



Environmental and Social Management Plan

Water Supply Pipeline and Ancillary Works Including Powerline to
Okanguati from the Omaharemba Aquifer

Kunene Regional Council

April 2018

ECC DOCUMENT CONTROL: ECC-61-108-REP-15-A

TITLE AND APPROVAL PAGE

Project Name:	Kunene Regional Council Water Supply Pipeline and Ancillary Works Including Powerline to Okanguati from the Omaharemba Aquifer
Client Name:	Kunene Regional Council
Ministry Reference:	N/A
Status of Report:	Final for Government
Date of issue:	April 2018
Review Period	NA

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DEFINITIONS AND ABBREVIATIONS

EAP	Environmental Assessment Practitioner
ECC	Environmental Compliance Consultancy
ESIA	Environmental and Social Impact Assessment
EMA	Environmental Management Act
ESMP	Environmental and Social Management Plan
I&AP	Interested and affected parties
PPE	Personnel Protective Equipment
QCPs	Construction quality control points

1. INTRODUCTION

1.1. PROJECT BACKGROUND

There is currently a critical shortage of available portable water for the residents of Okanguati. Ohamaremba Aquifer approximately 15km to the south-east of Okanguati has been identified as having sufficient capacity to provide fresh water to the town for approximately 30 years. In order to supply the water to the town, a water pipeline, overhead power line, water pumps and boreholes are required in order to distribute water to the community (the project).

The route alignment, technology and design for the project has developed through a design evolutions process that has taken into consideration environmental and social receptors. This includes developing a route alignment that avoids receptors and minimise environmental and social effects. The alignment is presented in Figure 1.

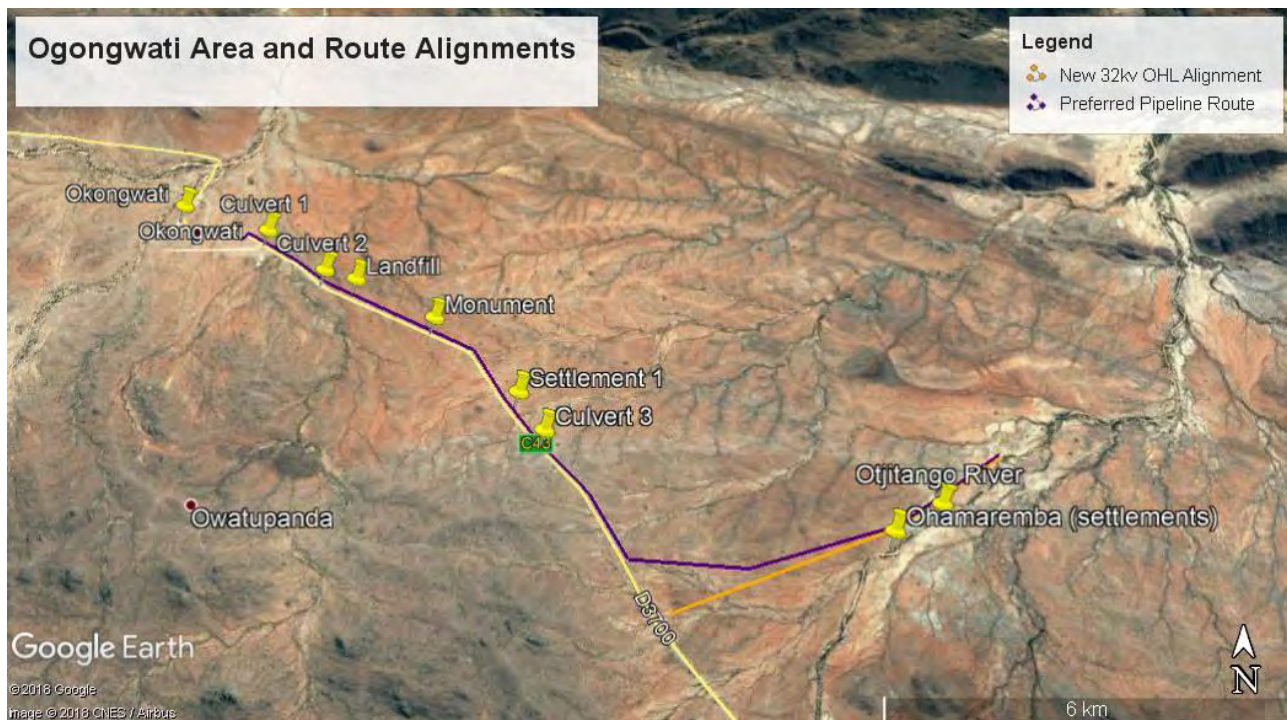


Figure 1 – Project Route Alignment

The proposed project includes the following elements:

- **Two Production Boreholes:** already drilled, approximately 57 and 33m deep located in the Ohamaremba area (boreholes KuRC 2017-1 (1069.8) and KuRC 2017-6 (1067.57) (see **Error! Reference source not found.** and **Error! Reference source not found.**);
- **Two Monitoring Boreholes:** already drilled (boreholes KuRC 2017-3 (1069.69) and KuRC-8 (1068.15)) (see **Error! Reference source not found.** and **Error! Reference source not found.**);
- **Water Pipeline:** 160mm diameter water pipeline, approximately 20km in length and buried approximately 900mm under the surface. Starting from the Water pumps in Ohamaremba and routing to Okanguati;
- **Water pump stations:** located in a fenced area (approximately 50m by 50m) at either end of the pipeline. Infrastructure includes a pumphouse, balancing tank and transformer. Depending on demand (population increase and climatic conditions), approximately 200 to 800 cubic litres of water will be per day (2019 157m³/day, and by 2035, it is anticipated to be 576m³/day);

- **Take off point:** A take off point at the school will provide approximately 50m³/day. A water meter in a secured cage and the water pipe may be connected to the existing water tank (to be determined) (metered and billed by NAMWATER); and
- **Overhead power line:** Approximately 2.45km long 33kv overhead powerline connecting to the existing overhead line. The powerline shall be greater than 5.9m.

Where the water pipeline routes in parallel to the C43, it will be sited at least 32m on either side of the road centre line, ensuring that the 30m road reserve is not compromised and there is available space for any potential upgrades. Where the pipeline crosses the road, existing culverts will be optimised, thereby minimising the need for trenching across the road. The exact location of the pumps is yet to be determined. The siting of these developments shall be compliant with this EMP and the Environmental Report.

The project shall provide communities in Ohamaremba with power as a result of the new overhead line (metered and billed by NORED).

A detailed description of the proposed project is provided in the Environmental and Social Impact Assessment (ESIA) Scoping Report.

1.2. ENVIRONMENTAL REGULATORY REQUIREMENTS

The proposed project is considered as a Listed Activity as set out in the Environmental Management Act, 2007 (Act No. 7 of 2007) and the Environmental Impact Assessment Regulation, 2007 (No. 30 of 2011) gazetted under the Environmental Management Act, (EMA), 2007 (Act No. 7 of 2007) (referred to herein as the EIA Regulations). As a Listed Activity an application for an Environmental Clearance Certificate is required. An ESIA Scoping Report and Environmental and Social Management Plan (ESMP) are required as part of the Environmental Clearance Certificate application, as well as to support the decision-making process. This report presents the ESMP (see Section 1.3) and has been undertaken in accordance with the requirements of the Environmental Management Act, 2007 and associated Regulations.

1.3. PURPOSE AND SCOPE OF THIS REPORT

The purpose of this ESMP is to provide a management framework for the planning and implementation of construction, operation and decommissioning activities, and provide construction standards and operating arrangements so that potential environmental and social impacts of the project are mitigated, prevented and minimised as far as reasonable practicable, and that statutory requirements and other legal obligations are fulfilled. This ESMP also presents protocols and procedures, and roles and responsibilities to ensure the management arrangements are appropriately and effectively implemented.

This ESMP forms an appendix to the Environmental Scoping Report; therefore, the ESIA report should be referred to for further information on the project, assessment methodology, applicable legislation and assessment findings.

This ESMP is a live document and shall be reviewed at predetermined intervals, and/or updated when the scope of works alters, or when further data / information can be added. All personal working on the project will be legally required to comply with the standards set out in this ESMPs.

The scope of this ESMP includes the duration of the project life: construction, operation and decommissioning. Kunene Regional Council will be responsible for each phase of the project and the implementation of this ESMP. The current understanding of each phase is as follows:

- **Construction phase:** The final alignment and construction activities are understood at this stage; however, the detailed design is still under development, including the exact location of the pumping stations. Some assumptions have been made, taking into consideration a worst-case scenario, and are presented in this report.

- **Operations phase:** The nature of the project will not require daily operations or regular management. Maintenance activities will be limited in nature and are expected to occur on an annual basis. Annual checks shall be undertaken, and it is assumed ad hoc maintenance will be required.
- **Decommissioning phase:** The decommissioning and reinstatement plan for the proposed project is unknown at this stage. It is therefore assumed that the pipeline will remain in situ, and the pumping stations and the overhead line will be removed. These works will be of similar nature as construction works, just in reverse and less severe.

1.4. MANAGEMENT OF THIS ESMP

Kunene Regional Council (the proponent) will hold the Environmental Clearance Certificate for the proposed project and shall be responsible for the implementation and management of this ESMP.

Prior to the construction works commencing, this ESMP shall be reviewed, amended as required and approved ready for implementation. The implementation and management of this ESMP and thus the monitoring of compliance shall be undertaken through daily duties and activities and monthly inspections (see Sections 2.2 and 4).

