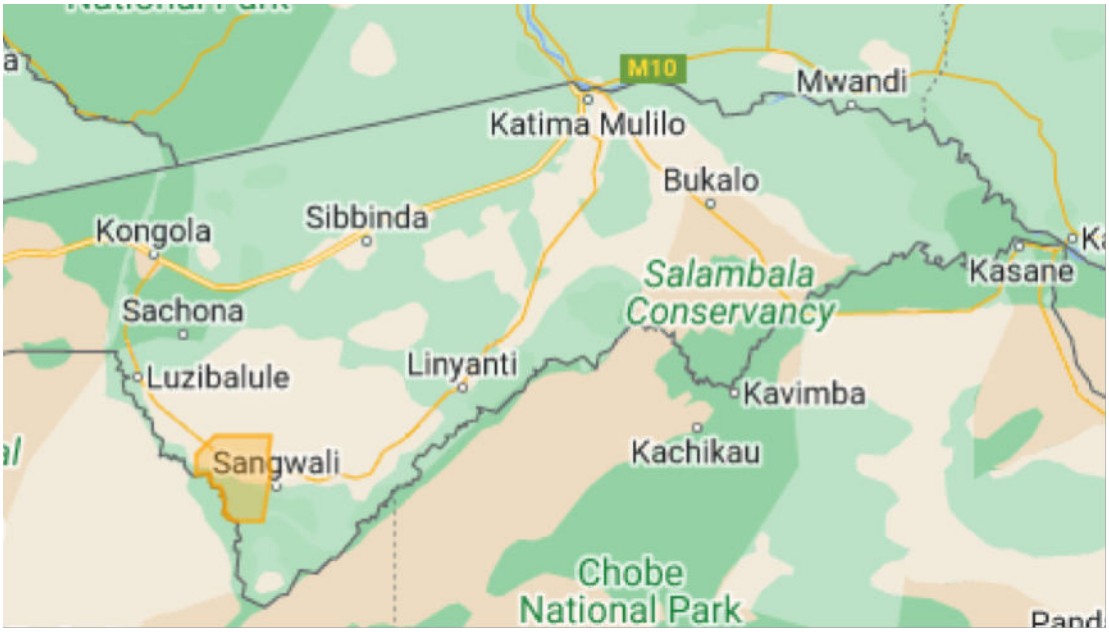
**APP: 240603003918**

# Environmental Management Plan Proposed Drilling of Boreholes for Water Supply at Lianshulu and Nongozi Villages in Balyerwa Conservancy, Zambezi Region





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| DOCUMENT INFORMATION | |
|---|---|
| **DOCUMENT STATUS** | **Final** |
| **PROJECT TITLE** | Environmental Management Plan Proposed Drilling of Boreholes for Water Supply at Lianshulu and Nongozi Villages in Balyerwa Conservancy, Zambezi Region |
| **CLIENT** | Balyerwa Conservancy |
| **LOCATION** | Balyerwa Conservancy, Zambezi Region<br>• Lianshulu Village<br>• Nongozi Village |
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| **DATE** | 12 September 2024 |
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## ACRONYMS

| | |
|---|---|
| **CCFN** | Community Conservation Fund Namibia |
| **DEA** | Department of Environmental Affairs |
| **EA** | Environmental Assessment |
| **EAP** | Environmental Assessment Practitioner |
| **ECC** | Environmental Clearance Certificate |
| **EIA** | Environmental Impact Assessment |
| **EMA** | Environmental Management Act (No. 7 of 2007) |
| **EMP** | Environmental Management Plan |
| **EMP** | Environmental Management Plan |
| **GRM** | Grievance Redress Mechanism |
| **HWC** | Human Wildlife Conflict |
| **IWRMP** | Integrated Water Resource Management |
| **KfW** | Kreditanstalt für Wiederaufbau |
| **$m^3$** | Cubic meter |
| **MAWLR** | Ministry of Agriculture Water and Land Reform |
| **MEFT** | Ministry of Environment Forestry and Tourism |
| **PPE** | Personal Protective Equipment |
| **RDC** | Red-Dune Consulting CC |
| **SM** | Site Manager |
| **WC** | Wildlife Crime |

