmental Control Officer and Programme Manager for approval prior to implementation. Any amendments to the EMP must be submitted to the Department of Environmental Affairs & Tourism for approval, before such amendments take effect.

1.4. Objectives of the EMP

The EMP has the following objectives:

- To outline functions and responsibilities of responsible persons.
- To state standards and guidelines, which are required to be achieved in terms of environmental legislation.
- To outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the PSS in the Steelpoort area.
- To prevent long-term or permanent environmental degradation.

2. MANAGEMENT PROCEDURES

2.1. Organisational Structure and Responsibility

2.1.1. *Functions and Responsibilities for the Construction Phase*

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Programme Manager, Project Manager and Environmental Control Officer for the construction phase of this project are as detailed below.

The Programme Manager will:

- Ensure that Eskom and the Contractor are aware of all specifications, legal constraints and Eskom standards and procedures pertaining to the project specifically with regards to the environment.
- Ensure that all stipulations within the EMP are communicated and adhered to by Eskom and its Contractor(s).
- Monitor the implementation of the EMP throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- Be fully conversant with the Environmental Impact Assessment for the project, the conditions of the Environmental Authorisation (once issued), and all relevant environmental legislation.

The Project Manager will:

- Be fully conversant with the Environmental Impact Assessment.
- Be fully conversant with the conditions of the Environmental Authorisation.
- Be fully conversant with the Environmental Management Plan.
- Be fully conversant with all relevant environmental legislation and Eskom environmental policies and procedures, and ensure compliance with these.
- Have overall responsibility for the implementation of the EMP.
- Conduct audits to ensure compliance to the EMP.
- Liaise with the Programme Manager or his delegate, the Environmental Control Officer and relevant discipline Engineers on matters concerning the environment.
- Prevent actions that will harm or may cause harm to the environment, and take steps to prevent pollution on the site.
- Confine activities to the demarcated construction site.

The Environmental Control Officer will:

- Be fully conversant with the Environmental Impact Assessment.

- Be fully conversant with the conditions of the Environmental Authorisation.
- Be fully conversant with the Environmental Management Plan.
- Be fully conversant with all relevant environmental legislation and Eskom environmental policies and procedures, and ensure compliance with them.
- Convey the contents of this document to the Contractor site staff and discuss the contents in detail with the Project Manager and Contractor. Training will be required to ensure all staff understand the process.
- Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMP and Environmental Authorisation (or Record of Decision).
- Take appropriate action if the specifications contained in the EMP are not followed.
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible.
- Review and approve construction methods (where it could result in environmental impacts), with input from the Project Manager, where necessary.
- Ensure that activities on site comply with all relevant environmental legislation.
- Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EMP.
- Compile progress reports on a regular basis, with input from the Project Manager, for submission to the Programme Manager, including a final post-construction audit.
- Liaise with the Project Manager regarding the monitoring of the site.
- Report any non-compliance or remedial measures that need to be applied to the appropriate environmental authorities, in line with the requirements of the Environmental Authorisation.

Contractors and Service Providers:

All Contractors (including subcontractors and staff) and service providers are ultimately responsible for:

- Complying with the environmental management specifications.
- Submitting an obligatory Methods Statement for approval by the ECO before any work is undertaken.
- Adhering to any instructions issued by the Project Manager on advice of the ECO.
- Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting.
- Keeping on file the list of transgressions issued by the ECO in the site office.
- Maintaining a public complaints register.

- Arrange for all employees and those of subcontractors to receive training before the commencement of construction in order that they are aware of the conditions of the EMP.

2.1.2. Functions and Responsibilities for the Operational Phase

The Manager, Generation Environmental Management will:

- Provide overall assurance to the MD: Generation Division (and hence ultimately the CEO) that environmental issues are appropriately addressed and managed at the various business units.
- Develop and implement strategies on various issues such as environmental management systems, air quality, waste, etc.
- Be responsible for overall consolidation and reporting of environmental performance within the Generation Division.
- Liaise on a strategic level with Government and other stakeholders on a range of issues.

The Station Manager will:

- Identify and appoint representatives from different departments of the power station. These employees shall be assigned the role of EMP drivers and shall collectively form the EMS management team with the environmental practitioner.
- Ensure that adequate resources (human, financial, technology) are made available for the successful implementation and operation of the EMS
- Conduct annual-basis Management reviews of the EMS to evaluate its effectiveness.
- Take appropriate action as a result of findings and recommendations in Management reviews and audits.

The Safety, Health and Environment (SHE) Representative will:

- Implement an Environmental Management System (EMS) for the power station.
- Manage and report on station's environmental performance
- Arrange for undertaking of internal environmental audits and co-ordinate external environmental audits.
- Liaise with statutory bodies such as DWAF and DEAT on environmental performance and other issues.
- Conduct environmental training and awareness of the PSS employees.
- Compile environmental policies and procedures.
- Advise top management on environmental issues.
- Liaise with interested and affected parties on environmental issues of common concern.

2.2. Awareness and Competence

It is important to ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm.

To achieve effective environmental management, it is important that employees, Contractors and subcontractors are aware of their responsibilities in terms of the relevant environmental legislation and the contents of this EMP. Environmental awareness induction and subsequent training must include the following:

- Employees must have a clear understanding of the key environmental features of the construction site and the surrounding environment.
- Employees will be thoroughly familiar with the requirements of the EMP and Environmental authorisation, and the environmental specifications as they apply to the construction of the power station.
- Employees must undergo training for the operation and maintenance activities associated with the PSS plant and have a clear knowledge of the potential environmental impacts that could occur and how they can be minimised and mitigated.
- Appropriate training in the identification of archaeological artefacts, and rare and endangered flora and fauna that may be encountered on the site.
- Awareness of any other environmental matters, which are deemed to be necessary by the ECO.
- The training must include a system of certification and/or accreditation related to training, to ensure all the workers have proof of training and competence on work performed.
- Records must be kept of those that have completed the relevant training.
- Training must include the environment, health and safety as well as HIV/AIDS education.

Training can be done either in a written or verbal format but will be in an appropriate format for the receiving audience. Where training has been done verbally, persons having received training must indicate in writing that they have indeed attended a training session and have been notified in detail of the contents and requirements of the EMP.

2.3. Monitoring

A monitoring programme will be in place not only to ensure conformance with the EMP through the contract/work instruction specifications, but also to monitor any environmental issues and impacts which have not been accounted for in the EMP that are, or could result in significant environmental impacts for which corrective action is required. As part of the contract or work instruction, Eskom will

stipulate the period and frequency of monitoring required. This will be determined from applicable permits and authorisations from authorities. The Programme Manager will ensure that the monitoring is carried out.

An Environmental Control Officer must be appointed to ensure compliance with the EMP, and to carry out monitoring activities. The Environmental Control Officer must have the appropriate experience and qualifications to undertake the necessary tasks. The Environmental Control Officer will report to the Project Manager should any non-compliance be evident or corrective action necessary as well as DEAT. Only in severe cases of non-compliance, or repeated offences, will the Environmental Control Officer be required to report to the Programme Manager.

All instruments and devices used for the measurement or monitoring of any aspect of this EMP must be calibrated, appropriately operated and maintained, and records well kept.

2.4. Non-Conformance and Corrective Action

The monitoring of the construction or operation of the power station may identify non-conformances to the EMP. Non-conformances may also be identified through incidents, emergencies or complaints. In order to correct these non-conformances, the source must be determined and appropriate corrective actions must be identified.

2.4.1. Compliance with the Environmental Management Plan Specifications and Environmental Authorisation conditions

- The EMP will be available on-site at all times.
- All persons employed by the Contractor or his sub-contractors will abide by the requirements of the EMP.
- Any members of the construction workforce found to be in breach of any of the specifications contained within the EMP may be ordered by the Project Manager to leave the site. The order may be given orally or in writing. Confirmation of an oral order will be provided as soon as practically possible, but the absence of a written order will not be cause for an offender to remain on site. No extension of time will be granted for any delay or disadvantage to the Contractor brought about by an offender ordered to leave the site.
- The Contractor will not direct a person to undertake any activity which would place them in contravention of the specifications contained within the EMP.
- Should the Contractor be in breach of any of the specifications contained in the EMP, the Project Manager will, in writing, instruct the Contractor responsible for the incident of non-compliance regarding corrective and/or remedial action required, specify a timeframe for implementation of these

actions, implement a penalty and/or indicate that work will be suspended should non-compliance continue.

- Should non-compliance continue, further written notification will be forwarded to the Contractor responsible for the incident of non-compliance outlining the required corrective and/or remedial action, the timeframe for implementation, penalties and/or work will be suspended as specified previously.
- The Contractor will be responsible and will bear the cost of any delays, corrective or remedial actions required as a result of non-compliance with the specifications and clauses of the EMP.
- An appropriate reporting schedule for frequent reporting (of compliance with the Environmental Authorisation/EMP) to DEAT and interested and affected parties will be developed. The process to be followed for the auditing of the Environmental Authorisation conditions/EMP, as well as the reporting procedure to be followed, will be outlined in this document.
- Departmental officials will be given access to the property referred to in the Environmental Authorisation for the purpose of assessing and/or monitoring compliance with the conditions contained in the environmental authorisation, at all reasonable times.

2.5. Documentation and Reporting

The following documentation must be kept on site in order to record compliance with the EMP:

- Record of Complaints
- Monitoring Results
- Non-conformance Reports
- Written Corrective Action Instructions
- Notification of Emergencies and Incidents.

2.5.1 Environmental Register

The Contractor will report incidents involving Contractor employees and/or the public that could potentially cause negative sentiment and perception towards the project:

- Report incidents involving Contractor employees and/or the public that could potentially cause negative sentiment and perception towards the project and/or Eskom.
- Report environmental complaints and correspondence received from the public to the Programme Manager and the Environmental Control Officer.
- Record and report incidents that cause harm or may cause harm to the environment, to the Environmental Control Officer.
- Record all hazardous materials used on site.

- Maintain a record of all Hazardous Waste Disposal Manifests detailing the nature of the hazardous waste disposed of, the hazardous waste classification and the location of the site to which such waste was sent.

The above records will form an integral part of the Contractors' Records. These records will be kept with the EMP, and will be made available for scrutiny if so requested by the Programme Manager or his delegate and the Environmental Control Officer.

The Environmental Control Officer will put in place an Environmental Register to document:

- All environmental complaints and correspondence received from the public, Eskom or the construction workforce.
- Incidents of non-compliance with the EMP (refer to Section 2.4.).
- Any other environmental incidents related to the construction phase of the project.

The Environmental Control Officer will ensure that the following information is recorded for all complaints/incidents:

- Nature of complaint/incident.
- Causes of complaint/incident.
- Party/parties responsible for causing complaint/incident.
- Immediate actions undertaken to stop/reduce/contain the causes of the complaint/incident.
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint/incident.
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions.
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented.
- Copies of all correspondence received regarding complaints/incidents.

2.6. Public Communication and Liaison with I&APs

Eskom must ensure that the public and surrounding communities are informed and updated throughout the construction and operational phases.

A signboard must be erected at the entrance to the construction site, informing the public of the construction activities taking place. The signboard must include the following information:

- The name of the Contractors.

- The name and contact details of the site representative to be contacted in the event of emergencies or complaint registration.

3. ENVIRONMENTAL GUIDELINES, STANDARDS AND PERMITS

3.1. Legal Summary

The following is a summary of the applicable environmental legislation for the establishment of the pumped storage scheme and associated infrastructure. The detailed summary has been included in Appendix A.

APPLICABLE LEGISLATION
National Legislation
Constitution of South Africa (Act No. 108 of 1996)
Environment Conservation Act (Act No. 73 of 1989)
National Environmental Management Act (Act No. 107 of 1998)
National Heritage Resources Act (Act No. 25 of 1999)
Hazardous Substances Act (Act No. 15 of 1973)
Mines Health & Safety Act (Act No. 29 of 1996)
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)
Occupational Health and Safety Act (Act No. 85 of 1993)
National Road Traffic Act (Act No. 93 of 1996)
Atmospheric Pollution Prevention Act (Act No. 45 of 1965)
National Water Act (Act No. 36 of 1998)
Conservation of Agricultural Resources Act (Act No. 43 of 1983)
National Veld and Forest Fire Act (Act No. 101 1998)
Health Act (Act No. 63 of 1977)
National Environmental Management: Air Quality act (Act No. 39 of 2004)
National Forest Act (act No. 84 of 1998)
National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
Provincial Legislation
Nature Conservation Ordinance (Act No. 19 of 1974)

3.2. Environmental Guidelines and Standards

All applicable environmental standards contained within the environmental legislation will be adhered to. At the time of compiling this draft EMP, the following environmental guidelines and standards were identified as being applicable.