This ESMP shall be circulated to all contractors and shall be made available on the proponent's website.

1.5. LIMITATIONS, UNCERTAINTIES AND ASSUMPTIONS OF THIS ESMP

This ESMP does not include measures for compliance with statutory occupational health and safety requirements. This will be provided in the safety management plan to be developed by the proponent.

Where there is any conflict between the provisions of this ESMP and any contractor's obligations under their respective contracts, including statutory requirements (such as licences, project approval conditions, permits, standards, guidelines and relevant laws), the contract and statutory requirements are to take precedence.

The information contained in this ESMP has been based on the project description as provided in the ESIA Scoping Report. Where the design or construction methods alter, this ESMP may require updating and potential further assessment undertaken.

1.6. ENVIRONMENTAL CONSULTANCY

Environmental Compliance Consultancy (ECC), a Namibian consultancy registration number 2013/11401, has prepared this ESMP on behalf of the proponent. ECC operates exclusively in the environmental, social, health and safety fields for clients across Southern Africa, in the public and private sector. ECC is independent to the proponent and has no vested or financial interest in the proposed project.

1.7. STRUCTURE OF THIS ESMP

The following structure has been adopted for this Report:

- Chapter 1 – Introduction
- Chapter 2 – Project Management and Personnel
- Chapter 3 – Communications and Training
- Chapter 4 – Compliance and Enforcement
- Chapter 5 – General Conduct and Site Management
- Chapter 6 – Register of Environmental Risks and Issues
- Annex A – Monthly Inspection Report & Compliance Report
- Annex B – Template Waste Management Plan
- Annex C – Protected / Important Trees

2. PROJECT MANAGEMENT AND PERSONNEL

2.1. KUNENE REGIONAL COUNCIL

Kunene Regional Council will hold the Environmental Clearance Certificate for the development and shall be responsible for the implementation and management of this ESMP across the development for its entire life time. The proponent shall provide a Project Team to oversee and undertake the construction works, which shall be composed of the proponent's personnel, contractors and consultants. A nominated role shall be identified to ensure maintenance of the development is undertaken through the operations phase and prior to the project moving into the decommissioning phase, a nominated role shall also be identified to ensure the management of decommissioning and the implementation of this ESMP is applied throughout.

2.2. ORGANISATIONAL STRUCTURE, ROLES AND RESPONSIBILITIES

The proponent shall be responsible for:

- Ensuring all members of the Project Team, including contractors and consultants comply with the procedures set out in this ESMP;
- Ensuring that all persons are provided with sufficient training, supervision and instruction to fulfil this requirement; and
- Ensuring that any persons allocated specific environmental responsibilities are notified of their appointment and confirm that their responsibilities are clearly understood.

Contractors shall be responsible for ensuring and demonstrating that all personnel employed by them are compliant with this ESMP, and meet the responsibilities listed above.

The key personnel and environmental responsibilities of each role through the project life are presented in Table 1. The contact details of key personnel shall be recorded in Annex A.

Table 1 – Key Roles and Responsibilities

ROLE	RESPONSIBILITY & DUTIES
Kunene Regional Council	– Overall responsibility for the implementation and management of this ESMP. – Ensure environmental policy is communicated to all personnel throughout the proposed project. – Responsible for providing the required resources (including financial and technical) to complete the required tasks.
Project Manager (construction and operations)	Role within Kunene Regional Council. Responsible for ensuring compliance with this ESMP including overseeing the construction works, day to day activities during operations, and routine and non-routine maintenance works during operations, as well as the decommissioning of the development. – Ensuring all personnel are aware of the commitments made in this ESMP and any other relevant regulatory requirements applicable to the project; – Ensuring adequate resources are made available for implementation of this ESMP; – Maintain the community issues and concern register, and keep records of complaints. – Ensuring all employees and contractors participate in a Site Induction process prior to commencing work on the project; – Maintain up to date register of employees who have completed the Site Induction; and

ROLE	RESPONSIBILITY & DUTIES
	Report any non-compliance or accidents to the Regulatory Authority.
Environment and Social Manager	The Environment and Social Manager will be appointed by the proponent, who will be available, as required for the following, during all phases of the project: - Being the principal contact point in relation to environmental performance of the project; - Reporting environmental performance to the Site Manager (construction) and PM (operations); - Reviewing environmental management content of method statements; - Providing guidance to personnel in dealing with environmental matters, including legal and statutory requirements affecting the works; - Being responsible for all environmental management plans and environmental monitoring, and production of associated reports/records; - Being responsible for providing a response to environment-related complaints received from the public or other stakeholders; - Ensuring that best environmental practice is undertaken throughout the duration of the project; - Undertaking checks of the construction site and construction activities; - Undertaking checks of maintenance works during operations; - Provisioning of environmental awareness/management training and inductions; - Responsible for the management, maintenance and revisions of this ESMP and subsequent environmental plans (e.g. Waste Management Plan); and - Timely distribution of any relevant environmental documentation, including revisions to this ESMP, to all construction managers and contractors. Note if this role is not filled due to the low impact associated with this project the Project Manager must take on the responsibilities and sign off on this position
Site Manager (construction) / Contractor (construction/operations)	Appointed to manage the performance of the construction and operational maintenance activities. Responsible for the implementation of this ESMP and ensuring all activities are compliant with this ESMP, as well as: - Managing the preparation and implementation of method statements for certain activities, and ensuring the Environment and Social Manager reviews all method statements and the relevant environmental protocols are incorporated; - Reporting any non-compliance or accidents to the PM and Environment and Social Manager; - Ensuring that all staff have attend a site induction session before commencement of any work on site and that they are adequately informed of the requirements of this ESMP; - Ensuring that all contract workers, sub-contractors and visitors to the site are conversant with the requirements of this ESMP, relevant to their roles on site and adhere to this ESMP at all times; and - Receiving, responding to and recording complaints.
Construction workers / maintenance workers	Responsible for being compliant with this ESMP throughout the construction works, in addition to: Ensuring they have undertaken a site induction and are conversant with the requirements of this ESMP;

ROLE	RESPONSIBILITY & DUTIES
	– Ensuring appropriate briefings for certain activities have been provided and fully understood; – Adherence to this ESMP at all times; – Reporting of any operations and conditions that deviate from the ESMP or any non-compliant issues or accidents to the Environment and Social Manager, and Site Manager/Contractor.
Independent Environmental Consultants / Nominated expert	A specialist consultant who will act in an advisory capacity on request from the proponent, Site Manager and Environment and Social Manager. Responsible for: – Ensuring they have undertaken a site induction and are conversant with the requirements of this ESMP; – Liaise closely with the Environment and Social Manager throughout their work on site; – Reporting any issues of concerns to the Environment and Social Manager, PM or Site Manager as soon as the issue arises, and take appropriate action as they deem necessary in line with this ESMP; – Record any issues or concerns and submit a written report to the Environment and Social Manager and PM; – Adherence to this ESMP at all times; – Reporting of any operations and conditions that deviate from the ESMP or any non-compliant issues or accidents to the Site Manager; – Monthly audits and inspections during construction; – Annual audit of compliance; and – Undertake site visits as and when required during construction and operation.

2.3. CONTRACTORS

Any contractors hired during the construction works or maintenance activities during the operational phase shall be compliant with this ESMP, and shall be responsible for the following:

- Undertaking activities in accordance with this ESMP as well as relevant policies, procedures, management plans, statutory requirements, and contract requirements;
- Implementing appropriate environmental and safety management measures;
- Reporting of environmental issues, including actual or potential environmental incidents and hazards, to the Site Manager and/or PM; and
- Ensuring appropriate corrective or remedial action is taken to address all environmental hazards and incidents reported by employees and subcontractors.

2.4. EMPLOYMENT

The proponent and all contractors shall comply with the requirements of the Republic of Namibia Regulations for Labour, Health and Safety, and any amendments to these regulations. The following shall be complied with:

- In liaison with local government and community authorities the proponent shall ensure that local people have access to information about job opportunities and are considered first for construction / maintenance contract employment positions;

- The number of job opportunities shall be made known together with the associated skills and qualifications. The maximum length of time the job is likely to last for shall be clearly indicated;
- Foreign workers with no proof of permanent legal residence shall not be hired; and
- Every effort shall be made to recruit from the pool of unemployed workers living in the local area.

Additional employment principals shall be developed and included to this ESMP to ensure a robust employment policy is implemented across the proposed project.

3. COMMUNICATIONS AND TRAINING

3.1. INTRODUCTION

The project will involve various construction activities and the operations of the development will interface with sensitive local environmental receptors. It is important that regular communications with the local communities are undertaken, and feedback is obtained, as well as regular communications within the Project Team during construction to ensure environmental awareness is communicated.

3.2. COMMUNICATIONS

3.2.1. ENVIRONMENTAL COMMUNICATIONS: PROPONENT TEAM

During construction, the PM and Site Manager, through the support from the Environment and Social Manager, shall communicate site wide environmental issues to the Project Team through the following means:

- Site induction (see section 3.4.1);
- Environmental posters and site notices;
- Method Statement and Risk Assessment briefings (see section 5.2);
- Audits and site inspections;
- Toolbox talks, including instruction on incident response procedures; and
- Key project specific environmental issues briefings.

This ESMP shall be distributed to the Construction Project Team, including contractors, to ensure that the environmental requirements are communicated effectively. Key activities and environmentally sensitive operations shall also be briefed to workers and contractors.