# 1 INTRODUCTION AND BACKGROUND

The Community Conservation Fund of Namibia (CCFN) is a non-profit Association incorporated under Section 21 of Namibia's Companies Act of 2004. Using a foundation model, the CCFN is mandated to raise funds and manage various financial mechanisms such as endowments, sinking or revolving funds, to ensure the long-term sustainability of Community-Based National Resource Management (CBNRM) activities that are carried out by communal conservancies and other entities with a similar legal mandate.

CCFN was appointed by the Ministry of Environment, Forestry and Tourism (MEFT) to be the Project Executing Agency (PEA) responsible for the overall management of a project titled "*Poverty Oriented Support to Communal Conservation in Namibia".* The Project's main objective is to contribute to biodiversity conservation and rural development through the establishment of sustainable Human-Wildlife-Conflict (HWC) management systems in Namibia's communal conservancies. The Project is co-financed by the Federal Republic of Germany through the German Ministry for Economic Cooperation and Development (BMZ) (through the KfW Development Bank).

The project is (i) working together with CBNRM partners to develop and institutionalize long-term mechanisms and structures that make management of HWC part of the sustainability strategy of CBNRM (ii) providing targeted conservancies with the means to address the HWC challenges they face in line with the National Policies of Namibia.

## 1.1 Background of the Consultancy

Many conservancies have observed an increased abundance of wildlife populations which often led to competition for grazing space and scarce resources such as water. The increase in wildlife is unfortunately also accompanied by increased frequency and severity of Human Wildlife Conflict (HWC), resulting in damage to crops, infrastructure, injuries, and loss of life to people and livestock. The Zambezi region is one of the areas most affected by Human Wildlife Conflict in the

country. Although, Water supply for both people, livestock, as well as wildlife, is in abundance due to sufficient water sources.

The diverse range of wildlife species and their interaction with human often result into incidents of human-wildlife conflict. Situated in close proximity to the Kwando River, livestock and communities are often attacked by wildlife when accessing the river for drinking water. There has been a rising increase in human and livestock attacks especially by crocodiles at riversides.

This necessitated the need to drill alternative water points away from the river in order to reduce Human Wildlife Conflict. Crocodiles and Elephants are reported to be key problem-causing animals in Zambezi region because of the proximity of communities to river systems. Communities draw water directly from the rivers due to limited alternative sources of water supply, which increases attacks by wildlife. It was therefore recommended to drill boreholes and provide alternative water points away from the rivers to reduce human wildlife conflict.

# 2 THE ENVIRONMENTAL MANAGEMENT PLAN

## 2.1 Purpose of the EMP

This Environmental Management Plan (EMP) is a risk strategy that contains logical framework, monitoring programme, mitigation measures, and management control strategies to minimize environmental impacts. It further stipulates the roles and responsibility of persons involved in the project. These strategies are developed to reduce the levels of impacts for the projects. Lastly, the EMP further aims to develop mitigation measure of social and environmental risk that the project may cause as identified in the Environmental Social Management Framework (ESMF) of the project.

## 2.2 Compliance to the EMP

This EMP is a legally binding document under the provisions of the Environmental Management Act, 2007 (Act No. 7 of 2007) (EMA). The Balyerwa Conservancy with support from CCFN and its contractors should adhere to the framework of this EMP.

## 2.3 Roles and Responsibility

### 2.3.1 Proponent

The proponent, Balyerwa Conservancy with support with from CCFN shall take overall responsibility for implementation of the EMP. It remains the responsibility of the proponent to appoint key personnel such as Site Manager and ensure that all employees and contractors are conversant with the EMP.

