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Environmental Management Plan (EMP) for the Rehabilitation of Water Services Infrastructure at Khorixas Town, Kunene Region

Scoping Report

Version – FINAL

APRIL 2024

Khorixas Town Council

Kunene Region

Contents

ABBREVIATIONS AND ACRONYMS	
AADD	Average Annual Daily Demand
AfDB	African Development Bank
BID	Background Information Document
CBD	Convention on Biological Diversity
DWSSC	Directorate of Water Supply and Sanitation Coordination
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
ESA	Environmental and Social Assessment
EIA	Environmental and Social Impact Assessment
EIA	Environmental Impact Assessment
EMA	Environmental Management Act (No 7 of 2007)

EMP	Environmental Management Plan
ESAP	Environmental and Social Assessment Procedures
EMP	Environmental and Social Management Plan
EVIMA	EVIMA Water Environmental Engineering Namibia (Pty) Ltd
GLR	Ground Level Reservoir
GRM	Grievance Redress Mechanism
Ha	Hectares
hrs	Hours
I&AP	Interested and Affected Parties
IUCN	International Union for Conservation of Nature
LFPR	Labour Force Participation Rate
km	Kilometres
kPa	Kilo Pascal
ABBREVIATIONS AND ACRONYMS	
kW	Kilowatt
m	Meters
m^3	Cubic meters
M^3/d	Cubic meter per day
m^3/h	Cubic meter per hour
mm	Millimeters
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT: DEAF	Ministry of Environment, Forestry and Tourism: Department of Environmental Affairs and Forestry
mWh	Meters water head
NamWater	Namibia Water Corporation
PPP	Public Participation Process
SADC	Southern African Development Community
SR	Scoping Report
UNFCCC	United Nations Framework Convention on Climate Change
UNCCD	United Nations Convention to Combat Desertification

1. INTRODUCTION

The Environmental management Act (EMP) involves the protection, conservation and sustainable use of the various elements of the environment, Social and safety of employees. The EMP for the proposed Rehabilitation of Water Services Infrastructure at Khorixas Town, Kunene Region and details activities, impacts, mitigation measures and expected costs during implementation and decommissioning phases of the project. Though the project bears the potential of a number of negative impacts on the environment. However, with proper environmental management procedures in place and adhered to then there should be minimal negative impact of concern emanating from it. Key areas that require mitigation measures include vegetation loss, project safety and security, conflict and health issues.

1.1 Objectives of the EMP

The objectives of the Environmental management Act are-;

- Ensure environmental conservation and sustenance to ensure a balanced approach between the development and the ecosystem.
- Ensure and enhance safety within the development both within the rehabilitation and operation phases.
- Promoting environmental and social cohesion with project affected persons within the project area

1.2 Recommendations for EMP

- Undertake community awareness programs to sensitize the beneficiaries on the aspects of water conservation, protection of riparian areas and hygiene.
- Periodical testing of water for water quality
- Establishment of silt traps
- Engagement of locals during rehabilitation as skilled and unskilled labourers

1.3 Management Plan Principles

The Environmental management Act (EMP) involves the protection, conservation and sustainable use of the various elements of the environment. The EMP for the planned Environmental Management Plan (EMP) for the Rehabilitation of Water Services Infrastructure at Khorixas Town, Kunene Region details of its activities, impacts, mitigation measures and expected costs during implementation and decommissioning phases of the project. The potential negative impacts of the project on the environment are few and with proper environmental management procedures in place and adhered to there should be minimal negative impact of concern emanating from it.

The project is geared towards enhancing social and economic benefits through sustainable water supply. Implementation of the proposed Project would be expected to comply with the environmental management requirements in accordance with the established Namibian laws and regulations. To realize these goals, acceptability by a majority of the beneficiaries and stakeholders as well as ensuring minimal effects to the physical environment will be required

for their participation in the project and continuous consultations, evaluations and review of the design aspects throughout project implementation cycle.