During the construction phase, regular communications between the management team shall include discussing any complaints received and actions to resolve them; any inspections, audits or non-conformance with this ESMP; and any objectives or target achievements.

3.2.2. ENVIRONMENTAL COMMUNICATIONS: COMMUNITY AND STAKEHOLDERS

The Project Manager shall represent the project and shall liaise with the local communities and stakeholders during the construction phase and through the operations phase where necessary. Clear contact details of the proponent and Project Manager shall be circulated around the community, should there be any questions, concerns or complaints. This ESMP will be published on ECC's and the proponent's website.

3.3. COMPLAINTS HANDLING AND RECORDING

. Any complaints received verbally by any personnel on the project site shall be recorded by the receiver, including the name and contact details of the complainant, date and time of the complaint, and the nature of complaint. The information shall be given to the Project Manager who is overall responsible for the management of complaints and will provide a written response to the complainant. The PM shall inform the Site Manager of issues, concerns or complaints.

The PM shall maintain a complaint's register that will detail the name and contact details of the complainant, date and time of the complaint, nature of complaint, action taken to resolve issues, and date of complaint handover. The PM shall be responsible for nominating the correct personnel to co-ordinate and resolve the issue.

The workforce shall be informed about the complaints register, its location and the person responsible, in order to refer local residents or the general public who wish to lodge a complaint.

The complainant shall be informed in writing of the results of the investigation and action to be taken to rectify or address the matter(s). Where no action is taken, the reasons why are to be recorded in the register.

The complaints register shall be kept for the duration of the project and will be available for government or public review upon request.

3.4. TRAINING AND AWARENESS

All personnel working on the project shall be competent to perform tasks that have the potential to cause an environmental impact. Competence is defined in terms of appropriate education, training and experience.

3.4.1. SITE INDUCTION

All personnel involved in the project shall be inducted to the site with specific environment and social awareness training, and health and safety issues. The environment and social awareness training shall ensure that personnel are familiar with the principles of this ESMP, the environment and social aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

The PM shall ensure a register of completed training is maintained and issued to the Environment and Social Manager monthly or when there are additions.

The Site Induction should include, but not limited to the following:

- A general site-specific induction that outlines:
 - What is meant by “environment” and “social”;
 - Why the environment needs to be protected and conserved;
 - How construction activities can impact on the environment;
 - What can be done to mitigate against such impacts;
- The inductee’s role and responsibilities with respect to implementing the ESMP;
- The site environmental rules;
- Details of how to deal with, and who to contact if environmental problems should they occur;
- Basic vegetation clearing principals and species ID sheets;
- The potential consequences of non-compliance with this ESMP and relevant statutory requirements; and
- The role of responsible people for the project.

4. REPORTING, COMPLIANCE AND ENFORCEMENT

4.1. ENVIRONMENTAL PERFORMANCE MANAGEMENT

4.1.1. SUMMARY OF ENVIRONMENTAL RISKS AND MITIGATION MEASURES

Chapter 6 provides a Register of Environmental Risks and Issues, which identifies mitigation and monitoring measures, as well as roles responsible. This register will be subject to regular review by the Environment and Social Manager together with the PM and updated when necessary.

The PM, Site Manager and Environment and Social Manager will use this register to undertake monthly inspections (see next section) to ensure the project is compliant with this ESMP.

4.1.2. CONSTRUCTION: ENVIRONMENTAL INSPECTIONS & COMPLIANCE MONITORING

4.1.2.1. DAILY COMPLIANCE MONITORING

A copy of this ESMPs shall be on site throughout the construction works and shall be available upon request. It is the responsibility of the PM and Site Manager to ensure this ESMP is complied with through their daily roles. Daily inspections will be undertaken by the Site Manager (or nominated site supervisor). Any environmental problems or risks identified shall be notified to the Environment and Social Manager and actioned as soon as is reasonably practicable.

4.1.2.2. MONTHLY COMPLIANCE MONITORING

Monthly inspections shall be undertaken by the Site Manager to check that the standards and procedures set out in this ESMP are being complied with and pollution control measures are in place and working correctly. Monthly Compliance Reports shall be produced (see Annex A (1) and (2) for a template which shall be completed prior to construction commenced and used throughout the construction phase). This compliance report shall be completed by the Site Manager and issued to the PM and Environment and Social Manager who will review. The report shall contain a brief description of any areas of non-conformance with the contract specification, the reason for the non-conformance, the responsible party, the result (consequence), the corrective action taken and any necessary follow up measures required.

4.1.3. OPERATIONS: ENVIRONMENTAL INSPECTIONS & COMPLIANCE MONITORING

Annual inspections of the pipeline, pump stations and overhead line will be managed and undertaken by the PM and contractor respectively. All infrastructure will be inspected to ensure plant and equipment are operating as per specification; no damage has been caused; and no leaks or spills have occurred. During maintenance activities, the Contractor shall fill in compliance reports (Appendix A (3)), which shall be submitted to the PM and Environmental and Social Manager. This report shall contain a brief description of any areas of non-conformance with the contract specification, the reason for the non-conformance, the responsible party, the result (consequence), the corrective action taken and any necessary follow up measures required.

4.1.4. INSPECTION OF PLANT AND EQUIPMENT

All plant and equipment performing an environmental function throughout the project life time shall be well maintained and serviced in line with their specification. A register of all plant and equipment under the responsibility of the Contractor shall be maintained and serviced as and when required. This register shall be reviewed monthly during operations and shall be up to date during maintenance activities, to ensure all checks and services have been undertaken and are up to date. The register shall include, but not limited to the following:

- Piece of plant and equipment;
- Make and Model;

- Frequency of required service and scheduled dates;
- Dates of last inspection, maintenance and/or test;
- Notes of any issues or concerns; and
- Responsible person.

4.2. REPORTING

There shall be a requirement to ensure that any incident or non-compliance, including any environmental issue, failure of plant and equipment that perform an environmental function or accident, is reported to the PM and the Environmental and Social Manager.

4.3. NON-COMPLIANCE

4.3.1. NON-COMPLIANCE EVENT

Where it has been identified that works are not compliant with this ESMP, the proponent shall employ corrective actions so that the works return to being compliant as soon as possible. In instances where the requirements of the ESMP are not upheld, a Non-Conformance and Corrective Action Notice shall be produced. The Notice shall be generated during the inspections and the PM shall be responsible for ensuring a corrective action plan is established and implemented to address the identified shortcoming. The PM shall also report to the Environmental and Social Manager.

A non-compliance event / situation, for example, is considered if:

- There is evidence of contravention of this ESMP and associated indicators or objectives;
- The Site Manager and/or Contractor have failed to comply with corrective or other instructions issued by the Environmental Manager or qualified authority; or
- The Site Manager and/or Contractor fail to respond to complaints from the public.

Works shall be stopped in the event of a non-compliance, until corrective action(s) has been completed.

4.3.2. DISCIPLINARY ACTION

This ESMP is a legally binding document and non-compliance with it shall result in disciplinary action being taken against the perpetrator/s. Such action may take the form of (but is not limited to):

- Fines / penalties;
- Legal action;
- Monetary penalties imposed by the proponent on the contractor;
- Withdrawal of license/s; and
- Suspension of work.

The disciplinary action shall be determined according to the nature and extend of the transgression / non-compliance, and penalties are to be weighed against the severity of the incident.

4.4. CONTROL OF RECORDS

A range of environmental records, for example waste management records are required and specified throughout this ESMP. Environmental records shall be maintained, either in hard copy or electronic format and shall be readily identifiable, retrievable and protected against damage, deterioration or loss.

4.5. ENVIRONMENTAL PERMITS

4.5.1. ECOLOGY

Article 23 (b) of the Forest Act, 2001 and associated Regulations, states that the clearance of vegetation on an area of land greater than 15 hectares will require a permit. This will include the removal of any protected or important species. An application shall be made to the Directorate of Forestry, under MAWF and approval will be in place prior to construction activities commencing.

4.5.2. HERITAGE

Pre-colonial archaeological sites are governed by the National Heritage Act (27 of 2004) and may be investigated or destroyed under permit issued by the National Heritage Council. The precautionary treatment of graves applies in all cases, but the more recent Christian graves at Okanguati are governed by the Burial Place Ordinance (27 of 1966). Destruction or the exhumation of such graves with the purpose to reinter the remains requires a permit issued by the Office of the President of Namibia.

5. ENVIRONMENTAL AND SOCIAL MANAGEMENT

5.1. OBJECTIVES AND TARGETS

Environmental objectives for the project are as follows:

- Zero pollution incidents;
- Minimise waste sent to landfill or being burnt;
- Minimise disruption to local communities (and therefore complaints);
- Protect local flora and fauna
- Protect the aquifer and springs; and
- Use natural resources effectively and efficiently.

Procedures for monitoring processes against the project environmental objectives will be agreed with the PM.

5.2. CONSTRUCTION PHASE

5.2.1. METHOD STATEMENTS AND RISK ASSESSMENTS

Method Statements and Risk Assessments shall be produced for specific activities prior to works commencing, and shall include environmental protection and mitigation measures, as well as emergency preparedness appropriate to the activity covered. The Site Manager/Contractor shall draft each one and the PM and Environment and Social Manager shall review, providing advice where necessary.

Method Statement briefings shall be provided before personnel carry out key activities for the first time.