3.2.1. Air Quality Guidelines

Currently air pollution in South Africa is regulated under the Atmospheric Pollution Prevention Act 45 of 1965 (APPA). The APPA is scheduled to be replaced by the National Environmental Management: Air Quality Act 39 of 2004. The new Act was signed by the President and gazetted in February 2005 and certain sections of the Act came into force on 11 September 2005. In terms of this Act power generation processes will be classified as a 'listed activity' and as such will require

an 'atmospheric emissions license' in order to operate. During the transitional phase an application for a registration certificate under the APPA will be taken as an application for an atmospheric emission license under the Air Quality Act. Holders of registration certificates will be responsible for proving compliance with the requirements of such permits and for applying for atmospheric emissions licenses.

As a pumped storage scheme, the project will not produce emissions like a typical coal fired power station. However, dust will still need to be managed on site during the construction phase.

3.2.2. Blasting Regulations and Standards

Wherever blasting activity is required on the site, the Contractor will rigorously adhere to the relevant statutes and regulations that control the use of explosives. Extensive blasting will be required for this project.

3.2.3. Control of Alien Vegetation

In terms of Government Notice R1048, the following regulations are applicable with regards to the control of invasive alien vegetation and declared weeds:

- It is illegal to have declared weed species or invasive alien vegetation on one's property.
- The landowner must immediately take steps to eradicate them by using the methods prescribed in the regulations, namely:
 - * uprooting and burning, or
 - * the application of a suitable chemical weed-killer (herbicide), or
 - * any other method of permanent eradication.
- One may not uproot or remove such plants and dump or discard them elsewhere to re-grow or allow their seeds to be spread or blown onto other properties.
- If the landowner does not comply with requirements above, a person may be found guilty of a criminal offence.

For further detail about the management of the alien vegetation on site refer to Section 4.12.4.

3.2.4. Waste Disposal

All waste (general and hazardous) generated during the construction of the scheme may only be disposed of at appropriately licensed waste disposal sites (in terms of Section 20 of the Environment Conservation Act, No 73 of 1989). The amount of waste to be generated by the project would be considered to be too

large an amount to be practically removed from site. This would, therefore, necessitate the creation of a general and hazardous dumping site on or in close proximity to the project development site.

Cognisance must also be taken of the relevant provincial legislation in this regard. It will be noted that all controlling authority regulations pertaining to litter in terms of the Environment Conservation Act (sections 19, 19A and 24A) have been delegated to the provinces. For further detail regarding the management of waste on site refer to Section 4.21.

3.3. Environmental Permitting Requirements

Environmental permits (or licences), which will be required to be obtained for construction and operation, are discussed briefly below. These will be required to be obtained before construction commences.

3.3.1. Protected Plants

In terms of the National Forest Act (No 84 of 1998) and Government Notice 1339 of 6 August 1976 (promulgated under the Forest Act (No 122 of 1984) for protected tree species), the removal, relocation or pruning of any protected plants will require a permit.

Protected indigenous plants in general are controlled under the relevant Provincial Ordinances or Acts dealing with nature conservation, i.e. Transvaal Nature Conservation Ordinance (No 12 of 1983). Included within the provincial Ordinance is the legislation regarding the plant species on the Red Data list.

3.3.2. Abstraction of Water

If water is to be abstracted from a public stream/river during construction (for construction activities), a permit is required from the Minister of Water Affairs and Forestry. If water is to be abstracted from water of which the rights of use belong to private landowners, it will be necessary to establish whether their water use rights are still valid in terms of the provisions of the National Water Act, negotiate with the relevant landowners and then to obtain a water use permit from DWAF in terms of Section 21, 40 and 41 of the National Water Act (No 36 of 1998).

Additional General Authorisation or IWULA requirements to be included:

- Discharge of Waste or Water containing waste into a water resource (Tunnel dewatering)
- Impeding water or diverting flow in a watercourse (Section 21c)
- Altering beds and banks of a watercourse (Section 21i)
- Removing of underground water (Section 21j).

3.3.3. Heritage Sites

In terms of the National Heritage Resources Act (No 25 of 1999), a permit is required to be obtained for the disturbance, removal or destruction of any national and provincial heritage sites, archaeological and palaeontological sites, burial grounds and graves, and public monuments and memorials. Appropriate funding provisions should be made to deal with potential exhumations.

3.3.4. Public Health

Ablution facilities must be approved by the nearest local authority in terms of their by-laws and relevant provincial standard by-laws. These facilities do not fall under provisions of the National Water Act (No 25 of 1999). Chemical toilets must be provided on site and must be emptied at regular intervals. No other types of ablution facilities are permitted on site.

3.3.5. Traffic and Transport

- *Abnormal Load Permit Application*

Eskom will be required to apply for a permit to transport very large turbine and machinery for the power house complex, in terms of the National Road Traffic Act, 1996 (Act No. 93 of 1996).

The critical part of the Abnormal Load Route Permit application is the survey of the prospective route by a qualified structural engineer who needs to examine all the bridges/overpasses/underpasses and issue a certificate of compliance for the particular vehicle type/width/length and height.

It is estimated that the whole survey and application procedure may take two to three months to complete.

4. CONSTRUCTION ACTIVITIES

4.1. Contractor Selection and Performance

- Eskom must ensure that this EMP forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project.
- The contractor must monitor the performance of the construction team from time to time to ensure compliance with the requirements of this EMP.

4.2. Legal and Other Requirements

- Eskom and the Contractor must commit themselves to comply with the relevant provisions of the applicable environmental legislation and associated regulations promulgated in terms of these laws.
- Eskom must enter into agreement with the local authority concerning any requirements directed towards protecting the environment. Contractors will be required to respect and comply with such agreements.
- All private agreements concluded by the Contractor with adjacent landowners during construction must be ratified by the Project Manager, to absolve legal liability on the part of Eskom.

4.3. Social Interaction

- All adjacent landowners must be notified and advised of the timing of the intended construction activities.
- A Community Liaison Officer/Communications Practitioner from Eskom will deal with community needs and complaints. Any community complaints raised by Interested and Affected Parties (I&AP's) must be addressed as a matter of urgency.
- Open liaison channels with nearby residents and I&APs must be developed in order to facilitate communication and field concerns or complaints about construction activities, working hour's etc.
- The construction camp must be planned in detail, such that affected parties do not feel threatened by the presence of construction workers.
- Contractors must prevent and prohibit their employees from entering neighbouring land and homes.
- The Contractor must construct and maintain adequate perimeter fencing around the camp and ensure that materials used for construction on the site do not blow on or move outside the site and environs.
- All construction activities must take place within the demarcated footprint. If it is necessary for activities to take place outside of this area, permission must be obtained from the ECO.

- Ensure that the entire construction camp site(s) is fenced, that access into and out of the camp is controlled and that gates are locked after hours and over weekends.
- Movement of construction personnel on site, outside of the demarcated development areas, must be strictly prohibited.

4.4. Labour

- Proposed normal working hours should be between 06h00 and 18h00, Monday to Friday, where practically possible. However, these working hours may not be possible if tunnel/waterways are constructed over 24 hour shifts, since a 24 hour working day (consisting of 3 shifts) is required for underground works. The remoteness of the site will not have a major impact on surrounding communities during construction.
- As construction activities will be taking place over 24 hour periods, the surrounding communities as well as all adjacent landowners must be notified by the Contractor accordingly.
- The Contractor must employ local labour with appropriate qualifications and experience from the surrounding areas, as far as possible.
- The Contractor will maintain records of time worked, wages paid and training to show compliance.

4.5. Employment

4.5.1. Local Preference

- The Contractor should give employment preference to residents of the project area.
- Where skilled workmen, artisans and operators are not available locally, they will be employed from non-local sources.
- The Contractor will make available to the Community Liaison Officer specific and relevant information on the available employment; this will include number and type of jobs, skill requirements for the jobs, duration of the jobs, remuneration scales, hours of work, conditions of work, procedures for the application of jobs, procedures for selecting job applicants, and training and certification available on the job.
- The Contractor will consider personnel from the applicants put forward by the Community Liaison Officer and will consider aptitude, health, previous training and expertise.
- No casual job seekers outside the construction site will be selected.
- The Contractor will maintain and submit records of all hiring, including dates of hiring and work commencement, the names and details of the applicants hired.

- The Contractor will maintain written records of all discussions with the Community Liaison Officer.

4.6. Safety and Security

4.6.1. General Procedures

The Contractor will ensure the implementation of the following safety and security measures:

- Clearly mark dangerous areas and restrict access to these areas.
- Ensure compliance with the Occupational Health and Safety Act (No 85 of 1993) and the Mines Health & Safety Act (Act No. 29 of 1996).
- Ensure that no person under the influence of alcohol or narcotic substances is permitted to work on the site.
- Ensure adequate signage is provided along the major roads and at the entrance of the construction site.
- In terms of construction worker safety, safety management plans must be implemented.
- Community safety concerns are to be addressed by the Contractor.

4.6.2. Health and Safety

Element	Management Plan
Controls	<ul style="list-style-type: none"> • A Health and Safety Plan will be developed in respect of construction worker safety. This plan must be in line with Eskom's SHE Policy and relevant legislation. • A health and safety officer/SHE Officer must be employed to monitor project activities for any potential problems. • Sufficient number of H & S Representatives must be appointed by the Contractor as dictated by staff numbers. • Contractors must adhere to the prescriptions of the relevant health and safety legislation and standards. The Contractor must familiarise himself and his employees with the contents of the aforementioned legislation. • First Aid facilities must be on hand at all times in accordance with international practice. • The Contractor must implement adequate and mandatory safety precautions relating to all aspects of the operation. Such safety measures and work procedures/instructions must be communicated to construction workers. • The wearing of Personal Protective Equipment (PPE) on site is mandatory for all personnel and construction team members. Minimum requirements must include the wearing of an approved safety helmet and safety boots. Ensure that all labourers are supplied with the appropriate PPE. • No one must be allowed on site unless wearing approved

Element	Management Plan
	<p>safety equipment.</p> <ul style="list-style-type: none"> • The Contractor's name or logo must be clearly visible on the helmet along with the name of the person and their designation. • Identity tags complete with a photograph must be issued to all individuals that are to be present on site for more than 3 consecutive calendar days. • Casual visitors must be required to sign a register at the security checkpoint, the responsible person must then be contacted before the visitor is allowed access to site. • Existing fences must be maintained throughout the construction period. • All temporary fencing must be removed on completion of the contract. • Spillages of chemicals or fluids must be cleaned up immediately in accordance with the appropriate procedures prescribed in the Material Safety Data Sheets. • No open trenches must be permitted without the use of demarcation tape. • Speed limits must be enforced in all areas, including public roads and private property to avoid potential accidents. • Erection of scaffolding must be undertaken by a certified practitioner. • Workers' right to refuse work in unsafe conditions must be respected. • Personnel must be trained in basic site safety procedures. • The Contractor must design, test/exercise appropriate emergency preparedness programmes (plans, schedules, procedures and methods) for addressing environmental accidents, incidents and events such as spills of fuel, oil or lubricants; veld fires and heavy rainfall causing exceptional runoff, leading to soil erosion and silt laden runoff etc. • The contractor must be obliged to ensure that workers are educated about HIV/AIDS and that safety measures are readily implemented. The local health services are to participate in order to ensure the implementation of education/condom distribution programmes.
Maintenance	<ul style="list-style-type: none"> • Ensure that experienced and skilled personnel are designated and authorised to take remedial and corrective action in the case of an accident or incident, e.g. fire officer, first aid officer and for spills. • Ensure that the emergency numbers for the area are clearly displayed and available at all times. • Ensure that basic fire-fighting equipment is available, i.e. fire extinguishers, rubber beaters and a water tank equipped with a pump and a hose.
Monitoring	<ul style="list-style-type: none"> • Regular auditing of safety requirements must be undertaken

Element	Management Plan
	<p>in order to monitor and control problems before they become unmanageable.</p> <ul style="list-style-type: none"> • A record must be kept of all incidents on site.

4.7. Hazard Risk and Emergency Response

Element	Management Plan
Potential Impacts	<ul style="list-style-type: none"> • Fire • Transport spillage of fuel • Overfilling of fuel tanks • Storage of fuels.
Sources	Sources identified in the risk assessment include both construction and operational hazards
Controls	<ul style="list-style-type: none"> • Development of construction specific response procedures for: <ul style="list-style-type: none"> * Safety training * On-site and off-site emergency plans for fire and spill response * Monitoring * Incident reporting * Community consultation and information * Cleaning-up and remediation procedures. • Develop construction work instructions for all high-risk activities. e.g. welding. • Regular checks and drills must be conducted to ensure that the risk and hazard control strategies are maintained and up to date.
Monitoring	<ul style="list-style-type: none"> • All monitoring will occur according to appropriate plans and guidelines. • The complaints register must be maintained. All complaints must be investigated and, if appropriate acted upon.
Corrective Action	<ul style="list-style-type: none"> • Impervious bunded storage, capable of containing a minimum of 110% of storage volume of hazardous substances (incl. hydrocarbon fuels, oils, used oil, explosive emulsions, etc.). • Oil separation system. • Spill kits. • If reports or drills indicate an error / omission in risk and hazard management procedures, then procedures must be altered or updated to ensure effective management. • If an incident occurs, the emergency procedures must be enacted to ensure all impacts are minimised. • The prevention of potential overfilling of the fuel storage tanks should be addressed to meet acceptable levels of risk. This can be done with adequate instrumentation and/or operating procedures. • Large spillages need to be contained and if possible be directed away from the offloading vessels. Fire protection and

Element	Management Plan
	fighting of the spilt hydrocarbon product must be achievable at the location of the contained material. Secondary containment at a remote location may address these issues.