### 2.3.2 Site Manager

The Site Manager (SM) represents the proponent on site. He/she shall be responsible for daily activities in ensuring environmental protection. All communication with regard to the implementation of EMP must be channelled through the SM

### 2.3.3 Employees

It shall be responsibility of employees to always adhere to the provision of EMP when on site

### 2.3.4 Environmental Compliance Officer

Compliance to EMP is enforced by the designated government officials.

### 2.3.5 Ministry of Agriculture Water and Land Reform

This ministry as mandated through the Water Resources Management Act 11 of 2013 to ensure adequate management, protection, development, use and conservation of water resources; to provide for the regulation and monitoring of water services and to provide for incidental matters. MAWLR will be responsible to ensure to that the allocated abstraction by the water permit is not exceeded to ensure a health aquifer.

## 2.4 Disciplinary Action

This EMP is a legally binding document, non-compliance to the EMP is punishable in accordance to the provision of EMA

# 3 THE EMP TABLE

This EMP is divided into two parts; i) Construction and ii) Operation in addressing issues of Socio-Economic, Bio-Physical Environment, Pollution and Waste Generation and Heritage Resources . This is a living document that is subject to amendment when the needs arises to ensure environmental protection. Thus, aspects that may not necessarily be covered during its development could be added on.

## 3.1 Part I: Construction Phase

### 3.1.1 Socio-Economic Consideration

| Environmental / Social Impact | Objectives | Proposed Mitigation Measures | Monitoring Indicator | Party Responsible |
|---|---|---|---|---|
| **Staff induction** | To ensure that all staff / employees are familiar with the requirements of the EMP | 1. All employees must go through an induction course for the provision of the EMP.<br>2. Ensure that a copy of the EMP is kept on site | • Induction Minutes and Attendance Register, Physical verification of the EMP on site. | Contractor |
| **Employment Socio-Economic advancement for local** | To ensure that general work created during the project is reserved for local people | 1. Ensure that all general work is reserved for local people<br>2. Fair compensation and labour practise as per Namibian Labour Laws must be followed | • Employee register<br>• Wages for employee<br>• Complains about payment | Contractor |
| **Skill and Knowledge transfer** | To build local capacity | 1. Identify and train competent people (Preferable youth) to do basic maintenance of the borehole and its supporting infrastructure | • Training report | Contractor |
| **General waste** | To manage solid waste | 1. Provide well labelled waste drums<br>2. No onsite burying / dumping or burning of waste | • Physical verification of waste drums | Contractor |

| Environmental / Social Impact | Objectives | Proposed Mitigation Measures | Monitoring Indicator | Party Responsible |
|---|---|---|---|---|
| | To prevent littering, pollution, contamination of water and general environmental health hazards | material is permitted.<br>2. Ensure appropriate waste collection and removal from the site and effective disposal | • Report of waste disposal | |

3.1.2 Health and Safety of employees

| Environmental / Social Impact | Objectives | Proposed Mitigation Measures | Monitoring Indicator | Party Responsible |
|---|---|---|---|---|
| **HIV and AIDS, Alcohol and Drug abuse** | Prevent alcohol and drug use at workplace. Provide awareness of dangers on HIV/AIDS | 1. Ban the employees against the use of alcohol during working hours.<br>2. Provide awareness on the dangers and health impacts of alcohol and drug use.<br>3. All employees must be screen with the breathalyser to avoid intoxicated personnel on site.<br>4. Adopt a disciplinary system to discipline staff for non-compliance.<br>5. Provide Condoms to employees. | • Monitor presence of alcohol at construction site<br>• Awareness meeting attendance registers<br>• Breathalyser report<br>• Disciplinary reports<br>• Physical assessment and logs of condom procurement | Contractor |
| **Health** | To ensure employees and community health | 1. Abide to the Occupational Health and Safety and Labour Act of Namibia and other statutory | • Complaints of health issues by employees | Contractor |