Method Statements shall be produced for a range of activities, including, but not limited to:

- Establishment of access roads;
- Removal and clearance of vegetation; and
- Ground excavation and pipeline installation.

5.2.2. QUALITY CONTROL POINTS

Quality control points (QCPs) shall be identified in the project schedule (especially for the construction phase) prior to specific activities commencing. QCPs are required to control project risks, including environmental and social risks, during specific activities, and to allow for stringent monitoring and accountability to reduce risk. At QCPs, sign off is required upon completion of an activity to allow the following activity to commence. This sign off shall be undertaken by the PM.

QCPs shall be identified and implemented by incorporating them into method statements and must include the key responsibility personnel that will sign off and or witness each quality control point (critical).

All QCPs shall be closed before the construction phase or maintenance activities are closed and signed off.

5.2.3. MAINTENANCE OF CONSTRUCTION AREAS

The construction area shall be established and managed to minimise impacts on the environment and society, and shall include the following considerations:

- Plant and equipment shall be brought onto site as and when required;
- Plant and equipment shall be stored in specific areas taking into consideration impacts on local residents and groundwater (e.g. start-up of equipment and noise levels);

- Amenities (e.g. portable toilets) shall be provided and set up in a suitable location to avoid impacts on local residents;
- Waste collection area and material storage areas shall be set up at specific sites to avoid impacts on local communities;
- Lighting shall only be used when necessary and will be designed to minimise spillage of light, and orientated away from community areas.

A 'good housekeeping' policy shall be adopted across the construction and maintenance working areas, and will include the following requirements:

- No fires on site;
- Considerate behaviour of all site staff;
- Maintenance of staff welfare facilities;
- Removal of food waste and other rubbish at frequent intervals; and
- No littering or discard of random solid waste.

5.2.4. VEGETATION CLEARANCE AND TOPSOIL AND SUBSOIL STRIP

The alignments of the water pipeline and overhead line shall be cleared of vegetation prior to trenching activities or installation of the poles. Protect species within 10m of the alignment shall be identified and avoided (see Annex C), applying a two-metre exclusion zone from the trunk of the tree. Where avoidance is unachievable, the relevant permission should be obtained (see Section 4.5).

Topsoil and subsoil shall be excavated during trenching works and in preparation of the area for the overhead line poles and pumping station locations. Excavated material shall be reused as backfill material when burying the pipeline and waste material shall be avoided. Any stockpiles of excavated material shall be less than 2m high, and stored in suitable locations to minimise impacts on local communities (e.g. dust).

5.2.5. ARCHAEOLOGICAL REMAINS

During ground excavation and other groundworks, there is potential for undiscovered archaeological remains to be uncovered. In the event of this occurrence, the following measures shall be applied:

- Works to cease, area to be demarcated with appropriate tape by the site supervisor, and the Site Manager to be informed;
- Site Manager to visit the site and determine whether work can proceed without damage to findings, mark exclusions boundary and inform the Environment and Social Manager with the GPS position if possible;
- If works cannot proceed without damage to findings, Site Manager to inform the Environmental and Social Manager who will get in touch with an archaeologist who will provide advice;
- Environment and Social Manager / Archaeological Specialist to evaluate the significance of the remains and identify appropriate action, for example, record and remove; relocate or leave in situ (depending on the nature and value of the remains);
- Inform the police if the remains are human; and
- Obtain appropriate clearance or approval from the competent authority, if required, and recover and remove the remains to the National Museum or National Forensic Laboratory as directed.

5.2.6. COMMUNITY NUISANCES AND HAZARDS

All personnel shall respect the property and rights of local inhabitants at all times and shall treat all such persons with courtesy. A Method Statement shall be produced detailing the specific measures that are to be implemented to manage nuisances and hazards to the community. Measures are detailed in these next sections that shall be included in the Method Statement.

5.2.6.1. DUST CONTROL

Specific activities that may generate dust shall be avoided during high wind events, e.g. topsoil strip.

5.2.6.2. NOISE CONTROL

Noise should be minimised as much as possible during construction works. The following measures shall be applied:

- Limit working hours to 7am to 6pm weekdays and 7am until 1pm on Saturday;
- Inform local communities of scheduling and duration of noisy activities through notices or face-to-face communications;
- Regular maintenance and servicing of vehicles, plant and equipment; and
- All plant to be shut down or throttled back between periods of use.

The Contractor shall comply with the World Health Organization guidelines (<http://apps.who.int/iris/handle/10665/66217>) for the management of community noise.

5.2.6.3. CONTINUAL OPERATION OF THE C43

The water pipeline will be sited adjacent to the C43. During construction works and maintenance activities, the normal operations of the regional road shall not be disrupted, and all works shall be at least 15m from the centre of the line of the road. Appropriate signs to inform road users of activities shall be sited at a suitable location before the area where works are being undertaken, to allow users to be informed of the hazards early.

5.2.7. POLLUTION CONTROL AND CONTINGENCY PLAN

5.2.7.1. HANDLING OF FUEL, OIL AND CHEMICALS

The Site Manager / Contractor shall take all reasonable precautions to prevent fuel, oil and chemical whilst undertaking works on site. To this end, the Site Manager / Contractor shall ensure that:

- All necessary approvals are in place prior to bringing fuel, oil or chemicals on to site;
- All fuel, oil and chemical deliveries (if any) shall be supervised by a responsible person, who shall be trained to deal with any spills;
- All mobile plant shall be fuelled prior to coming on to the construction area, and when required, shall be refuelled in a designated area on an impermeable surface. A spill kit will be located at each designated refuelling point. A drip tray will also be available to catch any spills;
- Regular checks are performed to verify that no leaking or defective equipment is brought onto site; and
- Equipment is maintained regularly to ensure that no fuel, oil or hydraulic leaks occur.

The Site Manager / Contractor shall ensure that there is sufficient absorbent material and spill kits available on site to manage accidental spills. The location of and instructions on how to use this equipment shall be included in the Site Induction, and nominated personnel will be appropriately trained to use spill kits.

Any accidental spillages of fuels and oils, or other hazardous substances, shall be cleaned up immediately and be reported Site Manager. The following responses shall be undertaken:

- Minor spill: Only diesel and oil, with no human injury, contamination to water bodies or other environmental receptors. Contain and clean up the spill using available spill kit. The Site Manager/Contractor shall inform the PM and Environment and Social Manager, supplying the following information:
 - Date, time, and location;
 - Substance spilled and quantity; and
 - Actions taken, and any future remediation required.
- Major Spill: Resulting in human injury or/and environmental contamination and water body contamination. Personnel shall contain the spill if possible and report the spill to the Site Manager, who shall then alert the appropriate emergency services (see Table 2), and the PM and Environment and Social Manager. In addition to the above information for a minor spill, the Site Manager shall also be informed of any immediate dangers, e.g. fire, explosion, release of chemical fumes.

5.2.8. FIRE PREVENTION

The Site Manager / Contractor shall take all necessary precautions to prevent the ignition and spread of fires caused either deliberately or accidentally as a result of the work being performed.

The Site Manager / Contractor shall prepare and implement a Fire Prevention Plan for fire prevention and emergency management. The Plan shall include, but shall not be limited to, the following:

- Potential sources of fire risk;
- Procedures to be followed to control an accidental fire;
- Identification and location of fire-fighting equipment that will be maintained on site and deployed in the event of an emergency.

The Site Induction will include a briefing of the risks and potential consequences of starting fires. Employees shall also be warned of the risks of careless disposal of burning cigarette butts.

The Site Manager shall provide fire-fighting equipment, the location of which will be included in the Site Induction.

5.3. OPERATIONS

5.3.1. COMMUNITY ACTIVITIES

Due to the shallow groundwater and the fracturing nature of the local geology, there is a high risk of contamination spreading through the ground and entering the groundwater. This could be from animal waste (urine and faeces), human waste, potential spills from vehicles or use of pesticides.

An aquifer protection zone along the fault zone of 150 m width shall be demarcated to protect the groundwater from pollution. Within this area, certain activities will not be allowed, including activities using oil, fuel or chemicals, storage of live-stock (animal kraals) and ablution facilities (including septic tanks and long-drop toilets).