4.8. Fire Control

Element	Management Plan
Sources	Open fires / flames on site.
Controls	<ul style="list-style-type: none"> • A Fire Management Strategy must be compiled and implemented. • All construction personnel will receive training on fire hazards and techniques to extinguish any fire that may be initiated on the site. • They must also be made aware of the added risks during the dry summer months, as well as, of the Fire Management Strategy to be implemented during construction. • The equipment required to extinguish any fires that may be initiated by construction activities must be installed on the site. • Flammable materials will be stored under conditions that will limit the potential for ignition and the spread of fires. • Staff will not be permitted to light fires on the site or on surrounding land, in areas other than those designated as safe by the Project Manager. • There will be a (recommended 5 m) firebreak around the construction site. This area will be kept clear of vegetation and refuse. • Burning of vegetation cut during site clearing and establishment will not be permitted unless authorised by the Project Manager. All cleared vegetation will be removed to a landfill site designated by the SHE Officer/ECO. • The Contractor will supply fire-fighting equipment in proportion to the fire risk presented by the type of construction and other on-site activities and materials used on site. This equipment will be kept in good operating order. • No fires must be allowed adjacent to the boundary fence, either inside or outside the construction site. • Any welding or other sources of heating of materials must be done in a controlled environment, wherever possible and under appropriate supervision, in such a manner as to minimise the risk of veld fires and/or injury to staff. • The Contractor will take reasonable and active steps to avoid increasing the risk of fire through his activities on site. Accidental fires must be prevented through proper sensitisation of employees towards the associated risks, dangers and damage of property. • The use of open fires for cooking of food, etc. by construction

Element	Management Plan
	<p>personnel must be restricted to designated cooking areas.</p> <ul style="list-style-type: none"> • Restrict smoking activities to designated smoking areas. • Ensure that an emergency preparedness plan is in place in order to fight accidental veld fires should they occur. The adjacent land owners/users/ managers must also be informed and/or involved. • The use of branches of trees and shrubs for fire-making purposes must be strictly prohibited.
Corrective Action	<ul style="list-style-type: none"> • Report any fires which occur to the ECO as soon as possible.

4.9. Site Establishment and Management

4.9.1. Construction Site Layout Plan

Once the final design and exact positioning of the station has been finalised, Eskom will position and detail allocated construction laydown areas and accommodation for contractors and will provide electricity take-off points, a water supply system and sewage discharge system and treatment plants. Offices and a central laboratory will also be positioned and provided by Eskom. Once this process is complete, the individual contractors will design their local layout and distribution for an electrical network, water supply and sewage discharge system within these allocated areas as proposed by Eskom.

Layout and separation distances must be done with care to prevent injuries and damage due to accidental fires. The following codes should be used as the minimum specification in terms of plant layout, safety distances, secondary containment and related issues:

- SANS 10089 Part 1 (formally SABS 089-1) is specific to the storage of large volumes of petroleum products.
- SANS 10087 Part 3 (formally SABS 087-3) is specific to the storage of LPG products.

These codes should be used as the minimum specification in terms of plant layout, safety distances, secondary containment and related issues.

The construction area must be clearly demarcated on the site plan, and all other areas must be considered no-go areas for the construction personnel. No construction must take place within the 1:100 year floodline or within 100 metres of a watercourse, whichever is the furthest, as well as other areas identified as sensitive.

Only designated areas may be used for the storage of construction material, topsoil, mining residual stockpiles, machinery, equipment and establishment of site offices.

The construction layout plan will be made available to the Project Manager (Eskom's representative) for written approval. Throughout the period of construction, the Contractor will restrict all activities to within the approved areas on the construction layout plan.

4.9.2. Construction Camp and Construction Staff

The Contractor will be responsible for negotiating the site camp(s) and conditions under which the site may be established with the relevant landowner(s) (if required) before the main contracts are in place. This includes contracts for the access tunnels and other associated infrastructure outside the main site area. Prior to the establishment of the site camp(s), the Contractor will produce a layout plan showing the positions of all buildings, vehicle wash areas, fuel and cement storage areas and other infrastructure for approval of the Project Manager. If possible, it is considered preferable to locate the site camp as close as possible to the construction site.

A signboard must be placed in the area of construction informing the public of the construction activities taking place.

Construction staff must be adequately educated by the Environmental Control Officer or the Project Manager as to the provisions included in the EMP and general environmentally friendly practice.

The conduct of on-site workers must be specified to the Contractor by Eskom. Specifications are to include sanitation, water and waste (litter), as well as informal trading and interfering in local community/cultural affairs. The following activities must be prohibited at site camp(s), and by the construction staff in general:

- The irresponsible use of welding equipment, oxy-acetylene torches and other naked flames which could result in veld fires or constitute a hazard.
- Indiscriminate disposal of rubbish or rubble.
- Littering of the site.
- Spillage of potential pollutants, such as petroleum products.
- Collection of firewood.
- Lighting of fires for cooking, heating or other purposes outside designated areas, and failure to exterminate any fires.
- Burning of any type of waste material.
- Interference with any wildlife, fauna or flora.
- Poaching of any description.
- Resource harvesting.
- Use of any ablution facility other than those provided.
- Burning of wastes and cleared vegetation under any circumstances.

- The use of rivers, streams, dams or any watercourses/surface water for washing or recreational purposes.
- Entering areas outside of the demarcated construction area without relevant permissions.

4.9.3. Sanitation

Element	Management Plan
Controls	<ul style="list-style-type: none"> • A minimum of one chemical toilet must be provided per 15 persons per shift. • Toilets must be strategically placed (easily accessible to workers) and will not be situated within 150m of any borehole, surface water source or drainage line. • They must be secure, clean and functional throughout the construction period. • All ablution activities must take place in these facilities, and the waste material must be stored and disposed of at the registered waste disposal site or collected by a suitable waste contractor on a regular basis. • The Contractor must ensure that toilets are cleaned or emptied regularly and that no spillage occurs during routine maintenance. • The exact location of the toilets must be approved by the SHE Officer/ECO prior to establishment. • All temporary/portable toilets must be secured to the ground to prevent them from toppling due to wind or any other cause. • The Contractor will ensure that the entrances to toilets are adequately screened from public view. • Discharge of waste from toilets into the environment and burying of waste is strictly prohibited. • Suitable toilets will be provided for the staff at all points at which workmen are carrying out duties under the contract.
Monitoring	<ul style="list-style-type: none"> • The Contractor will monitor that toilet facilities are used by personnel and that use of non-designated areas is actively discouraged.

The controls presented in the table above are only applicable to the initial ("upfront") contracts outside the main construction site. A proper sewage discharge system will be provided for the main contracts.

4.9.4. Site Management

Element	Management Plan
Controls	<ul style="list-style-type: none"> • The Contractor must take responsibility for the camp to conform to all contractual aspects and environmental standards applicable.

	<ul style="list-style-type: none"> • The Contractor must provide adequate refuse bins that must be cleaned/emptied and the waste removed from site on a regular basis. • The construction camp must be kept neat and tidy at all times. • Water sources/taps available for drinking water etc. must be pointed out by the ECO. The Contractor may only abstract from surface water sources for which General Authorisations or IWULAs are in place. Daily water abstraction volumes must be recorded on a tally sheet and provided to the ECO on a weekly basis. • Food preparation must only be done in areas designated by the ECO.
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4.9.5. Site Access

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Access in and out of the site must be allowed only at one point to minimise impacts during construction. • All areas of construction activity will be fenced by the Contractor prior to construction, unless authorisation to the contrary is given by the Project Manager. Fencing will be done at individual areas of construction and around the full perimeter of the site. • Construction activities must be limited to areas which are deemed to be safe, and deemed as the minimum area needed for the construction activity. All sites that are identified by the Project Manager as being unsafe or no-go areas will be indicated as such with warning signs in all relevant languages. • Livestock/domestic animals will be not be permitted access to construction sites. • Site access roads are to be designed, constructed and maintained by the Contractor. The areas where these roads are constructed are to be reinstated after construction. • Temporary access roads will follow existing tracks as far as practically possible. • Permanent access roads will also follow existing tracks as far as practically possible and are to be constructed and maintained by Eskom during construction and operation. • Adequate drainage must be in place, and where possible all the impacts must be restricted to the transformed existing road network.

4.9.6. Site Clearing

Element	Management Plan
Controls	<ul style="list-style-type: none"> • The size of areas subjected to land clearance will be kept to a minimum. • Only areas as instructed by the Project Manager must be cleared and grubbed. • Cleared vegetation debris which has not been utilised or collected by local communities will be collected and disposed of to a suitable waste disposal site. It will not be burned on site. • No vegetation will be cut or collected off construction sites for burning or for any other purpose without the prior permission of the Project Manager. • All vegetation not required to be removed will be protected against damage.

4.9.7. Plant Repair, Maintenance & Cleaning

Element	Management Plan
Controls	<ul style="list-style-type: none"> • No vehicle maintenance and repairs will be undertaken within a 100m radius of any water courses and drainage lines. • Any facilities susceptible to oil, petrol and diesel spillage will be located a minimum 100m from all surface water courses. • Repair yards, batching plants and stationary machines will be provided with impervious sumps, and spilled fluids and runoff will be kept in a conservancy tank until removed from the site in terms of the relevant legislative requirements. • Adequate collection facilities such as diversion mounds, ditches, drains, oil separation sumps and sedimentation ponds will be constructed at each location with a pollution potential. • All used oil will be stored in separate bunded areas for recycling by a recognised oil recovery service provider. • Sludges generated from desludging of oil separators must be disposed at an approved hazardous waste facility. • No repair work to fleet and plant must be conducted outside the designated workshop area or repair yard. Where emergency repairs necessitate work away from impervious bunded areas, use of drip trays may be allowed. • Spill containment kits must be available at the construction camp and all temporary lay down areas. • Regular inspections will be carried out to detect leaks and spillages. These facilities will be maintained as regularly as is necessary to ensure they meet the original specification.

4.10. Noise

Element	Management Plan
Potential Impact	Nuisance noise from construction activities affecting the surrounding areas.
Sources	<ul style="list-style-type: none"> • Site preparation and earthworks • Blasting • Construction related transport • Foundations and plant equipment installation • Building activities • Blasting activities.
Controls	<ul style="list-style-type: none"> • Construction site yards, concrete batching plants, asphalt batching plants, construction worker camps (accommodation) and other noisy fixed facilities should be located well away from noise sensitive areas adjacent to the development site. • Surrounding communities and adjacent landowners are to be notified upfront of construction activities. • With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the contractor should liaise with local residents on how best to minimise impact. • The effect of blasting on the local nesting raptor population, if relevant, is to be monitored. • In general operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993) and the Mine, Health and Safety Act, 1996 (Regulation 11.4). • Routine monitoring of the ambient and source/activity-specific noise levels by the SHE representative. • Construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA should wear ear protection equipment.
Maintenance	<ul style="list-style-type: none"> • All construction equipment must be maintained in good working order. • Silencers on construction equipment will be maintained to ensure no deterioration in noise-dampening capacity.
Corrective Actions	<ul style="list-style-type: none"> • The Contractor will respond timeously in the event of any complaints by local residents or others about disturbing noise. The noise source will be identified and appropriate noise mitigatory measures instituted in consultation with the affected party(ies). • In the case of legitimate complaints the noise level must be tested by a specialist.

4.11. Visual

4.11.1. Visual Quality

Element	Management Plan
Controls	<ul style="list-style-type: none"> Rehabilitation of construction camps. Landscaping of sites, especially lower dam. Enhance lower dam as a water feature.

4.11.2. Visibility

Element	Management Plan
Controls	<ul style="list-style-type: none"> No mitigation measures are proposed, since it is unlikely that there will be major changes in topography.

4.11.3. Observer Proximity

Element	Management Plan
Controls	<ul style="list-style-type: none"> Prevent residential development within 1km from the sites.

4.11.4. Viewer Incidence and Perception

Element	Management Plan
Controls	<ul style="list-style-type: none"> Promote the site as a tourist attraction to positively influence viewer perception.

14.11.5. Visual Absorption Capacity

Element	Management Plan
Controls	<ul style="list-style-type: none"> Ensure that construction material will not contrast with the environment in respect of texture and colour. Shield administrative buildings and access roads with appropriate landscaping techniques.

14.11.6. Visual Impact Index

Element	Management Plan
Controls	<ul style="list-style-type: none"> All mitigation measures implemented as proposed in tables under Sections 14.11.1 – 14.11.5.