| Environmental / Social Impact | Objectives | Proposed Mitigation Measures | Monitoring Indicator | Party Responsible |
|---|---|---|---|---|
| | | requirements such as International Labour Practise (Organization?) (ILO).<br>2. Ensure adequate first aid kit equipped with anti-venoms.<br>3. Supply clean drinking water to the site. | • First aid kit available | |
| **Safety** | To ensure employees and community safety | 1. Develop a safety plan.<br>2. Ensure that every employee goes through an induction course about safety.<br>3. Provide appropriate Personal Protective Equipment (PPE) which includes helmets, overalls, safety shoes, safety glasses, gloves, etc.<br>4. Train employee elephant behaviour and predators | • Safety plan / pamphlets<br>• Training minutes and attendance register<br>• Physical verification of PP | Contractor |
| **Noise Pollution** | To prevent noise nuisance | 1. Maintain low speed<br>2. All vehicles must be well serviced to prevent excessive noise<br>3. Do not hoot unnecessary<br>4. Do not rev the vehicle engines<br>5. Do not play loud music / radio | • Noise complaints / reports by tourist / community<br>• Vehicle service books | Contractor |

3.1.3 Safety of borehole / water infrastructures

| Environmental / Social Impact | Objectives | Proposed Mitigation Measures | Monitoring Indicator | Party Responsible |
|---|---|---|---|---|
| **Destruction of water infrastructure by elephant** | To prevent destruction of boreholes and associated infrastructure by elephants. | 1. Construct an elephant proof fence around the borehole and its supporting infrastructures | • Physical verification of elephant proof fence | Contractor |

3.1.4 Bio-Physical Consideration

| Environmental / Social Impact | Objective | Proposed Mitigation Measure | Monitoring Indicator | Responsibility |
|---|---|---|---|---|
| **Biodiversity** | To protect plant and animals (The proposed drilling sites are free of vegetation and animals (unless crawling animals) | 1. Do not cut down trees unnecessary.<br>2. Do not kill animals.<br>3. Poaching strictly forbidden. | • Physical verification<br>• Report of poaching | Contractor |
| **Land degradation** Uncontrolled movement of drill rig at the project site may cause land degradation. | To prevent soil disturbance / erosion | 1. Movement of vehicles / trucks must be well coordinated to ensure minimal soil disturbance | • Physical observation of tracks outside designated areas | Contractor |
| **Water pollution** Heavy vehicle and machinery may pollute water sources from | To prevent surface and groundwater pollution | 1. Fuelling of heavy vehicle on site must be well coordinated at designated places.<br>2. Stationary vehicles must be provided with drip tray to capture oil, lubricants, and | • Physical observation of drip trays, oil marks etc<br>• Vehicles service report / service books | Contractor |

| Environmental / Social Impact | Objective | Proposed Mitigation Measure | Monitoring Indicator | Responsibility |
|---|---|---|---|---|
| leakages of oils, hydraulic fluids, lubricants, and greases. | | hydraulic fluids leakages.<br>3. All vehicle and machinery must be well service to avoid leakages.<br>4. Provide and train employees on oil spill emergency response.<br>5. Soils contaminated with grease, oils and hydrocarbons must be collected and disposed of at an approved site; | • Training report on emergency response<br>• Reports of disposal of contaminated soils | |
| **General waste** | To manage solid waste<br>To prevent littering, pollution, contamination of water and general environmental health hazards | 1. Provide well labelled waste drums.<br>2. No onsite burying / dumping or burning of waste material is permitted.<br>3. Ensure appropriate waste collection and removal from the site and dispose at appropriate waste disposal site. | • Physical verification of waste drums<br>• Report of waste disposal at approved sites | Contractor |