It is also recommended that the environmental management guiding principles specific to this project be established to allow integration of environmental management considerations during rehabilitation and operations. Among the factors that need to be considered in this particular project implementation will include;

- Revisit the design of the water supply system
- Control of soil erosion and siltation of water sources (rivers and streams), incorporation of project components sustainability and operational provisions and the associated components,
- Enhancing integration of environmental, social and economic functions in the project
- The contractors and other players in the project activities ensure that implementation of the EMP through a sustained supervision and continuous consultations
- Involvement of the community in the project implementation to enhance ownership and capacity building for long term operations of the facility.
- Compensation of any land or property that may be affected by the project in accordance to the laid down regulations and/or agreements with the affected sections of the community.

1.4 Management Responsibilities

In order to implement the management plan, it is recommended that the Environmentalist from EVIMA should oversee the environmental and social management aspects including the water source conservation, soil erosion control, re-vegetation whenever appropriate, water conservation and equity in distribution, enhanced sanitation and hygiene measures throughout the project implementation to ensure compliance. The expert would also be required to coordinate and monitor environmental management activities during rehabilitation and postmonitoring audits. Other recommended participants include; The Khorixas Town Council will be responsible for coordination of all the activities and liaisons, particularly concerning the quality control of the works and social issues.

Project Implementation Management Committee will have the responsibility to enforce water quality monitoring and efficient maintenance systems, procedures to minimize interruptions to water supply and ensure accessibility by all consumers. In this regard appropriate capacity building and skills will be necessary.

1.5 Environmental Management Guidelines

The guidelines will include among other areas environmental management programs, standard operation procedures, compliance monitoring schedules and environmental audit schedules as required by the law. Social harmony, collaborations with the stakeholders or community management committees introduced at various rehabilitation sites. Specifically, the following will promote efficiency;

- Ensure environmental conservation and sustenance to ensure a balanced approach between the development and the ecosystem.
- Ensure and enhance safety within the development both within the rehabilitation and operation phases.
- Promoting environmental ethics within concerned parties and users

1.6 Environmental Education and Awareness Raising

Components of environmental training should also be incorporated in the Khorixas Town Council activities. The training should include among others: keeping a clean environment on site and their respective homes, importance of tree planting, and dust and noise effects and control. This training and awareness creation on environmental matters should also extend to neighbouring schools in simple forms like participating in classes and sponsoring environment related competitions. The council can also organize environmental displays and exhibits for local communities, to raise their awareness and level of commitment. The Khorixas Town Council will need to understand the basic environmental, water use sanitation and hygiene principles. In this regard therefore the following steps may be considered;

- Creation of liaison office for all matters related to environment, health and safety.
- Encourage contribution of improvement ideas on specific issues related to the management of the facilities.
- Establish initiatives that would instil a sense of ownership of the facilities and related components to all beneficiaries.

The contractor will also be expected to incorporate HIV/AIDS programs and covid 19 sensitization campaigns during rehabilitation phase. Awareness, prevention and training on HIV/AIDS and other social diseases is important during project rehabilitation and operation phase. The awareness creation should be improved through putting up of banners, posters and trainings that should be facilitated within the project area to the rehabilitation workers and the community.

2. REHABILITATION ENVIRONMENTAL MANAGEMENT PROCESS

A rehabilitation environmental management process is a practical and achievable plan of management to ensure that any environmental impact during the design, planning and rehabilitation phase are minimized. Measures have been proposed to deal with the following issues during Project rehabilitation:

- Interference with physical setting and key infrastructure installations;
- Noise and vibrations;
- Dust and air quality;
- Disposal of spoil and waste management;
- Vegetation loss;
- Accidental spills;

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- Occupational health and safety;
- Increased water demand;
- Archaeological and other cultural properties;
- Increase in HIV/AIDS prevalence and other STDs;
  Spread of communicable diseases and other infections;
- Immigration and settlement;
- Growth of unplanned settlements; and
- Child labour