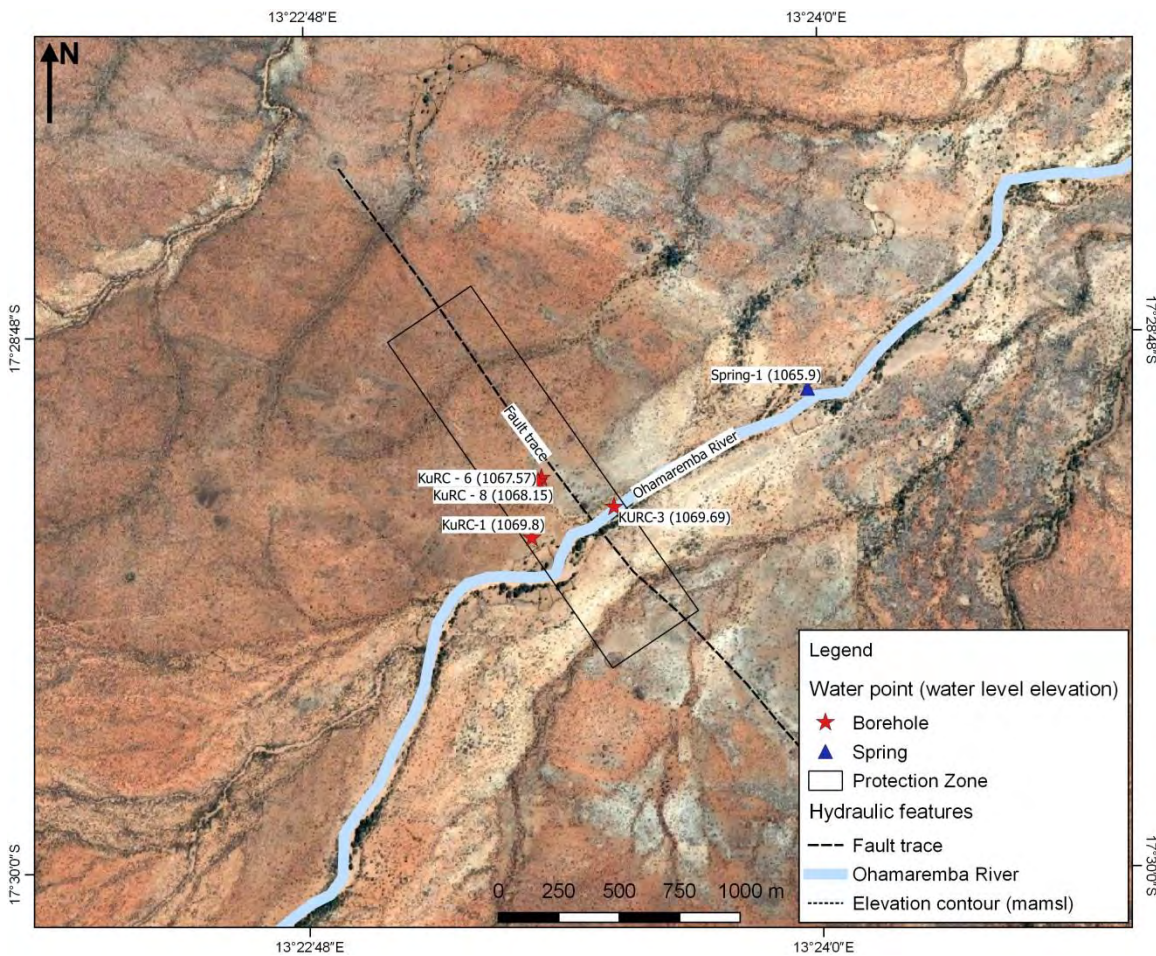


Figure 2 - Aquifer protection zone along the fault zone of 150 m width

5.3.2. ENVIRONMENTAL MONITORING

Monitoring shall be undertaken to ensure the impacts on the groundwater and springs are avoided and minimised. A monitoring plan is included in Annex D.

5.3.3. ANNUAL MAINTENANCE CHECKS

The pipeline, pumping stations, overhead line and other supporting infrastructure shall be checked annually. A Method Statement shall be produced setting out what needs to be checked and what the function is of each item. A report shall be produced by the Contractor documenting the findings of the audit, and any maintenance undertaken or further work to be progressed.

Any bird avoidance mechanisms (such as light green rectangles and anti-perching devices) on the overhead line and wooden poles should also be checked annually and any damaged ones reported to the PM and replaced as soon as possible.

5.3.4. CLEARANCE OF VEGETATION

There may be a requirement to undertake vegetation clearance on and around the pipeline and overhead line alignments. Vegetation shall be handled in line with the Forestry Permit/s and any protected species shall be identified and protected. A permit under the Forest Act will be required; the PM should consult with ECC to confirm the requirement during operations.

5.3.5. POLLUTION AND FIRE PREVENTION

Pollution and fire prevention principals and measures as stated in Sections 5.2.7 and 5.2.8 shall be complied with during the operational phase.

5.4. DECOMMISSIONING AND REINSTATEMENT

Due to the uncertainties at this stage for the decommissioning and reinstatement strategy, the following is assumed and recommended:

- The overhead line infrastructure shall be removed and disposed of in accordance to the Solid Waste Management Plan (see Section 5.5);
- The water pipeline shall either be removed and disposed of in line with the Waste Management Plan, or shall remain in-situ, and the concrete pipeline shall be broken to avoid hollow spaces and allow material to fill and ground around the disused pipeline. .
- The pumping station and associated infrastructure shall be disposed of in accordance to the Solid Waste Management Plan (see Section 5.5);
- Method Statements shall be produced and approved prior to undertaking decommissioning works; and
- The above works shall apply the principals set out in this ESMP, which shall be updated with any specific decommissioning or reinstatement activities or noticeable changes from this report, prior to undertaking the decommissioning works.

5.5. SOLID WASTE MANAGEMENT

The EMA (2007), Section 3, paragraph (i) states that waste must be reduced, re-used and recycled where possible, therefore in accordance with the Act, waste generated as a result of the project shall be managed and dealt with in accordance with a Waste Management Plan. This Plan will be produced prior to construction activities commencing, shall cover any waste produced during the operational phase, and shall be updated prior to commencing the decommissioning phase. The plan shall include the following information:

- Describe each waste type expected to be produced during construction activities;
- Estimate the quantity of each waste type;
- Identify the waste management action proposed for each waste stream, including re-using, recycling, recovery and disposal; and
- Designated areas to collect and separate waste.

A draft template for a Waste Management Plan is provided in Annex B. This plan shall be drafted prior to construction works, and shall be updated on a regular basis to ensure all waste and disposal route are identified. The aim of the Waste Management Plan is to achieve sustainable waste management. The main purpose is to outline waste streams and identify the best treatment and disposal option for each one, applying the waste management hierarchy and avoiding as much waste as possible ending up at landfill or being burnt. In addition, it will also outline any potential economical and investment requirements for the treatment and / or disposal of waste.

The following waste management measures will be followed:

- Waste will be collected, separated and stored in a designated area, with a temporary fence is required;
- Waste storage areas shall be kept clean and tidy at all times;
- Waste shall be removed on a regular basis to avoid pests and bad odours; and
- Waste shall be taken to an appropriate waste disposal site.

Portable toilets / toilet facilities will be provided for the construction workforce. These will be emptied and maintained regularly by a the contractor.

It is unlikely that hazardous material and wastes will be produced, however in the event that they do, they shall be managed in a safe and responsible manner so as to prevent contamination of soils, pollution of water and/or harm to people or animals as a result of the use of these materials. Hazardous and non-hazardous waste shall be stored separately at all times.

5.6. ENVIRONMENTAL EMERGENCY AND RESPONSE CONTACTS

The PM will be the primary contact person in the event of an environmental emergency, who shall immediately contact the Environment and Social Manager. The PM and Environment and Social Manager have the authority and independence to request reasonable steps be taken to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such steps, to direct that relevant actions be ceased immediately should an adverse environmental impact be anticipated.

In the event of an incident that requires the emergency services, the services that should be contacted are listed in Table 2.

Table 2 - Emergency Services contact telephone numbers

AMBULANCE OPUWO	POLICE (Kunene Region)	FIRE BRIGADE OPUWO
+264 (65) 27 0326	Police Okanguati 081 8861 391 Police Opuwo +264 (65) 27 3041 +264 (65) 27 3359 +264 (65) 27 3148/104	+264 (65) 27 3250

For large-scale spills and other significant environmental incidents, the fire services shall be contacted as required and the Ministry of Environment and Tourism (MET) office informed of the incident (telephone +264 61 284 2111). All correspondence with MET should be undertaken by the PM as guided by the Environment and Social Manager.

For the clean-up of smaller spills, the relevant Material Safety Data Sheet (MSDS) should be obtained online and be consulted to determine the appropriate clean-up procedure. Basic spill response training will be provided as part of the site environmental induction, spill response equipment, including relevant MSDS copies, will be provided in areas where potentially environmentally hazardous chemicals may be used.

All environmental incidents, regardless of their size or significance, should be recorded and reported to either the PM or the Environment and Social Manager.

6. REGISTER OF ENVIRONMENTAL RISKS AND ISSUES

6.1. INTRODUCTION

An environmental review of the proposed project has been completed to identify all the commitments and agreements made within the ESIA report. From this, a schedule of environmental commitments and risks has been produced, which details deliverables including measures identified for the prevention of pollution or damage to the environment during the construction phase.