3.1.5 Heritage Resources

| Heritage Resource | Objectives | Proposed Mitigation Measures | Monitoring Indicator | Responsibility |
|---|---|---|---|---|
| **Heritage and Archaeology** | The proposed area does not have known Heritage site or archaeological material. | 1. Employee must be trained on the possible find of heritage and archaeological material in the area.<br>2. Implement a chance find and steps to be taken for | • Training records and attendance registers | Contractor |

| Heritage Resource | Objectives | Proposed Mitigation Measures | Monitoring Indicator | Responsibility |
|---|---|---|---|---|
| | Regardless and as standard practise, a chance find is developed.<br>to ensure protection of artefacts, heritage and archaeological materials. | heritage and archaeological material finding (Heritage (rock painting and drawings), human remains or artefacts) are unearthed by;<br>i. Stopping the activity immediately<br>ii. Informing the operational manager or supervisor<br>iii. Cordoned of the area with a danger tape and manager to take appropriated pictures.<br>1. Manager/supervisor must report the finding to the following competent authorities, National Heritage Council of Namibia (061 244 375) National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461). | | |

## 3.1 Part B: Operational Phase

### 3.1.1 Part III: Aquifer Conservation

This aspect is critical part of this EMP to ensure the aquifer healthy.

| Environmental / Social Aspect | Objective | Action Required | Monitoring Indicator | Party responsible |
|---|---|---|---|---|
| **Water abstraction** | To conserve the aquifer | 1. Do not abstract more than what is allocated by the permit.<br>2. Develop and implement a ground water monitoring plan.<br>3. Install automatic measuring gauge to monitor abstraction.<br>4. Carry out periodic pumping yield to assess aquifer sustainability.<br>5. Monitor local vegetation and report their unusual health status.<br>6. Undertake systematic water quality assessment. | • Abstraction reports<br>• Ground water monitoring plan<br>• Report of test pumping<br>• Physical verification of vegetation<br>• Water quality | Proponent |
| **Ecology** | Rangeland Management | 1. Monitor the vegetation health condition during abstraction and vice versa. | • Vegetation monitoring | Proponent |

| Environmental / Social Aspect | Objective | Action Required | Monitoring Indicator | Party responsible |
|---|---|---|---|---|
| **Skill and Knowledge transfer** | To build local capacity | 1. Identify and train competent people (Preferable youth) to do basic maintenance of the borehole and its supporting infrastructure. | • Training report | Proponent |
| **Risk of water infrastructure destruction buy elephant** | To prevent infrastructure destruction by elephant | 1. Build high and thick enough that will prevent elephants access to the water tank and solar infrastructures. | • Elephant incident report | Proponent |
| **Conflict of water use buy the communities** | To prevent conflict among communities of the borehole | 1. Raise awareness of the indented purpose of the borehole.<br>2. Ensure no one is made to be entitled to owning or have controlling power on who should use the borehole | • Community consultation and awareness raising report | Proponent |
| **Corrosion of borehole metal casing** | To ensure the casing are not corroded that could affect pump yields and water quality | 1. Use non-corrosive casing. | • Corrosion monitoring reports | Proponent |

# 4 DECOMMISSIONING AND REHABILITATION PLAN

Decommissioning is normally the reverse of construction where all installed equipment / structure must be removed. Supply of water has an infinite timeframe. Unless otherwise of a pressing issue national issue, such as degraded water quality, that would necessitate decommissioning, the borehole is aimed to outlive generations to come. Aging equipment that required replacement should be done by qualified Namibians to ensure smooth operation of the borehole.

As mentioned above, Zambezi region is known to have corrosive underground water. It is critical to develop a strategy for periodic rehabilitation to ensure that the borehole yields are not affected.

# 5 CONCLUSION AND RECOMMENDATIONS

## 5.1 Conclusions

This Social Environmental Management Plan was developed for drilling of the boreholes. During site inspection, there were no concern on how few trees and shrubs were cleared to create working space on site and make way for the drilling vehicle. This study was undertaken with high degree of certainty and no impacts was observed which could not be minimized at insignificant levels.

## 5.2 Recommendations

It is recommended to the approving authority for the issuance of the ECC. Strong emphasis on ensuring on water quality to protect the health of human and animals.