3. OPERATIONAL ENVIRONMENTAL MANAGEMENT PLANS

An Operational Environmental Management Plan is focused on sound environmental management practices that will be undertaken to minimize adverse impacts on the environment through normal operation of a facility. The management plan further identifies what measures should be taken in the event of emergencies or incidents during the operation of the facilities. The plan has been proposed to deal with the following issues during Project operation:

- Reduced downstream flows;
- Increased domestic wastewater generation;
- Solid waste management;
- Sludge management;
- Backwash water management;
- Chemical handling;
- Noise generation and vibration;
- Emergency preparedness (Energy management; and Capacity building)

3.1 Auditing of EMP

The Khorixas Town Council and the contractor shall conduct regular audits to the EMP to ensure that the system for implementation of the EMP is operating effectively. The audit shall check that a procedure is in place to ensure that:

- The EMP being used is the up-to-date version;
- Variations to the EMP and non-compliance and corrective action are documented;
- Appropriate environmental training of personnel is undertaken;
- Emergency procedures are in place and effectively communicated to personnel;
- A register of major incidents (spills, injuries, complaints) is in place and other documentation related to the EMP; and
- Ensure that appropriate corrective and preventive action is taken by the Contractor once instructions have been issued
- Regular tool box meetings are conducted by the contractors' EHS officer.

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3.2 Management Responsibility

In order to ensure the sound development and effective implementation of the EMP, it will be necessary to identify and define the responsibilities and authority of the various persons and Organizations which will be involved in the project. The following entities should be involved in the implementation of this EMP;

- MAWLR
- Khorixas Town Council
- Environmental Commissioner;
  Contractor;
- Environmental Consultant;
- Regional Council

3.3 Environmental Commissioner

The responsibility of Environmental Commissioner is to exercise general supervision and coordination over all matters relating to the environment and to be the principal instrument of Government of the Republic of Namibia in the implementation of all policies relating to the environment. The Environmental Commissioner will visit the project regularly to monitor compliance with The Environmental Commissioner Licence conditions.

3.4 The Contractor

The company/firms that will be contracted to implement the proposed rehabilitation of water infrastructure will be required to comply with the requirements of the EMP within this report. To ensure strict compliance environmental specifications of this EMP should form part of the contract documents. The contractor shall prepare a rehabilitation EMP upon signing of the contract.

3.5 Consultant

The sourced consultant will have to ensure that the proposed EMP is up to date and is being used by the contractor. Periodic audits of the EMP will have to be done to ensure that its performance is as expected. (quarterly audits)

3.6 Regional Council

The relevant departmental officers of the County Government of Migori should be called upon where necessary during project implementation to provide the necessary permits and advisory services to the project implementers.

Table 1: Environmental management Act for Rehabilitation of Khorixas water infrastructure

Impact	Mitigation Measure	Institutional Responsibility	Time Frame
Interference with the physical setting	✞ The structures to be rehabilitated should be aesthetically acceptable to blend in with the surrounding. These structures should not form or end up being used by the resident population as access or bridges; ✞ The proponent shall as much as possible complete the works in such a way that natural aesthetics ✞ shall be retained at the locations; ✞ Restoration shall be undertaken to ensure that the original setting is as much as possible retained.	Khorixas Town Council & Contractor	During rehabilitation
Interference of existing installations on the pipeline route	Formal request for permission to cross, break in and build the water pipeline should be sought from affected property owners and the relevant institutions such as Namibia Power and roads authorities;	Khorixas Town Council, Contractor, Namibia Power, Roads Authorities	Throughout rehabilitation period

Impact	Mitigation Measure	Institutional Responsibility	Time Frame

	✞ Formal engagement should be done with key land and other property owners neighbouring the pipeline; ✞ Ensure dissemination of relevant information to each of the affected parties; ✞ A work plan with clear responsibilities for each party should be developed to ensure smooth execution of the rehabilitation.		
Noise generation	✞ Install portable barriers to shield compressors and other small stationary equipment where necessary; ✞ Use of quiet equipment (i.e. equipment designed with noise control elements); ✞ Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible; ✞ Provision of appropriate personnel protective equipment; ✞ Construct mainly during the day; and ✞ Consider labour-based rehabilitation methodologies.	Contractor	Throughout rehabilitation period