14.11.7. Lighting

Element	Management Plan
Controls	<ul style="list-style-type: none"> All light sources should be directed downwards, and away

	<p>from the mountain side.</p> <ul style="list-style-type: none">• Light sources should be shielded where appropriate.
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4.12. Vegetation

4.12.1. Vegetation Clearing

All vegetative matter will be physically removed from all areas where construction is to take place. Prior to site clearance, a detailed survey of the vegetation in the area must be undertaken by a qualified vegetation specialist and any protected plant species recorded must be appropriately marked. The appropriate permit/s must be obtained from the Provincial Department of Conservation in the event that protected plants need to be relocated. All cleared areas will be stabilised as soon as possible in order to minimise the risk of erosion.

In terms of the Environment Conservation Act (No 73 of 1989), the disposal of vegetation by burying or burning is prohibited. No vegetative matter will be burnt or removed for firewood by any Eskom employee or Contractor prior to the necessary permission from the relevant authorities. The use of herbicides will only be allowed after a proper investigation into the necessity, the type to be used, the long term effects and the effectiveness of the agent.

The Contractor will ensure:

- The areas needing to be cleared and the degree of clearing required must be determined and demarcated in consultation with the ECO before clearing begins.
- The Contractor may not deface, paint or otherwise mark and or damage natural features / vegetation on the site, unless agreed beforehand with the ECO. Any features / vegetation defaced by the Contractor must be restored to the satisfaction of the ECO.
- The ECO must be present during vegetation clearing.

Plant Search and Rescue:

- Plant search and rescue (i.e. the location and removal of specified plant species, without unnecessary damage, and their transfer to a specified location) and the collection of seed, will be conducted by the ECO prior to the onset of any site clearing operations within the footprint of the upper and lower reservoirs.
- All vegetation species not readily relocated or required for end—use rehabilitation must be contained in a temporary nursery constructed for this purpose on site.

- Sensitive areas and/or species that have been selected for conservation by the ecologist or ECO, will be demarcated with danger tape/hazard tape. No activity will take place at these areas.

4.12.2. Protection of Vegetation

The Contractor will ensure that all works are undertaken in a manner, which minimises the impact on vegetation outside of the site area as designated in the construction site layout. However, it may be necessary in certain instances to remove or prune vegetation outside of the development in order to prevent possible damage to the facilities. This must be undertaken in consultation with the Project Manager and ECO.

4.12.3. Threatened and/or Protected Plant Species

A protocol describing the actions to be followed if a threatened species is found must be in place. Prior to vegetation clearance, any threatened and/or protected plant species which have been identified by the vegetation specialist and/or Environmental Control Officer must be removed and transplanted, wherever possible. These plant species must be planted in similar soil conditions and to the same depth as they were before removal. Care must be taken during the removal of plants to ensure that they are not damaged. The plants must be watered directly after transplanting to settle the soil. The Contractor must be assisted by an experienced individual or organisation.

The purpose of the vegetation survey is to:

- determine the actual occurrence of threatened and or protected plant species; and
- ensure that appropriate mitigation measures are taken, i.e. removal for plants for genetic propagation, relocation of plants (the relocation of sensitive species is not considered a favourable option due to the unknown secondary impacts of the relocated plants on the receiving environment and the low probability of long-term survival of the relocated specimens due to high habitat specificity).

Where it is absolutely essential to cut protected indigenous plants, Provincial Ordinances will be adhered to. The necessary permits will be obtained prior to commencement of any work.

4.12.4. Alien Vegetation

Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the agricultural resources and soil

conservation works are regulated by the Conservation of Agricultural Resources Act (No 43 of 1983) and must be addressed on a continual basis, through an alien vegetation control and monitoring programme.

In view of the fact that the presence of declared weeds is illegal, it is recommended that the landowner/manager comply with the following legally prescribed requirements (refer to Sections 1, 2, 5 and 6 of the Conservation of Agricultural Resources Act (No 43 of 1983), as well as government notice GN R1048):

- a) The landowner/manager must take steps to eradicate the declared weeds by using the methods prescribed in the regulations, namely
 - uprooting and burning, or
 - the application of a suitable chemical weed-killer (herbicide), or
 - any other method which will ensure their permanent eradication.
- b) One may not uproot or remove such plants and dump or discard them elsewhere to re-grow or to allow their seeds to be spread or blown onto other properties.
- c) If the landowner/manager does not comply with the requirements under a) and b) above, he/she is guilty of a criminal offence.

The Contractor will remove all alien vegetation on the PSS as listed in the Conservation of Agricultural Resources Act (No 43 of 1983), or as directed by the Environmental Officer during the construction period.

An alien control and monitoring programme must be developed before the construction phase and to be carried over into the operational phase. The following elements should be included in such a programme:

- The active control of all alien invasive species by means of manual removal, ring-barking, chemical control or a combination of these methods.
- The bigger trunks and branches must be removed while the smaller branches can be used as a soil stabiliser against wind erosion in exposed areas, while providing micro-habitat for seedling establishment.
- Rehabilitation of the cleared areas, starting with the establishment of a grass cover.
- All emergent seedlings must be removed by hand and re-sprouting from existing rootstock must be chemically treated in a continual monitoring and follow-up programme.

If properly planned and motivated this could serve as a trade-off programme with the potential of attracting external funding (e.g. Working for Water and/or Extended Public Works Programme). The method used for clearing of alien plants must include a full long-term alien eradication programme. The mature woody

plants can be cut down to knee height and herbicide must be applied to all exposed surfaces (a dye must be mixed with the herbicide to assist with identifying plants where it has been applied). All alien plant material must then be removed from site to reduce seeds from spreading. All seedlings, young plants and forbs can be removed by hand, ensuring that roots are removed with the plant. Follow-up clearing must be implemented following the initial alien removal (after approximately two months), to eradicate all the seedlings that will germinate following the removal of the mature specimens. Follow-up clearing must be required on an annual basis to prevent the aliens from re-establishing (Bromilow, 2001).

4.12.5. *Herbicide Use*

The use of herbicides will be in compliance with the Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947). In terms of this Act, a registered pest control operator will apply herbicides, or will supervise the application of herbicides. Herbicide use will only be allowed with the approval of Eskom. The application will be according to set specifications and under supervision of a qualified technician.

Therefore, the Contractor will:

- Ensure that a registered pest control operator applies or supervises the application of all herbicides.
- Ensure that all Eskom policies on the use and application of herbicides will be adhered to.
- Ensure that all herbicides are stored in a well-ventilated demarcated storage area.
- Ensure that a register of all contents of the storage area is kept and updated on a regular basis.
- Ensure that a daily register of all relevant details of herbicide usage is kept, and that such a register is maintained by the relevant Eskom custodian.

The Eskom policy for herbicide use is included in Appendix B.

4.12.6 *Risk of Fire*

Risk of fire: The risk of accidental fires to occur during the construction phase are considered to be high, especially during the dry summer months.

- Accidental fires should be prevented through proper sensitisation of the contractors and their workers towards the associated risks, dangers and damage of property.

- An emergency preparedness plan should be in place to fight accidental veld fires, should they occur. The adjacent land owners/users/managers should also be informed and/or involved.
- The use of open fires for cooking of food etc. by construction personnel should be strictly prohibited. Enclosed areas for food preparation must be provided.
- Use of branches of trees and shrubs for fire making purposes must be strictly prohibited.

4.13. Biodiversity

Element	Management Plan
Potential Impacts	Impact on both fauna and flora as a result habitat destruction due to construction activities.
Sources	<ul style="list-style-type: none"> • Construction camp and labour • Mobile construction equipment • Traffic to and from site.
Controls	<ul style="list-style-type: none"> • Confine impacts to development area. • Limit movement of vehicles and personnel through areas of sensitivity and within receiving environment. • Awareness programmes for construction and operational personnel. • Implementation of site specific rehabilitation programmes. • Implementation of bio-monitoring programme.
Corrective actions	<ul style="list-style-type: none"> • The Contractor will, as soon as reasonably possible, but within 24 hours of becoming aware of a complaint relating to biodiversity interaction, respond to the complaint and register the complaint in the Environmental Register. In addition, the complaint must be reported to the Environmental Practitioner as soon as possible such that the incident can be investigated by the Environmental Practitioner, ECO or Contractor.

4.14. Heritage

Element	Management Plan
Potential Impacts	Heritage objects or artefacts found on site and inappropriately managed.
Controls	<ul style="list-style-type: none"> • All relevant legislation regarding the conservation of national heritage sites must be adhered to. • Excavation and mapping of sites before construction commences. • Shifting of development/infrastructure to avoid sites. • Formalising sites by fencing them in. • Under no circumstances must the Contractor, his employees, his sub-contractor's employees remove, destroy or interfere with archaeological artefacts.
Maintenance	Awareness of procedures for dealing with heritage objects must be

Element	Management Plan
	updated where necessary.
Corrective Action	<ul style="list-style-type: none"> In the event that any heritage sites are found within the footprint of the construction activity, all work will cease immediately, and the event reported. The excavation must be examined by an archaeologist as soon as possible. The ECO will advise the Contractor of necessary actions to be taken after receiving advice from the archaeologist. All necessary actions to ensure that delays to construction are minimised must be taken. If any human remains are discovered they must be treated with respect and South African Heritage Resources Agency notified immediately. An archaeologist/palaeontologist must be contracted to remove the remains at the expense of the developer. Eskom may need to apply for a permit from SAHRA to destroy the occurrences if they are to be affected by the proposed activities. The province archaeologist may at her discretion ask that mitigatory work in form of archaeological trial excavations and rescue of archaeological material be conducted by an accredited archaeologist as a condition of such a permit being issued.

4.15. Air Pollution Management

4.15.1. Air Quality

Element	Management Plan
Sources	<ul style="list-style-type: none"> Fuel burning engines Emissions from concrete and asphalt batch plants Fire Dust generation on access roads
Controls	<ul style="list-style-type: none"> All activities on-site must comply with the requirements of the Atmospheric Pollution Prevention Act (Act No. 45 of 1965) <u>National Environmental Management: Air Quality Act (Act No 39 of 2004)</u>. Burning of materials including wood, grass and refuse which emit visible smoke will not be permitted on construction sites. Waste must be disposed, as soon as possible at a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand on site to decay, resulting in malodours and attracting vermin. No open fires are to be allowed on site. Ensure that batching plants are fitted with the appropriate filters. Eliminate excessive idling of plant in confined spaces e.g. tunnel.

Element	Management Plan
Maintenance	<ul style="list-style-type: none"> The Contractor will ensure that all vehicles and machinery are fitted with appropriate emission control equipment, are maintained frequently and serviced to the manufacturers' specifications.
Corrective Actions	<ul style="list-style-type: none"> If monitoring results or complaints indicate inadequate compliance with the EMP, the source of the problem must be identified and existing procedures or equipment modified to ensure that the problem is rectified. Non-compliance with the EMP must be reported to the department, in writing, within 24 hours of an incident.

4.15.2. Dust Control

Element	Management Plan
Potential Impacts	Dust and particulates from vehicle usage, excavation, temporary stockpiles and land clearing affecting the surrounding community and site visibility.
Sources	<ul style="list-style-type: none"> Clearing of vegetation and topsoil Excavation, grading / scraping and transport of material Loading and unloading of trucks Re-entrainment of deposited dust by vehicle movement Wind erosion from stockpiles and unsealed roads and surfaces.
Controls	<ul style="list-style-type: none"> Speed limits must be enforced in all areas, including public roads and private property to limit the levels of dust pollution. Max speed of 40km/h maintained on the construction site. Dust must be suppressed on access roads and construction sites during dry periods by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that will not result in the generation of run-off. Dust dispersion from construction activities, unsurfaced roads, spoil dumps and other construction locations will be limited and suppressed to the maximum extent practical. Spoil dumps will be positioned such that they are not vulnerable to wind erosion. Spoil and other dust-generating dumps which are left unused for 28 days or longer will be sprayed with water or chemically inert stabilisers to control dust, and treated with mulch and seeded. Untarred roads will be sprayed with water from a water cart to limit dust generation by construction vehicles. Where spraying of water on roads is not adequate for dust control, environmentally benign binding agents will be used to limit dust generation by construction vehicles. An appropriate freeboard will be maintained in trucks hauling dirt, sand, soil and other loose material when leaving the road

Element	Management Plan
	reserve.
Maintenance	<ul style="list-style-type: none"> Roads must be sealed as soon as possible and maintained to ensure that dust from road or vehicle sources will not exceed prescribed levels. Any cleared areas must be watered to ensure that dust levels are minimised prior to sealing or revegetation.
Corrective Actions	<ul style="list-style-type: none"> In the event of serious levels of dust pollution, the implementation of constant dust monitoring by qualified consultants must be undertaken. If monitoring results or complaints indicate inadequate compliance with the EMP, the source of the problem must be identified and existing procedures modified to ensure that the problem is rectified.