Table 3 – Environmental Risks and Issues, Mitigation and Monitoring Measures

REF NO.	ACTIVITY	RISKS AND POTENTIAL IMPACTS	MANAGEMENT / MITIGATION MEASURES	MONITORING REQUIREMENTS	FREQUENCY	RESPONSIBILITY
CONSTRUCTION						
1	Development of access roads	– Removal of vegetation – Injury or mortality of reptiles and amphibians – Land take	– Use existing tracks as much as possible. – Route new tracks around established and protected trees, and clumps of vegetation – Identify important tree species (protected species) and mark with red/white tape to clearly highlight to construction workers – Remove invasive species – Visually check the area prior to undertaking construction works – Relocate slow moving reptiles and amphibians away from the construction area – No driving off designated access routes (into the bush) / off-road driving – Speed restrictions applied – Avoid natural drainage lines – Install any erosion control measures to avoid surface run off during the wet season.	– Daily visual observations during activity	– Daily – Duration of works	– Site Manager
2	Establishment and Management of Construction working areas	– Noise and dust. – Residential visual amenity. – Community	– Bring plant and equipment as and when required. – Suitable siting of construction office, waste collection area, and storage area	– Daily visual observations. – Site Manager to oversee the set-up of the	– Daily – Duration of construction works	– Site Manager

REF NO.	ACTIVITY	RISKS AND POTENTIAL IMPACTS	MANAGEMENT / MITIGATION MEASURES	MONITORING REQUIREMENTS	FREQUENCY	RESPONSIBILITY
		severance. – Impacts on flora and fauna	for plant and equipment. – Downward lighting. – Application of good housekeeping. – No snares or catching of animals for pets or food. – Enforcement of QCPs.	construction working areas		
3	Removal of vegetation along alignments and pumping station locations	– Loss of established vegetation and protected species – Injury or mortality reptiles and amphibians	– Identify important tree species (protected species) and mark with red/white tape to clearly highlight to construction workers, prior to construction work – Any trees felled, to be used in accordance with the permit. – No animals or birds may be collected, caught, consumed or removed from site by the Contractor or personnel on site. – Catch and release slow moving reptiles and amphibians, move at least 50m from the site. – Clear vegetation section by section, but not leaving for a duration where regrowth can occur. – Remove any invasive or alien species along the route. – Identify and mark some large individuals of <i>Acacia erioloba</i> and <i>Combretum imberbe</i> trees in the immediate vicinity of the boreholes for	– Oversee work – Daily observations	– Duration of works	– Site Manager

REF NO.	ACTIVITY	RISKS AND POTENTIAL IMPACTS	MANAGEMENT / MITIGATION MEASURES	MONITORING REQUIREMENTS	FREQUENCY	RESPONSIBILITY
			long term groundwater monitoring purposes. – Check working area prior to construction works commencing daily. – Avoid disturbing geological features and rocky areas. – Enforcement of QCPs.			
4	Ground excavation and trenching	– Disturbance / damage of undiscovered archaeological remains – Dusts from stockpiles or during high winds	– Site Manager or appropriate person to oversee all ground excavation works. – Daily inspection of open trench for reptiles. Must be removed to a safe location and not killed or harmed. – Ensure members of team are trained in safe snake handling or appoint a trained snake handler for the project (this can be a trained worker) – In the event of a heritage discovery, works to cease until advice from specialist is obtained. A permit from the National Heritage Council will be required to relocate remains. – Minimise stockpiling and specific works during high winds	– Oversee work – Daily observations	– Duration of works	– Site Manager
5	Construction of pumping stations	– Land use – Loss of established vegetation and protected species – Injury or mortality reptiles and	– Suitably positioned – away from areas of large /dense vegetation	– Oversee work – Daily observations	– Duration of works	– Site Manager

REF NO.	ACTIVITY	RISKS AND POTENTIAL IMPACTS	MANAGEMENT / MITIGATION MEASURES	MONITORING REQUIREMENTS	FREQUENCY	RESPONSIBILITY
		amphibians				
6	General construction activities: Generation of waste	Generation of waste, odours and pests	- Application of Waste Management Plan. - Waste to be collected, separated and stored in appropriately marked areas / containers (e.g. wood, metals, building rubble, garden waste, domestic waste). - Waste storage areas shall be appropriately signed, well maintained and good housekeeping will be applied. - Waste will be disposed of to designated and appropriate facilities, which will be identified in the Waste Management Plan (most likely the waste dump site close to the route alignment). - Waste will not be burnt on site (burnt on designated disposal site) - Site induction and training of staff.	- Operate in accordance with the Waste Management Plan. - Update the Waste Management Plan as and when required. - Daily and weekly checks of waste collection area.	- Daily - Weekly - Duration of construction works	- Site Manager - Environment and Social Manager
7	Operating plant and equipment	- Local Community: - Reduced local air quality (vehicle emissions) - Increase in local noise levels	- Avoid idling of plant and equipment (turn off when not in use) - Minimise the multiple use of noisy plant and equipment. - Vehicles to be in good working order and well maintained and serviced in accordance with specific requirements.	- Daily observations - Weekly checks by the Site Manager	- Daily - Weekly	Site Manager

REF NO.	ACTIVITY	RISKS AND POTENTIAL IMPACTS	MANAGEMENT / MITIGATION MEASURES	MONITORING REQUIREMENTS	FREQUENCY	RESPONSIBILITY
			– Notice to surrounding community of when noisy activities are to be undertaken. – Site Induction			
8	Use and maintenance of plant and equipment: Spills of fuels, oils or chemicals	– Loss of containment, causing localised ground contamination, potential groundwater contamination	– Spill kits in designated areas around site. – Contain and clean up spill in accordance with emergency procedures. – Report spill as soon as possible. – All plant and material to be well maintained and have appropriate containment (drip trays). – Site Induction and appropriate training of nominated persons. – Suitable PPE and equipment when handling hazardous chemicals, liquids and materials. – Storage of vehicles away from the area where the aquifer / shallow groundwater is located	– Daily observations and checks of plant and equipment	– Daily	– Site Manager
9	General construction activities: Energy use	– Use of resources	– Turn off plant and equipment when not in use. – Regular maintenance of plant and equipment. – Minimise / optimise workforce travel. – Source sustainable material where possible. – Apply waste hierarchy and reuse and	– Daily observations	– Daily	– Site Manager

REF NO.	ACTIVITY	RISKS AND POTENTIAL IMPACTS	MANAGEMENT / MITIGATION MEASURES	MONITORING REQUIREMENTS	FREQUENCY	RESPONSIBILITY
			recycle.			
10	General construction activities: Material use	– Use of resources	– Source materials locally to reduce transportation. – Source sustainable material where possible. – Apply waste hierarchy and reuse and recycle. material where possible	– Daily observations	– Daily	– Site Manager
11	Vehicle movements on site	– Hazards to workers (collisions leading to injuries)	– Speed limit of 40km/hr. – Site induction and training of staff. – Reversing of vehicles overseen with appropriate warnings (lights / sounds).	– Daily observations	– Daily	– Site Manager
OPERATIONS						
12	Pumping operations	– Misconception from local communities during excessive doubts that the pumping is causing the natural springs to dry up	– Regular monitoring: During construction Identify and mark some large individuals of Acacia erioloba and Combretum imberbe trees in the immediate vicinity of the boreholes for long term groundwater monitoring purposes. – Regular communication with the community.	– Groundwater monitoring – Regular communications with the community	– Weekly – Annually	– Project Manager – Environment and Social Manager
13	Increase in population in the area / community activities	– Groundwater contamination (including the springs)	– Borehole / aquifer protection zones to be implemented – 150m width – see figure 2. No activities using oil, fuel or chemicals, storage of live-stock (animal kraals) and ablution facilities (including septic tanks and long-drop toilets)	– Groundwater monitoring – Review of activities in 150m protection zone – Regular communications with the community	– Weekly – Monthly – Annually	– Project Manager – Environment and Social Manager

REF NO.	ACTIVITY	RISKS AND POTENTIAL IMPACTS	MANAGEMENT / MITIGATION MEASURES	MONITORING REQUIREMENTS	FREQUENCY	RESPONSIBILITY
			– Educating local communities			
14	Annual checks and maintenance activities: Use of plant and equipment	– Loss of containment, causing localised ground contamination	– Spill kits in designated areas around site. – Contain and clean up spill in accordance with emergency procedures. – Report spill as soon as possible. – All plant and material to be well maintained and have appropriate containment (drip trays). – Maintenance activities of large plant and equipment shall be undertaken off site. – Site Induction and appropriate training of nominated persons. – Suitable PPE and equipment when handling hazardous chemicals, liquids and materials.	– Daily observations and checks of plant and equipment	– Daily throughout duration of maintenance works	– Contractor
15	Annual checks and maintenance activities: Generation of waste	– Generation of waste, odours and pests	– Application of Waste Management Plan. – Waste to be collected and separated – Waste will be disposed of to designated and appropriate facilities, which will be identified in the Waste Management Plan. Waste will not be burnt on site (burnt on designated disposal site)	– Operate in accordance with the Waste Management Plan. – Update the Waste Management Plan as and when required. – Daily and weekly checks of waste collection area.	– Daily throughout duration of maintenance works – Weekly	– Contractor – Environment and Social Manager

REF NO.	ACTIVITY	RISKS AND POTENTIAL IMPACTS	MANAGEMENT / MITIGATION MEASURES	MONITORING REQUIREMENTS	FREQUENCY	RESPONSIBILITY
16	Maintenance of swathe under overhead line (removal of vegetation)	- Waste – see above - Disturbance of flora and fauna	- Visually check the area prior to undertaking maintenance works - Relocate slow moving reptiles and amphibians away from the clearance area - No driving off designated access routes (into the bush) / off-road driving - Speed restrictions applied	Daily observations during maintenance works to minimise impacts on flora and fauna	Daily	Contractor
17	Overhead line	- Bird migratory patterns and behaviour - Baboons being injured or killed - Impacts on elephants and giraffe movements	- Bird avoidance mechanisms: light green rectangles, anti-perching devices, bird flight diverters, flappers, coils – all in working order - Jumper cables on transformer should be covered with LDPE (Low Density Polyethelene) pipes - The powerline shall be greater than 5.9m and shall remain at this height.	Annual Checks of overhead line, supporting infrastructure and mitigation measures	Annual	Project Manager
DECOMMISSIONING						
NA	TO BE COMPLETED PRIOR TO DECOMMISSIONING PHASE	–	–	–	–	–

7. IMPLEMENTATION OF THE ESMP

This ESMP:

- A. Has been prepared pursuant to a contract with the proponent;
- B. Has been prepared on the basis of information provided to ECC up to March 2018;
- C. Is for the sole use of the proponent, for the sole purpose of an ESMP;
- D. Must not be used (1) by any person other than the proponent or (2) for a purpose other than an ESMP; and
- E. Must not be copied without the prior written permission of ECC.