Impact	**Mitigation Measure**	**Institutional Responsibility**	**Time Frame**
Dust emissions	✞ Minimizing the number of motorised vehicles on use; ✞ Rehabilitate disturbed areas; ✞ Provide scour checks on over-15% slopes or when working in loose soils; ✞ Use predetermined tracks; ✞ Avoiding machinery working in seasonally marshy areas, pans and floodplains; ✞ Wet all active rehabilitation areas as and when necessary to reduce dust; ✞ Undertake staff training and allocate roles to trained/responsible staff members.	Contractor	Throughout rehabilitation period

Disposal of spoil	✞ Maximise the re-use of excavated materials in the works as far as feasible to ensure that no permanent spoil dumps are created; this can be used for backfilling ✞ Properly dispose off the spoil in the identified by the design team and approved by the confirmed land owners; ✞ Care should be taken to avoid spoil location in land that could otherwise be used for productive purposes.	Contractor	Throughout rehabilitation period

Impact	**Mitigation Measure**	**Institutional Responsibility**	**Time Frame**
Solid waste generation	✞ Rehabilitation waste should be recycled or reused as much as possible to ensure that materials that would otherwise be disposed off as waste are diverted for productive uses; ✞ The Proponent shall put in place measures to ensure that rehabilitation materials requirements are carefully budgeted and to ensure that the amount of rehabilitation materials left on site after rehabilitation is kept minimal; ✞ Minimization of solid waste during rehabilitation of the proposed Project through use of durable, long-lasting materials that will not need to be replaced often, thereby reducing the amount of rehabilitation waste generated over time; ✞ Solid bins should be strategically placed within the campsite and site, they should also be adequately designed and covered to prevent access by vermin and minimize odour. They should also be emptied regularly; ✞ Measures to ensure that waste materials from the Project are disposed at suitable sites will be taken.	Contractor	Throughout rehabilitation period

Impact	**Mitigation Measure**	**Institutional Responsibility**	**Time Frame**

	These will include engaging only approved waste handlers to verify that disposals are done in accordance with the requirements of the Environmental Commissioner; ✞ The ultimate fate of the wastes should be monitored so that they are not illegally disposed of; ✞ Provide portable sanitary conveniences for the rehabilitation workers for control of sewage waste. A ratio of approximately 25 workers per portable toilet should be used.		
Vegetation loss	✞ The Contractor will ensure proper demarcation of the Project area to be affected by the rehabilitation works; ✞ Strict control of rehabilitation vehicles to ensure that they operate only within the area to be disturbed by access routes and other works; ✞ Retention of trees and shrubs, where possible on the potential sites for screening of the visual impact; ✞ Where the proposed route requires the removal of any vegetation, care will be taken to minimize the destruction or damage of trees. ✞ Re planting of destroyed trees and land scaping in cleared areas where works are completed.	Contractor	Throughout rehabilitation period

Impact	**Mitigation Measure**	**Institutional Responsibility**	**Time Frame**

Accidental spills or leakages	✞ Maintain vehicles and machineries at manufacturers specifications; ✞ Ensure proper storage of chemicals / materials; ✞ During the course of the rehabilitation works, temporary drainage channels should be constructed to encourage dispersal of meteoric waters. ✞ Ensure regular servicing of all contractor vehicles and trucks	Contactor	Throughout rehabilitation period
Worker accidents and hazards	To reduce the workers accidents and hazards the Proponent will develop and commit the Contractors to Site Occupational Health and Safety rules and regulations as stipulated in the Occupational Safety and Health Act, 2007; ✞ All rehabilitation workers should be advised of the dangers associated with rehabilitation work; ✞ Employ a nurse for the workers if possible ✞ Workers should be provided with suitable personal protective equipment (PPE); ✞ Provision of adequate sanitary facilities to workers;	Contactor	Throughout rehabilitation period