4.16. Geohydrology

4.16.1. Borehole Loss

Element	Management Plan
Controls	<ul style="list-style-type: none"> Compensation for boreholes loss by providing alternative water source. Re-drilling boreholes to substitute loss.

4.16.2. Dewatering of Surge Shaft Decant

Element	Management Plan
Controls	<ul style="list-style-type: none"> Drill 700m deep borehole at the proposed shaft position to establish presence of water bearing fracture zones. Dewater inflowing groundwater during the construction phase <u>and treat or recycle where necessary</u>. Grouting side walls may reduce/prevent groundwater inflow during construction phase.

4.16.3. Dewatering of Machine and Transformer Halls

Element	Management Plan
Controls	<ul style="list-style-type: none"> Dewatering during the construction phase <u>and treat or recycle where necessary</u>. Grouting side walls may reduce/prevent long-term impacts after construction.

4.16.4. Dewatering of Pressure Tunnel

Element	Management Plan
Controls	<ul style="list-style-type: none"> Dewatering during the construction phase <u>and treat or recycle where necessary.</u> Grouting side walls may reduce/prevent long-term impacts after construction.

4.16.5. Dewatering of Tailrace, Access and Emergency Tunnels

Element	Management Plan
Controls	<ul style="list-style-type: none"> Dewatering during the construction phase <u>and treat or recycle where necessary.</u> Grouting side walls may reduce/prevent long-term impacts after construction.

4.16.6. Groundwater Quality associated with Waste Water Treatment

Element	Management Plan
Controls	<ul style="list-style-type: none"> Exclude soak-aways and wastewater irrigation as methods of disposal. Assess underlying geological structures prior to positioning. of all evaporation/maturation ponds, if any. In case of wastewater works as treatment method, ensure correctly sized, designed and constructed facility. Construct all waste water dams to minimise seepage, i.e. lined dams. Design ponds (if any) in such a manner to ensure sufficient capacity and prevent overflow / spillage. Install monitoring boreholes to monitor groundwater quality.

4.16.7. Groundwater Quality associated with Seepage from Waste Disposal

Element	Management Plan
Controls	<ul style="list-style-type: none"> Area to be managed to prevent ponding of poor quality water. Install a drainage system below the disposal facility. Poor quality water to be diverted to lined recovery dams. Line waste disposal facility to prevent leachate from entering the groundwater. Dispose of solid waste at an alternative licensed disposal facility. Install groundwater monitoring boreholes to monitor groundwater quality down-gradient of disposal facility. Prevent further groundwater use until after remediation period.

4.16.8. Groundwater Quality associated with Fuel/Oil Spillages

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Contain oil and fuel in bunded areas. • Ensure clean-up protocols are in place and followed when required. • Install oil traps and separators. • Keep accurate oil/fuel records (purchased, disposal, and recycled). • Install monitoring boreholes to monitor groundwater quality. • Remediate spillages. • Prevent further groundwater use until after remediation period.

4.16.9. Groundwater Losses due to Borrow Pit Areas

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Excavations to remain above static groundwater level to prevent evaporative losses as a result of groundwater decant.

4.17. Water Management

4.17.1. Water for Domestic Use

The Contractor will reticulate water from the main supply of water provided by Eskom to the construction yard.

Element	Management Plan
Controls	<ul style="list-style-type: none"> • The provision of potable water and safe drinking utensils at various points on the site. • Provision of facilities for hand washing at all ablution facilities and near all toilet facilities. • Contractors must ensure construction crews are provided with an appropriate portable water supply, safe and healthy sanitary facilities and protection against exposure to environmentally dangerous or unhealthy situations or conditions. • All runoff water from fuel deposits, workshops, vehicles washing areas and other equipment must be collected and directed through oil traps to settlement ponds. These ponds must be suitably lined. • All runoff washing water and changing facilities must not be disposed of directly into drainage lines, streams or rivers, but in an environmentally acceptable manner. • Collection and disposal must be regulated to local authority <u>standards</u>, if they are the Water Services Provider in the area concerned. Disposal certificates must be produced for each

	collection by the appointed service provider to the Contractor.
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4.17.2. Water Consumption

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Create awareness and encourage the construction workforce to use water sparingly such that there is no water wastage. • Routine sampling of potable water [including baseline sampling] and final effluent (if discharged into watercourse) must be implemented. • Ensure that no natural water sources (i.e. streams, rivers) are used for construction activities or for domestic purposes by the construction workforce. • Negotiate the use of water for any purpose with the appropriate authorities and obtain written approval. • The contractor will not make use of/collect water from any other source than those pointed out to them as suitable for use.

4.17.3. Water Pollution Management

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Ensure that working areas where hazardous substances (such as cement, additives, plasticisers and vehicle fuels) are handled or stored are designed to collect and contain these hazardous substances. • Ensure that no pollution enters surface water or has the potential to pollute groundwater by ensuring that there is containment of spillages (e.g. diesel, oils, etc) and that there is an emergency plan in place to deal with accidental spillage (Refer to Appendix C). • Ensure that washing of containers, equipment, vehicles and other surfaces only occurs at designated washing areas. • Ensure that sufficient ablution facilities are provided (at least one toilet for every 15 members of the construction workforce per shift). Adequate numbers and placement of portable chemical toilet facilities at construction sites is crucial to prevent unnecessary pollution of the surrounding environment. • All fuel, chemical, oil, etc spills must be confined to areas where the drainage of water can be controlled and managed to confine spillages such that they do not interfere with stormwater and groundwater (referred to as 'clean water'). This can be achieved through the use of appropriate structures and methods such as the construction of bunded areas, berms and pans, or through the application of surface treatments that neutralise toxic effects.

4.17.4. Water Flows across Construction Sites

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Adequate measures will be put into place to control surface water flows across and around all construction sites. • The quantity of uncontaminated stormwater entering cleared areas will be minimised by appropriate site design and by installation of control structures and drains which direct such flows away from cleared areas and slopes to stable (vegetated) areas or effective treatment installations. • Site drainage lines will be identified and control measures installed to handle predicted stormwater and sediment loads generated in the mini catchment. • The extent of continuous slopes in zones where flowing water is anticipated will be minimised by appropriate design and the installation of control structures. • The velocity of stormwater flows and associated scouring across construction sites will be controlled through the installation of geotextiles, rock- or other structures. • All drains constructed on site must discharge into natural drainage lines. • A ground water monitoring programme must be established on the site. This monitoring programme must commence within one week of construction activities beginning.

4.17.5. Waste Water

Element	Management Plan
Controls	<ul style="list-style-type: none"> • All water discharged from the works including effluent from sewage treatment, wash water and stormwater from workshops and refuelling areas, as well as all runoff from areas with pollution potential will comply with national effluent standards. • Plan the layout of wash areas, batching areas and workshops with the following guidelines in mind: • Optimise the layout to minimise disturbance to the environment and to neighbours. • Concrete slabs must slope towards a conservancy tank so that run-off water can be collected. These tanks must be emptied, at least once a week or when they are 60% full.

4.18. Surface Water and Drainage

4.18.1. Ecological Instream Flow Requirements

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Design outlet works, for ecological releases. • Establish, implement and monitor the ecological reserve. • Flow measurement of releases.

4.18.2. River Diversions

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Should be engineer-designed to allow for the free movement of runoff water. • Should be engineer-designed to prevent degradation of water courses such as the forming of erosion. • Should be designed to mitigate biological loss and habitat.

4.18.3. Stream/Drainage Line Crossings

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Adequate drainage systems at river crossings to prevent damming up and backwater at upstream sides. • Minimise disturbance of the banks. • Sufficient drainage systems should be designed as not to choke watercourse. • Erosion protection at approaches and drainage systems, to prevent sediment entering water bodies and to prevent erosion. • Protection downstream to prevent scour and to keep flow velocities down. • Adequate discharge capacities in the event of flooding.

4.18.4. Permanent Stream Crossings

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Regular inspections at river crossings. • Regular maintenance. • Adequate discharge capacities in the event of flooding.

4.18.5. Spillway Erosion

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Spillway and stilling basin to be designed according to acceptable engineering Standards. • Regular monitoring of possible forming of erosion or degradation of watercourses.

4.18.6. Borrow Areas

Element	Management Plan
Controls	<ul style="list-style-type: none"> Borrow areas should be placed outside the 1:100 year flood line. Where this is not possible, flood protection measures should be implemented and maintained in cases where borrow areas are within the 1:100 year flood line. Area should be made free draining after construction and landscaped to follow the natural topography. Additional mitigation measures will include Excavation, Backfilling, Trenching, Soil Stabilisation and Erosion Control issues which are discussed in detail within this EMP. These must be applied to the borrow areas.

4.18.7. Risk of flooding of the Steelpoort River

Element	Management Plan
Controls	<ul style="list-style-type: none"> Downstream slope, toe, outlet works, spillway, needs to be designed according to relevant engineering Standards. Construct dam structure outside relevant flood events. Emergency response and preparedness plans need to be developed for the dam. Hydrological data and relevant flood evaluations should be addressed during the 5-yearly dam safety inspections.

4.18.8. Reservoir Breach

Element	Management Plan
Controls	<ul style="list-style-type: none"> Engineer design and construction supervision according to the guidelines of the South African National Committee on Large Dams, and relevant engineering Standards. Adequate operation and maintenance. Regular dam safety inspections. Early warning systems. Emergency Response and Preparedness Plans. Review of dam design by Authorities or specialists to bring down the probability of occurrence.

4.18.9. Sewage Impacts

Element	Management Plan
Controls	<ul style="list-style-type: none"> Adequate water treatment plant. Surface Water Quality Monitoring. Flow metering/measuring. Safe disposal of sewage sludge.

4.18.10. Taking of Surface Water for the Construction Camp

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Obtaining water from existing water users (subject to registration of such water users). • Installing flow metering / measuring devices to stay within allocation. • Reusing / Recycling of water. • Maintain systems to reduce leaks. • Training of workers on water conservation and demand management.

4.18.11. Flooding of the Construction Site by Surface Water Bodies

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Locality of construction sites should be above 1:100 year flood lines. • Adequate engineer designed flood protection measures. • Maintenance of flood protection measures.

4.18.12. Sewage Return Flows from Permanent Buildings

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Community training and awareness. • Water treatment options. • Removal or re-routing of contaminant sources. • Set environmental objectives of the water quality.

4.19. Wetlands

4.19.1. Impact on Wetlands adjacent to the Upper Reservoir Site

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Ensure that wetlands and associated buffers are not affected by any construction activities, these are no-go areas.

4.20. Soil Management

4.20.1. Topsoil

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Topsoil¹ will be sourced from areas which are cleared for construction and spoil dumps, conserved and used judiciously in the rehabilitation of disturbed land.

¹ Topsoil is defined as the top layer of soil that can be mechanically removed to a depth of about 100mm without ripping or blasting.

Element	Management Plan
	<ul style="list-style-type: none"> • The Contractor is required to strip topsoil together with grass from all areas where permanent or temporary structures are located, construction related activities occur, and access roads are to be constructed. Topsoil must be stockpiled for later use. • Topsoil stripping will be scheduled for the dry season, as far as possible. • Topsoil is to be handled twice only - once to strip and stockpile, and secondly to replace, level, shape and scarify. • Topsoil must not be compacted in any way, nor should any object be placed or stockpiled upon it. No vehicles may be allowed access onto the stockpiles after they have been placed • Topsoil is to be replaced along the contour. • Topsoil stripped from different sites must be stockpiled separately and clearly identified as such. • Land to which topsoil has been applied will be vegetated as soon as possible after application. • The disposal of unused topsoil (i.e. topsoil leftover after site rehabilitation and landscaping is complete) must be undertaken in consultation with the surrounding landowners and relevant authorities.
Maintenance	<ul style="list-style-type: none"> • Stored topsoil will be free of deleterious matter such as large roots, stones, refuse, stiff or heavy clay and noxious weeds which would adversely affect its suitability for planting. • Topsoil stockpiles are not to exceed 2 m in height. Topsoil, which is to be stockpiled for periods exceeding 28 days, must be treated with mulch, roughened and seeded with an approved grass mixture or ground cover specified by the SHE Officer/ECO. The mulch cover must be kept free of alien vegetation/seeds.