ECC has prepared the ESMP on the basis of information provided by the proponent, specialist reports and the ESIA.

ANNEXES

ANNEX A (1): CONSTRUCTION MONTHLY INSPECTION REPORT

INSPECTION DATE: _____

CONTRACTORS ON SITE: _____

INSPECTION COMPLETED BY: _____

SUMMARY OF CONSTRUCTION ACTIVITIES OCCURRING:

CONSTRUCTION					
Ref No.	Item	Requirements	Responsibility	Compliant	Notes / Action Taken / Corrective Action Required
1	– Development of access roads	– Use existing tracks as much as possible. – Route new tracks around established and protected trees, and clumps of vegetation – Identify important tree species (protected species) and mark with red/white tape to clearly highlight to construction workers – Remove invasive species – Visually check the area prior to undertaking construction works – Relocate slow moving reptiles and amphibians away	Site Manager	Yes ☐ No ☐ N/A ☐	

CONSTRUCTION					
Ref No.	Item	Requirements	Responsibility	Compliant	Notes / Action Taken / Corrective Action Required
		from the construction area – No driving off designated access routes (into the bush) / off-road driving – Speed restrictions applied – Avoid natural drainage lines – Install any erosion control measures to avoid surface run off during the wet season			
2	Establishment and Management of Construction working areas	– Bring plant and equipment as and when required. – Suitable siting of construction office, waste collection area, and storage area for plant and equipment. – Downward lighting. – Application of good housekeeping. – No snares or catching of animals for pets or food. – Enforcement of QCPs.	Site Manager	Yes ☐ No ☐ N/A ☐	
3	Removal of vegetation along alignments and pumping station locations	– Identify important tree species (protected species) and mark with red/white tape to clearly highlight to construction workers, prior to construction work – Any trees felled, to be used in accordance with the permit – No animals or birds may be collected, caught, consumed or removed from site by the Contractor or personnel on site. – Catch and release slow moving reptiles and	Site Manager	Yes ☐ No ☐ N/A ☐	

CONSTRUCTION					
Ref No.	Item	Requirements	Responsibility	Compliant	Notes / Action Taken / Corrective Action Required
		amphibians, move at least 50m from the site. – Clear vegetation section by section, but not leaving for a duration where regrowth can occur. – Remove any invasive or alien species along the route. – Identify and mark some large individuals of <i>Acacia erioloba</i> and <i>Combretum imberbe</i> trees in the immediate vicinity of the boreholes for long term groundwater monitoring purposes. – Check working area prior to construction works commencing daily. – Avoid disturbing geological features and rocky areas. – Enforcement of QCPs.			
4	Ground excavation and trenching	– Site Manager or appropriate person to oversee all ground excavation works. – Daily inspection of open trench for reptiles. Must be removed to a safe location and not killed or harmed. – Ensure members of team are trained in safe snake handling or appoint a trained snake handler for the project (this can be a trained worker) – In the event of a heritage discovery, works to cease until advice from specialist is obtained. A permit from the National Heritage Council will be required to relocate remains. – Minimise stockpiling and specific works during high	Site Manager	Yes ☐ No ☐ N/A ☐	

CONSTRUCTION					
Ref No.	Item	Requirements	Responsibility	Compliant	Notes / Action Taken / Corrective Action Required
		winds			
5	Construction of pumping stations	– Suitably positioned – away from areas of large /dense vegetation	Site Manager	Yes ☐ No ☐ N/A ☐	
6	General construction activities: Generation of waste	– Application of Waste Management Plan. – Waste to be collected, separated and stored in appropriately marked areas / containers (e.g. wood, metals, building rubble, garden waste, domestic waste). – Waste storage areas shall be appropriately signed, well maintained and good housekeeping will be applied. – Waste will be disposed of to designated and appropriate facilities, which will be identified in the Waste Management Plan. – Site induction and training of staff.	– Site Manager Environment and Social Manager	Yes ☐ No ☐ N/A ☐	
7	Operating plant and equipment	– Avoid idling of plant and equipment (turn off when not in use) – Minimise the multiple use of noisy plant and equipment. – Vehicles to be in good working order and well maintained and serviced in accordance with specific requirements. – Notice to surrounding community of when noisy	Site Manager	Yes ☐ No ☐ N/A ☐	

CONSTRUCTION					
Ref No.	Item	Requirements	Responsibility	Compliant	Notes / Action Taken / Corrective Action Required
		activities are to be undertaken. – Site Induction			
8	Use and maintenance of plant and equipment: Spills of fuels, oils or chemicals	– Spill kits in designated areas around site. – Contain and clean up spill in accordance with emergency procedures. – Report spill as soon as possible. – All plant and material to be well maintained and have appropriate containment (drip trays). – Site Induction and appropriate training of nominated persons. – Suitable PPE and equipment when handling hazardous chemicals, liquids and materials. – Storage of vehicles away from the area where the aquifer / shallow groundwater is located	Site Manager	Yes ☐ No ☐ N/A ☐	
9	General construction activities: Energy use	– Turn off plant and equipment when not in use. – Regular maintenance of plant and equipment. – Minimise / optimise workforce travel. – Source sustainable material where possible. Apply waste hierarchy and reuse and recycle.	Site Manager	Yes ☐ No ☐ N/A ☐	
10	General construction activities: Material use	– Source materials locally to reduce transportation. – Source sustainable material where possible. – Apply waste hierarchy and reuse and recycle.	Site Manager	Yes ☐ No ☐ N/A ☐	

CONSTRUCTION					
Ref No.	Item	Requirements	Responsibility	Compliant	Notes / Action Taken / Corrective Action Required
		material where possible			
11	Vehicle movements on site	– Speed limit of 40km/hr. – Site induction and training of staff. – Reversing of vehicles overseen with appropriate warnings (lights / sounds).	Site Manager	Yes ☐ No ☐ N/A ☐	

ANNEX A (2): CONSTRUCTION MONTHLY COMPLIANCE REPORT

INSPECTION DATE: _____

INSPECTION COMPLETED BY: _____

APPROVED BY: _____

SUMMARY OF CONSTRUCTION ACTIVITIES OCCURRING:

CONTRACTORS ON SITE:

NON-CONFORMANCE

AREA OF ACTIVITY:

REASON:

RESPONSIBLE PARTY

RESULT:

CORRECTIVE ACTION TAKEN:

FOLLOW-UP ACTION TO BE TAKEN:

ADDITIONAL COMMENTS:

GOOD PERFORMANCE

Description of activity or action in which contract went beyond compliance towards responsible care for the environment:

ADDITIONAL COMMENTS

ANNEX A (3): MAINTENANCE MONTHLY INSPECTION REPORT

INSPECTION DATE: _____

INSPECTION COMPLETED BY: _____

SUMMARY OF MAINTENANCE ACTIVITIES OCCURRING:

CONTRACTORS ON SITE:

OPERATIONS: MAINTENANCE					
Ref No.	Item	Requirements	Responsibility	Compliant	Notes / Action Taken / Corrective Action Required
12	Pumping operations	- Regular monitoring: During construction Identify and mark some large individuals of <i>Acacia erioloba</i> and <i>Combretum imberbe</i> trees in the immediate vicinity of the boreholes for long term groundwater monitoring purposes. - Regular communication with the community.	Project Manager Environment and Social Manager	Yes ☐ No ☐ N/A ☐	
13	Increase in population in the area / community activities	- Borehole / aquifer protection zones to be implemented (150m width across fracture zone needs to be maintained – see figure 1) - Educating local communities	Project Manager Environment and Social Manager		

OPERATIONS: MAINTENANCE					
Ref No.	Item	Requirements	Responsibility	Compliant	Notes / Action Taken / Corrective Action Required
14	Annual checks and maintenance activities: Use of plant and equipment	– Spill kits in designated areas around site. – Contain and clean up spill in accordance with emergency procedures. – Report spill as soon as possible. – All plant and material to be well maintained and have appropriate containment (drip trays). – Maintenance activities of large plant and equipment shall be undertaken off site. – Site Induction and appropriate training of nominated persons. – Suitable PPE and equipment when handling hazardous chemicals, liquids and materials.	Contractor		
15	Annual checks and maintenance activities: Generation of waste	– Application of Waste Management Plan. – Waste to be collected and separated – Waste will be disposed of to designated and appropriate facilities, which will be identified in the Waste Management Plan. –	– Contractor Environment and Social Manager		
16	Maintenance of swathe under overhead line	– Visually check the area prior to undertaking maintenance works – Relocate slow moving reptiles and amphibians away from the clearance area – No driving off designated access routes (into the bush) / off-road driving	Contractor		

OPERATIONS: MAINTENANCE					
Ref No.	Item	Requirements	Responsibility	Compliant	Notes / Action Taken / Corrective Action Required
		– Speed restrictions applied			
17	Overhead line	– Bird avoidance mechanisms: light green rectangles, anti-perching devices, bird flight diverters, flappers, coils – all in working order – Jumper cables on transformer should be covered with LDPE (Low Density Polyethelene) pipes	Project Manager		

ANNEX B: TEMPLATE WASTE MANAGEMENT PLAN

INTRODUCTION

The aim of this Waste Management Plan is to achieve sustainable waste management. The main purpose is to outline waste streams and identify the best treatment and disposal option for each one, applying the waste management hierarchy and avoiding as much waste as possible ending up at landfill or being burnt. In addition, it also outlines any potential economical and investment requirements for the treatment and / or disposal of waste.