Impact	**Mitigation Measure**	**Institutional Responsibility**	**Time Frame**

	✞ Train all workers on Safety Health and Environment (SHE) with an aim of improving awareness; ✞ Trenches over 1.5 m deep or wherever soil conditions dictate should be shored and secured against accidental entry by workers and the public; ✞ Install safety signage along the work areas; ✞ Where rehabilitation activities interfere with the movement of traffic, the site should be signed and controlled by trained flagmen/flag women and lit by night.		
Extraction and use of materials	✞ The Contractors will source rehabilitation materials such as sand and hard core from registered and approved quarry and sand projects have undergone satisfactory environmental impact assessment/audit and received THE Environmental Commissioner approval. Since such firms are expected to apply acceptable environmental performance standards, the negative impacts of their activities at the extraction sites are considerably well mitigated; ✞ The Contractor will only order for what will be required through accurate budgeting and estimation of actual rehabilitation requirements.	Contactor rehabilitation	Throughout rehabilitation period mining firms whose

Impact	**Mitigation Measure**	**Institutional Responsibility**	**Time Frame**
Increased water demand	✞ The Proponent through the Contractor shall ensure that water is used efficiently at the site by sensitizing rehabilitation staff to avoid irresponsible water use;	Contactor	Throughout rehabilitation period

Impact	**Mitigation Measure**	**Institutional Responsibility**	**Time Frame**

	✞ Any water handling equipment, facility and systems shall be appropriate for the intended usage. Water used on the rehabilitation shall reflect the level of conservation achieved by the Contractors. Documentation of amounts of water used will therefore be mandatory.		
Archaeological and other properties	The contractor should develop and implement a chance find procedure in case archaeological sites are found during the rehabilitation process. Such procedure must incorporate liaison with the National Museum of Namibia.	Contactor/National Heritage Council of Namibia/Khorixas Town Council	Throughout rehabilitation period
Increase in HIV/AIDS The STDs occurrences as a result of social interaction between immigrant workers and local populations is conducted through: Selecting appropriate locations away from concentration of human settlements for rehabilitation camps;	Resident Engineer should ensure that prevention and management	Contactor	Throughout prevalence and other of STDs period

	Education and sensitization of workers and the local communities on STDs including provision of condoms to the project team and the public; The contractor has to institute HIV/AIDS awareness and prevention campaign amongst workers for the duration of the contract e.g. erect and maintain HIV/AIDS information posters at prominent locations as specified by the Resident Engineer; The contractor has to ensure that staff are made aware of the risks of contracting or spreading sexually transmitted diseases; The contractor should ensure that the project workers are sensitized on the local culture.		
Spread of communicable diseases and other infections	✞ Treat affected local and migrant workers which will control the movement of disease vectors (through contaminated water and between people); ✞ Provision of personal hygiene facilities in good condition with adequate water supply;	Contactor	Throughout rehabilitation period

Impact	Mitigation Measure	Institutional Responsibility	Time Frame
	✞ Ensure awareness raising on proper sanitation and personal hygiene to promote proper health.		
Immigration and settlement	✞ Workers should be sensitized on the local cultures and beliefs to ensure there is harmony in the project area.	Contactor	Throughout rehabilitation period
Child labour	✞ The contractor should ensure that all the personnel employed should be adults and should possess valid national identification cards.	Contactor	Throughout rehabilitation period
Reduced downstream flows	✞ There should be due adherence to the safest maximum abstractable water quantities of throughout the project life; ✞ Adhere to MAWLR water use permits; ✞ The Proponent shall monitor the hydrology to determine whether there is reduced downstream flows to avoid conflict with Sony sugar factory abstracting down stream	MIWASCO,	Throughout operation phase