4.20.2. Spoil Material

Element	Management Plan
Controls	<ul style="list-style-type: none"> • The location of spoil stockpile sites will be agreed by the ECO prior to the onset of any operations that will generate spoil materials. No spoil material will be dumped outside the defined site. The Contractor will ensure that the material does not blow or wash away. If the spoil material is in danger of being washed or blown away, the contractor will cover it with a suitable material such as hessian or plastic. • All cut material will be tested against quality requirements for other works. • If material meets quality requirements for other works it must be taken to the relevant area on instruction of the Project Manager. • If material does not meet the quality requirements for other

	<p>works the material must be disposed of at a relevant waste disposal site.</p> <ul style="list-style-type: none"> • Spoil dumps will be located at least 10 m away from natural drainage lines. • Spoil dumps will be placed wherever practical in topographically sheltered locations to obtain maximum protection from wind exposure. • All spoil dumps assessed as being unstable will be encircled with silt fences or drainage systems that will collect and dispose of contaminated water. • Spoil dumps will have slopes not greater than 1:2 (vertical to horizontal). Less steep slopes will be applied in conditions where erosion risks are indicated to be high. • Spoil dumps will be smoothed and contoured and compacted to prevent ponding.
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4.20.3. Excavation, Backfilling and Trenching

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Excavations should preferably not be undertaken until such time that all required materials/services etc. are available on-site, to facilitate immediate laying of such services or the construction of subsurface infrastructure. • Any such excavations must be undertaken within the confines of an established construction site - i.e. a site that is either protected with a peripheral fence, or a site that has a regular/continual human presence. Failing this, regular daily inspections are essential. All excavations, regardless of depth, must be provided with escape ramps, suitably constructed with a stable gravel or similar material, at a minimum gradient of 1:2. • Consider using any excess rocks and boulders that were excavated from the construction site for any erosion protection work which is required on site. • Excess material as a result of excavation activities is not to be dumped along the roadsides, but must, together with construction rubble be removed, once construction is completed, and appropriately disposed of. • Suitable excavated material is to be stockpiled next to excavations for use as backfill and all unsuitable or excess material must be loaded onto trucks and hauled to designated spoil areas. • Backfill material must be from excavated material or imported from a suitable source if the excavated material does not conform to the required specifications. • Areas to be backfilled must be cleared of all unsuitable material and debris.

4.20.4. Erosion Control

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Areas susceptible to erosion must be protected by installing the necessary temporary and/or permanent drainage works as soon as possible and by taking other measures necessary to prevent surface water from being concentrated in streams and from scouring slopes, banks or other areas. • Any runnels or erosion channels developed during the construction period or during the vegetation establishment period shall be backfilled and compacted, and the areas restored to a proper condition. • Anti-erosion compounds shall consist of an organic or inorganic material to bind soil particles together and shall be a proven product able to suppress dust and erosion. The application rate shall conform to the manufacturer’s recommendations. The material used shall be of such quality that grass seeds may germinate and not prohibit growth. • The following erosion control methods can be considered where required: <ul style="list-style-type: none"> ❖ Brushcut packing ❖ Mulch or chip cover ❖ Straw Stabilisation ❖ Watering ❖ Planting/sodding ❖ Hand seeding/sowing ❖ Hydroseeding ❖ Retating walls ❖ Soil binders and anti-erosion compounds ❖ Log/pole fencing. • These erosion control measures, including stormwater drainage systems, will be installed before construction commences. • Installed erosion control measures will be appropriate to site conditions to handle a one-in-two-year storm event for temporary structures, and a one-in-fifty year storm event for permanent structures which provide ongoing sediment control after a site has been rehabilitated. • Contingency plans will be in place for extreme storm events. • Blocking of stormwater drainage systems must be prevented and storm water must be managed to prevent soil erosion. • Natural stormwater run-off, which is not polluted by the site operations, must be diverted around spoil dumps and soil stockpiles. • Where stormwater has accumulated in the working area and needs to be pumped out, it must be disposed of into the nearest stream or river in such a way that erosion does not occur along the course of its passage.

Element	Management Plan
	<ul style="list-style-type: none"> • No stormwater must be allowed to enter drainage installations (i.e. installations for the reception, conveyance, storage or treatment of sewage. • Maintain soil erosion structures such as stone pitching, gabions, etc to enable effectiveness. • Site activities will take overall recognition of the importance of measures to avoid and reduce erosion by phasing the work program to minimise land disturbance in the planning and design stage, by keeping the areas of land cleared to a minimum, and by ensuring that the period of time for which areas remain cleared are kept to a minimum. • All cleared areas will be proactively rehabilitated and in accordance with specific instructions from the Project Manager. • Soil must be exposed for the minimum time possible once cleared of invasive vegetation. The timing of clearing and grubbing must be co-ordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion. • Stockpiled topsoil must be either vegetated with indigenous grasses or covered with a suitable fabric to prevent erosion and invasion by weeds. • Only light equipment may be used for transport and delivery of construction material in areas of unstable soils, in areas where no erosion is evident.

4.21. Waste Management

Element	Management Plan
Potential Impacts	Inefficient use of resources resulting in excessive waste generation Litter or contamination of the site or water through poor waste management practices.
Sources	<ul style="list-style-type: none"> • Packaging • Construction wastes • Waste dirt or rock from excavation • Storage of oils and fuels • Domestic waste from site offices and construction camp • Sludges generated from tunnel dewatering system/quarry/borrow pit.
Controls	<ul style="list-style-type: none"> • Adhere to waste management guidelines and any relevant license conditions imposed. • Where possible, construction wastes on site must be reused or recycled. • Disposal of waste must be in accordance with relevant legislative requirements. • The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of it as prescribed in the applicable environmental legislation (refer to

Element	Management Plan
	<p>Appendix A).</p> <ul style="list-style-type: none"> • The contractor will appoint a person to manage and control waste. • Integrated waste management on site will be carried out by applying, in order of preference, waste avoidance, reuse, recycling and environmentally responsible disposal. These waste management guidelines are included within Appendix D. • Burning of waste material will not be permitted except under special circumstances and with prior approval of the Project Manager. • The Contractor will provide and maintain adequate facilities for litter collection (e.g. bins) at strategic locations around the site camp such as the office, garage, parking, housing facilities and locations where food is consumed. All refuse receptacles shall be weather-, tamper- and vermin- proof. • Waste will be sorted at source (i.e. the separation of tins, glass, paper etc). Recycled waste of this sort will either be collected by a local contractor or removed by the contractor to an approved facility. • A high quality of housekeeping will be maintained on all construction sites to ensure that materials are not left where they can be washed or blown away to become litter. • Littering must be prohibited and routine clean-up drives must be implemented. • Stockpiled waste must not remain on site for longer than 30 days. • The Contractor must supply waste bins/skips throughout the site at locations where construction personnel or labourers are working. The bins must be provided with lids and an external closing mechanism to prevent contents from blowing out, and must be scavenger proof to prevent animals attracted to waste. Bins must be emptied on a regular basis and the waste removed to the construction camp where it must be contained in scavenger, water and windproof containers until disposed of. • <u>Waste</u> (general and hazardous) generated during the construction phase may only be disposed of at appropriately licensed sites in terms of applicable Environmental legislation. • <u>As the quantity of construction waste, particularly waste concrete, may be large and not practical to transport to a licensed dumping site, consideration should be given to creating an approved waste dumping site on site. Excess rock material could also be dumped in the dead volume of the lower dam.</u> • The collection, storage and disposal of waste may not cause any nuisance (odours, fumes, aesthetic impacts, etc.). • No waste may be disposed of on neighbouring land.

Element	Management Plan
	<ul style="list-style-type: none"> Anything recyclable must be recycled. Illegal dumping must be prohibited.
Maintenance	<ul style="list-style-type: none"> Litter collection at all construction sites will be undertaken at least once per working day. Work teams will be supplied with refuse bags which can be disposed of daily in skips at centralised locations. All waste containers will be emptied at least once a week. Waste documentation must be completed and kept onsite.
Corrective actions	<ul style="list-style-type: none"> A complaints register must be maintained, in which any complaints from the community must be logged. All complaints must be investigated and, if appropriate, acted upon. Corrective actions are required to be undertaken immediately after a complaint is made or a non-conformance is identified.

4.22. Storage and Handling of Hazardous Substances

Element	Management Plan
Potential Impacts	<p>Release of contaminated water from contact with spilt chemicals.</p> <p>Fuel source for on-site fires.</p> <p>Generation of contaminated wastes from used chemical containers.</p>
Controls	<ul style="list-style-type: none"> The storage of flammable and combustible liquids such as oils will comply with all relevant legislation and regulations. Any spills will be rendered harmless and arrangements made for appropriate collection and disposal including cleaning materials, absorbents and contaminated soils. Ensure that spill kits are available on site to clean up spills and leaks. Obtain any storage and disposal permits / approvals necessary and comply with the conditions attached to such permits and approvals. Ensure that any delivery drivers are appropriately supervised by an individual familiar with all procedures and restrictions on site. This is of particular importance during off and on-loading of materials. Ensure that only designated areas are used for the handling or storage of construction materials. All materials must be stored at one location, to be approved by the ECO. The Contractor must comply with all national, regional and local legislation with regard to the storage, transport, use and disposal of chemicals, harmful and hazardous substances and materials. The Contractor will furthermore be responsible for the training and education of all personnel on site who must be handling

Element	Management Plan
	<p>the material about its proper use, handling and disposal as well as spill response.</p> <ul style="list-style-type: none"> • The Contractor must be responsible for establishing an emergency procedure for dealing with spills. • Storage of all hazardous materials is to be safe, tamper proof and under strict control. • Fuels, solvent and other wastes must be stored in vessels equipped with secondary containment structures and must be moved from construction area being disposed of in compliance with the relevant legislation and regulations. • The containers in which the products are kept must, in compliance with hazardous material management procedures, be removed from the site once empty. Hazardous products must otherwise be stored on adequately bunded surfaces in the designated hazardous material storage areas. • All manufactured and/or imported material must be stored in an appropriate manner in the construction camp. Depending of the type of material, storage areas will be roofed with impervious material (e.g. cement and chemicals). • Fluids must not be stored together with solids; instead fuels, lubricants, transmission and hydraulic fluids must be stored in a designated area for fluids. • Cement, building sand, topsoil and subsoil must also be stockpiled separately in their designated areas. • Separate material delivery and storage, and lay-down areas must be demarcated as needed. • All material storage areas must be sited away from ecologically sensitive areas. • Hazardous chemicals used during construction must be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) must be available on site. • The Contractor must provide adequate and approved facilities for the storage and recycling of used oil and contaminated hydrocarbons. Such facilities must be designed and situated with the intention of preventing pollution of the surrounding area and environment. • Identify and maintain a register of all activities that involve the handling of potentially hazardous substances, as well as devise and supervise the implementation of protocols for the handling of these substances. This will include all fuels, oils, lubricants and grease. • Ensure that all hazardous substances are handled in accordance with the manufacturer's specifications and legal requirements. • Store all hazardous substances (including oils, fuels, chemicals, etc.) in a manner prescribed in the relevant Acts and Regulations.

Element	Management Plan
Maintenance	<ul style="list-style-type: none"> • Any accidental chemical/fuel spills to be corrected immediately. • Keep MSDS records of chemicals in use up to date. • Waste records must be kept available for review. • Implement appropriate actions and measures to reduce, stop or contain a spill of potentially hazardous substances (e.g. fuel or lubricating oil). • Implement appropriate actions and measures to reduce or prevent contamination of the ground and surface water as a result of a spill of potentially hazardous substances.
Corrective Actions	<ul style="list-style-type: none"> • Observation and supervision of chemical storage and handling practises and vehicle maintenance throughout the construction phase. • Arrange and supervise the implementation of clean-up operations and appropriate disposal of contaminated materials at the hazardous waste disposal site. • A complaints register must be maintained, in which any complaints from the community must be logged. All complaints must be investigated and, if appropriate, acted upon. • Keep written records detailing the type of spill, the corrective and remedial measures implemented in the stopping or reduction of the spill, and the clean up of the spill. Such progress reporting is important for monitoring and auditing purposes and the written reports may afterwards be used for training purposes in an effort to prevent similar future occurrences. • Report the nature and extent of the spill to the ECO or Project Manager, as soon as reasonably possible, but within 24 hours. • The <u>ECO</u> will prescribe measures to be implemented in order to prevent spills of potentially hazardous substances. • Preventative measures to reduce the possibility of spillage of hazardous substances are included in Appendix C.

4.22.1. Cement and Concrete

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Concrete must be mixed only in an area demarcated for this purpose. All concrete spilled outside this area, must be promptly removed by the Contractor and taken to a permitted waste disposal site. After all concrete mixing is complete all waste concrete must be removed from the batching area and disposed of at an approved waste disposal site. • The batching plant will be enclosed by a bunded wall with divisions and dedicated compartments for the various types of materials. Air filters will be monitored and cleaned and replaced as per the supplier's guidelines.

Element	Management Plan
	<ul style="list-style-type: none"> • Operators must wear suitable safety clothing. • All runoff from batching areas must be strictly controlled. Cement contaminated water must be collected, stored and disposed of at a site approved by the Project Manager. • Appropriate measures for overflow from batching plant, e.g. during heavy rains, must be put in place. • Waste concrete and cement sludge must be scraped off the site of the batching plant daily and removed to an approved landfill site. (To prevent pollution during the rain). • Solidified concrete can be disposed of at a registered general waste landfill site. • Concrete must not be mixed directly on the ground. Plastic liners or mixing trays are to be used.