This Waste Management Plan is a live document and should be updated during the annual review, which is undertaken by the Operational Manager and Environmental and Social Manager.

PRINCIPALS

The following principles should be applied to the management of waste on site:

- The waste hierarchy (avoid, reuse, recycle, recovery, disposal) should be applied for each waste stream, so that the impact on the environment is reduced as much as possible;
- Waste collection area will be identified prior to construction activities, and demarcated and secured with appropriate fencing;
- Bins shall be emptied on a regular basis to avoid pests and bad odours;

Table 1 – Waste Management Roles

ROLE	INDIVIDUAL OR PARTY
Proponent	
Contractor	
Responsible person for the Waste Management Plan	

The following waste management measures shall be followed:

- Waste will be collected, separated and stored in a designated area which will be appropriately fenced and signposted to keep out unauthorised people and animals;
- Waste collection containers will be of an appropriate design to ensure that no waste can escape, and will be labelled with waste type (e.g. wood, metals, building rubble, garden waste, domestic waste);
- Waste storage areas shall be kept clean and tidy at all times;
- Bins shall be emptied regularly to avoid pests and bad odours; and
- No burning will be allowed on site.

Any hazardous material and wastes (including medical waste, if necessary) shall be managed in a safe and responsible manner so as to prevent contamination of soils, pollution of water and/or harm to people or animals as a result of the use of these materials. Hazardous and non-hazardous waste shall be stored separately at all times.

WASTE MANAGEMENT ARRANGEMENTS

The project shall have a dedicated waste collection, sorting and pickup area. This area will be fenced off, clearly signposted and access shall be by those authorised.

The following information shall be provided in this section:

- Location plan of the dedicated area
- Arrangements to appropriately secure and designate the area (fencing, locked gate)
- Access arrangements
- Drainage arrangements
- Set up of the site
- Authorised personnel
- Any rules or codes of conduct

WASTE GENERATED

Provide all waste streams, type and quantity, allowing a review to be undertaken and the most appropriate waste disposal options are identified.

Table 2 – Waste Type and Management

WASTE TYPE	ESTIMATED QUANTITY	WASTE MANAGEMENT	WASTE CARRIER INFORMATION AND SITE
Vegetation	(example only) 40 palm trees Other bushes and vegetation	Recover, store and replant palm trees Other bushes etc. give away to community or compost	Company Name: Phone No. xxx xxx xxxxx
Packaging and plastic			
Excavated Material	100m ³		

ANNEX C: PROTECTED / IMPORTANT TREES

Images taken from Mannheimer, C.A. & Curtis, B.A. (eds) 2009. Le Roux and Muller's Field Guide to the Trees and Shrubs of Namibia. Windhoek: Macmillan Education Namibia.



Adenia Pechuelii



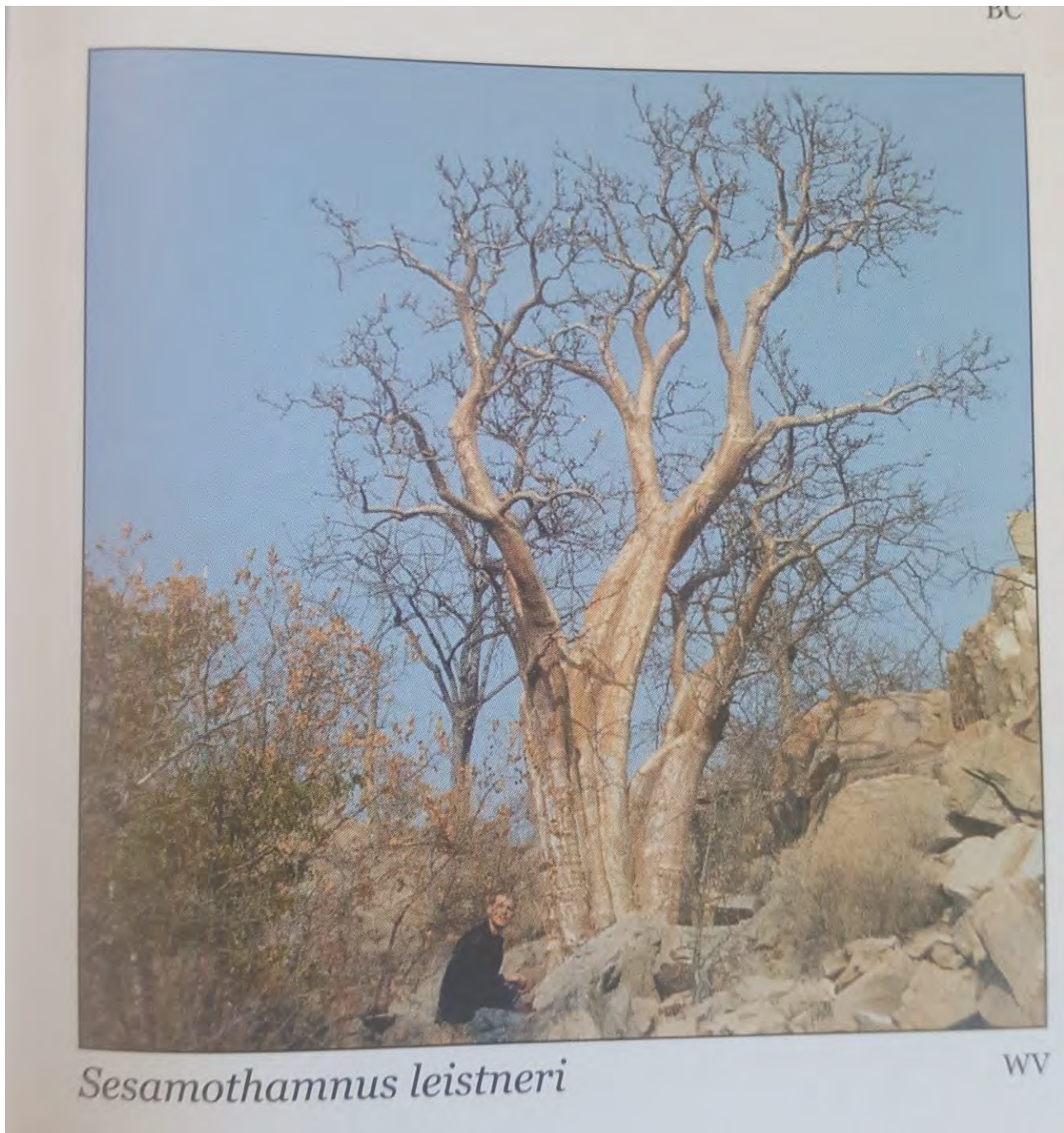
Cyphostemma Currorii



Cyphostemma Uter



Erythrina Decora



Sesmaothamnus leistneri

ANNEX D: MONITORING PLAN

Item	Rationale	Monitoring Area / Site Description / Details	Frequency	Phase (Construction, Operations, Decommissioning, or All)	Parameters	Quality Control Point
Pre-construction groundwater monitoring	Lack of historical data on the aquifer, therefore, recharge rate and sustainability of the aquifer is unknown. Further data required. Sensor readings on the water level in the bore will document when/if the levels change. Pressure sensors will record changes to the water level and shall be recorded remotely by the sensor. This provides seasonal data of the groundwater in the area. Data can then be compared with the monitoring data during production pumping.	Water monitoring level sensors (pressure sensors) installed in the boreholes.	Daily or as per hydrogeologists recommendations as data is refined during monitoring	Prior to construction	Water level	Yes

Vegetation Clearing	Prevent alien species entering the project area. Inspect and ensure equipment is clean prior to use on site and arrives free from soil, mud and seeds from other areas.	Visual inspections for weed and seeds.	Prior to equipment starting on site	Construction	Complete form	
Reptile Protection	Ensure reptiles that potentially fall into the trench during the night are removed safely in the morning from the trench.	Visual inspections for reptiles	Daily	Construction	Record number and species of reptiles	Yes
Exclusion zone establishment (aquifer protection zone)	Minimise certain activities leading to ground and thus groundwater contamination.	Check the fence or demarcation area is in place to prevent potential contamination of the aquifer Along the fault zone of 150m wide	Quarterly	Operations	No kraals, housing or sewerage waste to be developed within the exclusion zone and grazing within the protection zone should be prohibited	Yes
Lack of historical Data and dynamics of aquifer	Lack of historical data on the aquifer, therefore, recharge rate and sustainability of the aquifer is unknown. Evaluated on an annual basis.	Abstraction rate Rainfall Periods of flow Water level	Weekly	Operations	Abstraction rate Rainfall Periods of flow Water level	

	Vegetation monitoring around the production bores to determine if the rate of groundwater abstractions impacts the vegetation surrounding the dewatering area.	At production bores	Annually	Construction and Operations	Photos taken north, south, east and west. General vegetation observations including plant health, colour, % of leaf cover etc.	Yes
Water Quality / Contaminated water	Community activities above the aquifer may contaminate groundwater	Water Quality: Inorganic constituents Microbiological analyses	Water quality on a quarterly basis as per NAMWATER requirements (responsibility Namwater) Quarterly	Operations	Inorganic constituents Microbiological analyses as per the Namwater standard water supply testing programme.	