4.22.2. Fuel Storage

Element	Management Plan
Controls	<ul style="list-style-type: none"> • All legal compliance requirements with respect to fuel storage and dispensing must be met. • All fuel storage tanks (temporary or permanent) and associated facilities must be designed and installed in accordance with the relevant oil industry standards, SANS codes and other relevant requirements. • The Contractor must ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and under lock and key at all times. • Areas for storage of fuels and other flammable materials must comply with standard fire safety regulations and may require the approval of the Municipal Fire Prevention Officer. • Flammable fuel and gas must be well separated from all welding workshops, assembly plants and loading bays where ignition of gas by an accidental spark may cause an explosion or fire. • The tank must be erected at a safe distance from buildings, boundaries, welding sites and workshops and any other combustible or flammable materials. • Symbolic safety signs depicting "No Smoking", "No Naked Flames" and "Danger" are to be prominently displayed in and around the fuel storage area. • The capacity of the tank must be clearly displayed and the product contained within the tank clearly identified. • There must be adequate fire- fighting equipment at the fuel storage and dispensing area or areas. • The storage tank must be removed on completion of the construction phase of the project. • All such tanks to be designed and constructed in accordance with a recognised code (international standard).

Element	Management Plan
	<ul style="list-style-type: none"> • The rated capacity of tanks must provide sufficient capacity to permit expansion of the product contained therein by the rise in temperature during storage. • Tanks must be situated in a bunded area, the volume of which must be at least 110% of the proposed volume of the tank. • The floor of the bunded area must be smooth and impermeable, constructed of concrete or plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The floor of the bunded area will be sloped towards an oil trap or sump to enable any spilled fuel and/or fuel – soaked water to be removed. • Any water that collects in the bund must not be allowed to stand and must be removed and the hydrocarbon digestion agent within must be replenished. • Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks must be sealed and stored on an area where the ground has been protected. • Any electrical or petrol-driven pump must be equipped and positioned so as not to cause any danger of ignition of the product. • If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used. • The drum must not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank must be stored in a waterproof container when not in use. • All waste fuel and chemical impregnated rags must be stored in leak-proof containers and disposed of at an approved hazardous waste site. • The amounts of fuel and chemicals stored on site will be minimised. • Storage sites will be provided with bunds to contain any spilled liquids and materials.
Maintenance	<ul style="list-style-type: none"> • Regular inspections will be carried out to detect leaks and spillages. All storage facilities will be maintained as regularly as is necessary to ensure they meet the original specification. Inspections will be carried out on a daily, weekly and monthly basis by the ECO. Quarterly audits will also be undertaken. The contractors will be audited by Eskom Generation, and the SHE department will be audited by independent auditors. • All equipment that leak oil or fuel must be repaired immediately or removed from the construction site
Corrective Actions	<ul style="list-style-type: none"> • Absorbent material must be available at tanks to absorb any spills.

4.23. Traffic and Transport

4.23.1. Transport of Components

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Number of trips kept to a minimum. • Use approved route. • Transport outside peak hours on busy sections.

4.23.2. Construction Traffic

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Road rehabilitation after construction.

4.23.3 Road Safety during Construction

Element	Management Plan
Controls	<ul style="list-style-type: none"> • <u>Maintain speed at low speed.</u> • <u>Establish speed humps (traffic calming zones) to regulate speed.</u> • <u>Implement guard rails to prevent people walking on the road (and encourage walking on pavement).</u> • <u>Develop an overhead "pedestrian crossing" at schools and communal centres.</u> • <u>Install warning signs to improve awareness.</u>

4.24. Site Clean-up

Element	Management Plan
Controls	<ul style="list-style-type: none"> • The Contractor must ensure that all temporary structures, materials, waste and facilities used for construction activities are <u>disposed of on site in the approved dumping areas</u> upon completion of the project. • Fully rehabilitate (e.g. clear and clean area, rake, pack branches etc) all disturbed areas and protect them from erosion. • Only indigenous plants that are able to establish easily and will need less maintenance because they have already adapted to the local conditions must be considered for rehabilitation purposes. • Before final decisions about the choice of plant species are taken the ECO must be approached for their advice.

4.25. Tourism

Element	Management Plan
Potential Impacts	Sense of place. Disruption of land use. Tourism growth and sustainability.
Controls	<ul style="list-style-type: none">• Location of construction camp away from tourism areas.• Containment of construction camps to predetermined areas away from tourism areas.• Use of existing tourism facilities by construction management staff.• Marketing of tourism facilities identified near the development during the construction phase.

5. OPERATION AND MAINTENANCE

5.1. Labour

5.1.1. Conduct of Employees

The following restrictions or constraints will be placed on the operation and maintenance staff in general:

- No indiscriminate disposal of rubbish or rubble.
- No littering of the servitude and substation areas and the surrounding areas.
- No collection of firewood.
- No interference with any wildlife, fauna or flora.
- No poaching of any description.
- No use of facilities other than the chemical toilets provided.

5.2. Hazard and Risk

Element	Management Plan
Potential Impacts	<ul style="list-style-type: none"> • Fire from flammable liquid • Transport spillage of fuel • Storage of fuel.
Sources	Fuel.
Actions/Controls	<p>When design is completed, a detailed Risk Management and Emergency Response Plan must be developed prior to commissioning for review by appropriate stakeholders. The plan will cover:</p> <ul style="list-style-type: none"> • Design specifications for layout, selection of materials, construction and operation of the facility. • Preventative measures. • Control measures. • Non-technical measures including organizational and systems measures. • Appropriate warning sign boards, clearly denoting warning procedures and emergency exit routes, must be posted at relevant locations in the facility. • Setting up of emergency teams with team leaders. • Formulation of detailed emergency procedures such as: <ul style="list-style-type: none"> * Emergency notification / alarm procedures including names and telephone numbers of internal and external emergency service. * Evacuation routes, maps, route signs etc. * Directions to showers, wash stations, fire extinguishers etc. * Location. • Safety training. • On-site and off-site emergency plans (for fire and spill

Element	Management Plan
	<p>response).</p> <ul style="list-style-type: none"> • Monitoring. • Incident and safety reporting. • Community consultation and information
Maintenance	Regular checks and drills must be conducted to ensure that the risk and hazard control strategies are maintained up to date.
Monitoring	<ul style="list-style-type: none"> • All monitoring will occur according to the risk management and emergency response plan, guidelines and license conditions. • A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.
Corrective Actions/Reporting	<ul style="list-style-type: none"> • If a report or drill indicates an error/omission in risk and hazard management procedures, then procedures must be altered or updated to ensure effective management. • If an incident occurs, then emergency procedures must be enacted to ensure all impacts are minimized.

5.3. Noise

Element	Management Plan
Potential Impacts	<ul style="list-style-type: none"> • Nuisance noise from the commissioning and operations activities.
Sources	<ul style="list-style-type: none"> • Staff transport and equipment transport • Power house complex • Commissioning activities • Maintenance activities • Pump house.
Actions/Controls	<ul style="list-style-type: none"> • The design of the PSS in the Steelpoort area should incorporate all the necessary acoustic design aspects required, in order for the overall generated noise level from the new installation not to exceed a maximum equivalent continuous rating level as specified for industrial districts in SANS 10103. • Notwithstanding this provision, the design is also to take into account the maximum allowable equivalent continuous day and night rating levels of the potentially impacted sites outside the proposed PSS site. • The latest technology incorporating maximum noise mitigating measures for the PSS components should be designed into the system. • The design process should consider, <i>inter alia</i>, the following aspects: <ul style="list-style-type: none"> - The position and orientation of buildings on the site. The position of the surface facilities that generate the loudest noise should be located far as possible from the noise sensitive sites on adjacent farms.

Element	Management Plan
	<ul style="list-style-type: none"> - The enclosure of noisy plants in buildings where possible and practical. - The design of the buildings to minimise the transmission of noise from the inside to the outdoors. • The insulation of particularly noisy plant and equipment.
Maintenance	All plant and equipment, including vehicles, must be properly maintained in order to minimise noise generation.
Monitoring	<ul style="list-style-type: none"> • Observation of on-site noise levels by SHE Officer. • A complaints register must be held, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon. • Noise monitoring conducted following commissioning to ensure noise levels meet specified levels.
Corrective Actions/Reporting	<ul style="list-style-type: none"> • Corrective action is required to be undertaken immediately after a complaint is made or non-conformance is identified. • Any complaints regarding noise must be investigated, sources identified and mitigation measures implemented. Feedback on resolution of the issue must be provided to the complainant. • The SHE Officer/Station manager will maintain an incident reporting system to record non-conformances. • The Generation Environmental Manager will report on compliance with this EMP if required by the administering authority.

5.4. Biodiversity

Element	Management Plan
Potential Impacts	<ul style="list-style-type: none"> • Impact of operational activities on flora and fauna in the surrounding areas.
Sources	<ul style="list-style-type: none"> • Movement of employee and visitor vehicles within and around the site.
Actions/Controls	<ul style="list-style-type: none"> • Implementation of a site rehabilitation and landscaping program. • Use of indigenous plants in landscaping and rehabilitation activities. • Program regular alien plant identification and eradication activities. • The maintenance staff may not harm or kill any fauna during the activities of maintaining the PSS plant. • Wildlife interaction will be investigated by the Environmental Officer. • The active control of all alien invasive species by means of manual removal, ring-barking, chemical control or a combination of these methods. • The bigger trunks and branches must be removed while the

Element	Management Plan
	<p>smaller branches can be used as a soil stabiliser against wind erosion in exposed areas, while providing micro-habitat for seedling establishment.</p> <ul style="list-style-type: none"> • Rehabilitation of the cleared areas, starting with the establishment of a grass cover. • All emergent seedlings must be removed by hand and re-sprouting from existing rootstock must be chemically treated in a continual monitoring and follow-up programme.
Maintenance	<ul style="list-style-type: none"> • Vegetative barriers must be regularly maintained so as to ensure minimal visual intrusion. • Maintenance of plants on site to ensure continued viability of vegetative barriers. • Maintenance of rehabilitated areas to ensure sustainability.
Monitoring	<ul style="list-style-type: none"> • Observation of site appearance by Station Manager. • A complaint register, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon. • Regular alien plant inspections (6 – 12 monthly).
Corrective Actions/Reporting	<ul style="list-style-type: none"> • An incident reporting system will record and manage follow up of resolution of non-conformances. • In the event of an incident, the Environmental Officer will write a report regarding the incident, and make recommendations. A follow up site inspection will be conducted by the Environmental Officer in order to assess the effectiveness of the recommendations. • The Power Station Manager will report on compliance with this EMP if required by the administering authority.

5.4.1. Use of herbicides in the Alien Control Programme

The use of herbicides will be in compliance with the terms of the Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947). In terms of this Act, a registered pest control operator will apply herbicides, or will supervise the application of herbicides.

Therefore, Eskom will:

- Ensure that a registered pest control operator applies or supervises the application of all herbicides.
- Ensure that all herbicides are stored in a well-ventilated demarcated storage area.
- Ensure that a register of all contents of the storage area is kept and updated on a regular basis.
- Ensure that a daily register of all relevant details of herbicide usage is kept, and that such a register is maintained by the relevant Eskom custodian.

5.5. Air Pollution Management

Element	Management Plan
Controls	<ul style="list-style-type: none"> The pumped storage schemes' equipment must be performance tested during the commissioning phase to ensure that the manufacturer's standard has been delivered. All pumped storage schemes equipment must be maintained according to industry standards. This will ensure that emissions, odours and dust continue to fall within guideline levels. Roads must be sealed and maintained to ensure that dust from road or vehicle sources will not exceed prescribed levels. During establishment of vegetation from rehabilitation/landscaping affected areas must be watered to ensure dust level are minimised. Ensure incident and complaint registers are established and maintained.

5.6. Geohydrology

5.6.1. Upper Reservoir Seepage

Element	Management Plan
Controls	<ul style="list-style-type: none"> During the operational phase, seepage through the dam wall will contribute towards down-gradient base-flow requirements (springs along mountain slope). Locate possible seepage paths for remedial grouting by installation of piezometers downstream of grout curtain, will reduce excessive seepage (<400m³/d). Install groundwater monitoring boreholes down-gradient of the dam wall to monitor quality and water levels.

5.6.2. Lower Reservoir Seepage

Element	Management Plan
Controls	<ul style="list-style-type: none"> Less seepage due to fluctuations in water level. Locate possible seepage paths for remedial grouting by installation of piezometers downstream of grout curtain. Install groundwater monitoring boreholes down gradient of the dam wall to monitor quality and water levels.

5.6.3. Artificial Groundwater Recharge

Element	Management Plan
Controls	<ul style="list-style-type: none"> Apply source in construction, oppose to obtaining it from a more expensive/located source elsewhere. Backfill existing geotechnical boreholes in dam basin with a

	<p>mixture of bentonite and cement, trimmed and filled from the bottom, to prevent excessive losses through recharge.</p> <ul style="list-style-type: none"> • Line reservoirs with clay bases to minimise seepage losses.
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5.7. Water Management

Element	Management Plan
Potential Impacts	Wastewater entering the surrounding areas / system.
Sources	<ul style="list-style-type: none"> • Stormwater • Firefighting water • Potentially contaminated bund water • Management of potentially contaminated stormwater run-off • Landscaping and gardening.
Controls/actions	<ul style="list-style-type: none"> • All chemical/hydrocarbon storage areas must be bunded. This bund water must be removed from site by a licensed contractor. • All plant and chemical usage areas must be paved. • Potentially contaminated water must be directed to an oil/water separator. Oily water must be removed from the site by a licensed contractor. • Any run-off that is discharged from the site must be uncontaminated. • All vehicle transfers of materials must be conducted within a bunded area to minimise the potential for spills to enter the stormwater. • Spills of potential contaminants must be immediately cleaned up and neutralised. Such spills must be handled with consideration to health and safety considerations. • The use of water to clean up spills must be avoided except where absolutely necessary. • Movement of vehicles on and off site is to be through approved access points only. • Spill kits must be made available on site for the clean up of spills and leaks of contaminants. • Spill response procedures to include removal/disposal of potentially contaminated water and any used absorbent materials.
Maintenance	<ul style="list-style-type: none"> • The water quality control structures used on site must be monitored and maintained in a fully operational state at all times. • Ensure incident/complaint registers are established and maintained.
Monitoring Parameters	<p>The following parameters must be monitored in order to determine the hydrochemical character of the groundwater:</p> <ul style="list-style-type: none"> • Major ions (Ca, Mg, Na, K, HCO₃, SO₄ and Cl) • Electrical conductivity (EC) • Total dissolved salts (TDS) • pH.

Element	Management Plan
	<p>The following parameters must be monitored as indicators of potential organic contamination:</p> <ul style="list-style-type: none"> • Dissolved organic carbon (DOC) • PO₄ • NO₃ • Total petroleum hydrocarbon (TPH) levels.
Monitoring	<ul style="list-style-type: none"> • Monitoring program to be developed in consultation with relevant authorities and stakeholders.
Corrective Actions/reporting	<ul style="list-style-type: none"> • Corrective action is required to be undertaken immediately of a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the effected environment as much as practically possible and taking preventative measures. • An incident reporting system will record significant events and issues with the sediment and water quality controls. • In the event of a major spill or leak of contaminants, the administering authority must be contacted immediately as per incident reporting procedures. • The Power Station Manager will report on the performance of the sediment and water quality control measures when required by the administering authority. • In the event that water quality at the monitoring locations in found to fall outside of the prescribed guideline levels, the source of the deviation must be investigate and measures taken to correct the problem. • No ground water or surface water must be polluted by any activities on site. • Should any negative effects (on the supply of groundwater to neighbouring users in the area) become apparent these must immediately be reported to <u>Department of Water Affairs and Forestry</u>.

5.8. Surface Water and Drainage

5.8.1. Evaporation

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Keep surface areas of reservoirs to a minimum. • Provide floating covers or buoys for upper reservoir to keep open water areas to a minimum.

5.8.2. Existing Irrigation Water Users

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Compensation releases. • Designing of suitable outlet works.

5.9. Wetlands

5.9.1. Streamflow Regulation - Functioning of Wetlands in the Catchment

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Release of a Q70 (i.e. the flow within the tributary that is exceeded more than 90% of the time) flow from the reservoir as a compensation flow. This would mimic the baseflow that typically occurs in the tributary during low flow periods.

5.10. Maintenance of Rehabilitated Areas

Element	Management Plan
Controls	<ul style="list-style-type: none"> • Monitoring of plant growth in rehabilitated areas will be conducted on a weekly basis during initial phases and on a monthly basis when plants have become firmly established. • Vegetation must be replanted in areas where vegetation cover has decreased due to dieback, or has failed otherwise to successfully establish. • Noxious weeds, invasive and alien species will be controlled by pulling, cutting or any other means approved by the Project Manager. The use of herbicides will not be allowed unless specified by the Project Manager. Bare patches will be replanted. • Acceptable cover will be construed as not less than 75% of the area being covered in the case of hydro seeding and sowing and 50% in the case of hand planted runners. There will be no bare patches greater than 750mm in diameter.

5.11. Waste Management

Element	Management Plan
Potential Impacts	<ul style="list-style-type: none"> • Ineffective use of resources resulting in excessive waste generation. • Litter or contamination of the site or water through poor waste management practices.
Sources	<ul style="list-style-type: none"> • Office and workshop facilities • Transformers and switchgear • Fire services and fire water storage.

Element	Management Plan
	<ul style="list-style-type: none"> • Water storage tank • Fuel and oil storage
Actions/Controls	<ul style="list-style-type: none"> • All structures and/or components replaced during maintenance activities are appropriately disposed of at an appropriate DWAF licensed waste disposal site or sold to a recycling merchant for recycling. • Ensure that care is taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation. • Waste handling, collection and disposal operations are managed and controlled by a waste management contractor • Wastewater: <ul style="list-style-type: none"> * Water from bunds and oily water from oil/water separator must be removed by a licensed contractor. • Waste – Leaked oil and chemicals: <ul style="list-style-type: none"> * Appropriate disposal must be arranged with a licensed facility in consultation with the administering authority * Waste must be stored and handled according to the relevant legislation and regulations. • General Waste: <ul style="list-style-type: none"> * Recycled where possible or disposed of properly to landfill as designated by the administering authority. • Hazardous Waste: <ul style="list-style-type: none"> * Separate hazardous and general waste and dispose hazardous waste to an appropriate hazardous waste disposal site. • Sewage: <ul style="list-style-type: none"> * Disposal to municipal sewer if possible, or effective and licensed treatment plant.
Maintenance	<ul style="list-style-type: none"> • Uncontaminated waste must be removed at least weekly for disposal. • Contaminated or regular wastes must be disposed of as necessary and in accordance with legislation. • An incident/complaint register must be established and maintained.
Monitoring	<ul style="list-style-type: none"> • Wastewater pumped to evaporation ponds, if any, to be tested periodically. • Visual inspection of the site must be carried out daily for evidence of litter or waste material that has been inappropriately disposed of by site personnel. • Waste collection must be monitored on a regular basis. • Waste documentation must be completed and available for inspection on request. • A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon. • Weekly and monthly reports on exact quantities of all waste

Element	Management Plan
	streams exiting the site must be compiled by the waste management contractor and monitored by the SHE management representative. All appropriate waste disposal certificates accompany the monthly reports.
Corrective Actions/Reporting	<ul style="list-style-type: none"> • Corrective action is required to be undertaken immediately after a complaint is made or non-conformance is identified. • Upon the identification of any non-conformance, appropriately feasible remediation measures must be determined and implemented. • An incident reporting system will record and manage follow up of resolution of non-conformances • The Power Station Manager will report on compliance with the EMP if required by the administering authority.

5.12. Storage, Handling and Management of Hazardous Substances

Element	Management Plan
Potential Impacts	<ul style="list-style-type: none"> • Release of contaminated water from contact with spilled chemicals. • Fuel source for on site fires. • Generation of contaminated wastes from used chemical containers and spill clean up. • Storage of fuel.
Actions/Controls	<ul style="list-style-type: none"> • Management strategies/operational procedures for the routine monitoring and inspection of fuel tanks, pipelines and other fuel related equipment will be compiled and implemented. • The storage of flammable and combustible liquids such as oils will comply with the relevant legislation. • The storage and handling of corrosive substances must be in accordance with the relevant legislation. • The minimum amount of fuel required for efficient operation of the facility must be stored on site. • Any spills will be rendered harmless and arrangements made for appropriate collection and disposal, including cleaning materials, absorbents and contaminated solid in accordance with this EMP. • Ensure that spill kits are available on site to clean up spills and leaks. • Obtain any permits and approvals necessary and comply with the conditions attached to such permits and approvals. • Transport of all hazardous substances must be in accordance with the relevant legislation. • Identify and maintain a register of all activities that involve the handling of potentially hazardous substances, as well as devise and supervise the implementation of protocols for the handling of these substances. This will include all fuels, oils, lubricants and grease.

Element	Management Plan
	<ul style="list-style-type: none"> • Ensure that all hazardous substances are handled in accordance with the manufacturer’s specifications, legal requirements and Eskom’s procedures. • Store all hazardous substances in a manner prescribed in the relevant Acts and Regulations (e.g. in a well-ventilated area). • Implement appropriate actions and measures to reduce, stop or contain a spill of potentially hazardous substances (e.g. fuel or lubricating oil). • Implement appropriate actions and measures to reduce or prevent contamination of the ground and surface water as a result of a spill of potentially hazardous substances. • Arrange and supervise the implementation of clean up operations and proper disposal of contaminated materials at a licensed hazardous waste disposal site. • Keep written records detailing the type of spill, the corrective and remedial measures implemented in the stopping or reduction of the spill, and the clean up of the spill. Such progress reporting is important for monitoring and auditing purposes and the written reports may afterwards be used for training purposes in an effort to prevent similar future occurrences. • All such tanks to be designed and constructed in accordance with a recognised code (international standard). • The rated capacity of tanks must provide sufficient capacity to permit expansion of the product contained therein by the rise in temperature during storage. • Tanks must be situated in a bunded area the volume of which must be at least 110% of the proposed volume of the tank. • The floor of the bunded area must be smooth and impermeable, constructed of concrete or plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The floor of the bunded area will be sloped towards an oil trap or sump to enable any spilled fuel and/or fuel – soaked water to be removed. • The fuel delivery area must be bunded and an interceptor system must be installed, with all drainage directed to an oil water separator. This will allow for the removal of free product from any surface run-off or spillages. The interceptor system must contain a holding tank that is used to contain any free product recovered. Free product must be removed from this separator, stored in a holding tank, and recycled or disposed of in an appropriate manner. The water may be discharged in the municipal sewer in accordance with the municipalities effluent standards. • Internationally approved non-corrosive pipework systems must be installed (approved codes). • Antiflash nozzles must be installed at the end of the vent pipes and provisions must be made for overfill protection devices in the tank filling pipes to prevent tank overfills during

Element	Management Plan
	<p>filling operations.</p> <ul style="list-style-type: none"> Fuel must be dispensed via a system that has mechanical leak detectors linked to the fuel lines. These link detectors must form an integral part of the pumping system and allow for automatic cut-off of the fuel supply must a leak be detected. Any water that collects in the bund must not be allowed to stand and must be removed and the hydrocarbon digestion agent within must be replenished.
Maintenance	<ul style="list-style-type: none"> Spill and emergency response equipment must be accessible at chemical transfer/unloading points and refueling locations. Bunds and storage facilities must be maintained to ensure design capacity is available. Water which ponds within the bunded areas must be pumped to the oil/water separator as soon as possible after rain events cease.
Monitoring	<ul style="list-style-type: none"> Observation and supervision of chemical storage and handling practices and vehicle maintenance by the Station Manager throughout the power station's operational phase. Inspection of demineralization plant chemicals storage for corrosion Inspection of bunding integrity, stability and function A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.
Corrective Actions/Reporting	<ul style="list-style-type: none"> Corrective action is required to be undertaken immediately after a complaint is made or non-conformance is identified An incident reporting system will record and manage follow up of non-conformances The Power Station Manager will report on compliance with the EMP if required by the administering authority.

5.13. Traffic and Transport

Element	Management Plan
Controls	<ul style="list-style-type: none"> Travel between sites is minimised (electronic control). Only 40 staff at Valley Control Centre.

5.14. Tourism

Element	Management Plan
Potential Impacts	<p>Sense of place. Disruption of land use. Tourism growth and sustainability.</p>
Controls	<ul style="list-style-type: none"> Containment of construction camps to predetermined areas away from tourism areas. Location of development so as to limit negative impacts on

	<p>existing tourism operations.</p> <ul style="list-style-type: none">• Use of existing tourism establishments for maintenance management staff• Location of development so as to limit negative impacts on existing tourism operations.
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6. DE-COMMISSIONING

6.1 General Principles for Environmental Management during Decommissioning

At this point of the project planning process, the necessity for and timing of the decommissioning of the PSS plant is not known. In addition, approval of this EMP by DEAT is limited by a specified timeframe, where-after revision and re-submission is required. Therefore, only general principles for decommissioning are detailed below. These principles are required to be re-visited and supplemented in the event of the decommissioning of the PSS in the Steelpoort area.

In order to minimise the extent of rehabilitation activities required during the decommissioning phase, Eskom will ensure that constant effort is applied to rehabilitation activities throughout the construction, operation and maintenance phases of the project.

On decommissioning of the PSS plant, Eskom will:

- Ensure that all sites not already vegetated are vegetated as soon as possible after operation ceases with species appropriate to the area.
- All structures, foundations and concrete and tarred areas are demolished, removed and waste material recycled or disposed of at an appropriately licensed waste disposal site.
- All access/service roads not required to be retained by landowners are closed and fully rehabilitated.
- All disturbed areas are compacted, sloped and contoured to ensure drainage and runoff and to minimise the risk of erosion.
- All rehabilitated areas are monitored for erosion.
- Ensure a long term monitoring system is in place to ensure total rehabilitation of the site after decommissioning.