Impact	Mitigation Measure	Institutional Responsibility	Time Frame
Chemical handling	✞ Improve chemical handling, avoid leakages and spillages; mainly chlorine and alum ✞ Appropriate record keeping of data on chemicals and material safety data sheets; ✞ Awareness creation amongst workers on proper handling of chemicals through training.	Government agency	Throughout operation phase
Solid waste generation and disposal	Provision of solid waste storage bins and skips; Monitor skips so that they do not become overfilled; Ensure that the solid waste collected is disposed of in an approved dumpsite.	Government agency	Throughout operation phase

Noise generation and vibration	The design shall propose noise and vibration proofed systems installation. These shall be monitored during operation and if the values go above ambient or specifications, the necessary measures shall be undertaken which may include: ✞ Improvement of proofing systems; o Servicing of the offending equipment; ✞ Development of foundations and mountings; and Complete or partial overhaul. ✞ Personal protective equipment shall be provided at noisy areas for use by workers and visitors.	Government agency	Throughout operation phase

Impact	**Mitigation Measure**	**Institutional Responsibility**	**Time Frame**
Emergency and preparedness response	✞ Design and implement an emergency response plan; ✞ Coordinate with aid organizations/agencies such as with the local fire brigade; ✞ Install fire hydrants within the proposed development; ✞ Install a fire extinguisher at the plant and train workers on how use it	Khorixas Town Council	Throughout operation phase

Energy Management	✞ To ensure efficient energy consumption, energy saving policies, technologies and management strategies in the overall Project management scheme should be included; ✞ It will be important to monitor energy use during the operation of the proposed Project and set targets for efficient energy use; ✞ Appropriate power transformers and accessories shall be installed in conjunction with the power distribution company; ✞ Liaise with Namibia Power to ensure that the plant receives quality energy supplies as required under each plant and equipment specifications; ✞ A stand -by generator set shall be installed and form part of the power supply system on site. This generator shall be sound proofed and kept in good running condition by regular checks and testing.	Khorixas Town Council	Throughout operation phase
Capacity building	✞ Provide a forum for human resources development on environmental conservation; ✞ Establish a schedule for continuous improvement of human capacity on environmental management; ✞ Develop in-house guidelines on environment, health and safety management.	Khorixas Town Council	Throughout operation phase

Decommissioning Phase

Table 2: Decommissioning EMP

Project Activities	Environmental /Social Impact	Proposed Mitigation Measures	Monitoring Indicators	Means of Verification	Responsible party	Monitoring Frequency

Demolition of camp site	Solid rehabilitation waste generation Increase in Health and Safety Incidents	Avoid decommissioning by liaising with area leaders Timely collection and disposal of rehabilitation wastes and debris by The Environmental Commissioner approved collector; Identify those who can reuse or recycle aspects of the waste and deliver them such wastes there; Consistent Health and safety management with competent HSE personnel, equipment operators etc	Documented agreement with the community to retain the camp facilities if possible and desired No rehabilitation waste on site and/or dumped near site; Amount of wastes recycled/reused and who;	Records of recycled or reused wastes; Fully rehabilitated campsite (either used by community or removed by the contractor to its original state)	Contractor	Once after completion of the project

Decommissioning of water piping	Grievances due to the loss of piped water Increased time taken to fetch water Increased demand for casual labour Significance loss of water Increased incidences of water borne diseases. Health and Safety incidents during the decommissioning phase Rising of dust Increase amount of nonrecyclable waste material Impact on service lines (water, sewer and lighting) Impact on community assets along the road corridor Increase in noise pollution Increase in surface run-off due to poor drainage Stagnation of water	Waste management plan with identified locations for disposal, re-use or repurposing the waste material A well developed and approved road decommissioning plan Health and Safety Management Plan for the phase Acquisition of all approvals, licenses, permits from relevant national and county government authorities Caution all present at the worksite of dangerous zones; Secure, barricade and condone off dangerous zones; Implement all the requirements of OSHA (provision of workers with PPE and ensuring that they use it, sensitization of all workers about potential hazards and how to mitigate them;	Well documented and approved decommissioning plan, waste management plan, health and safety plan etc Available permits, licenses and approvals prior to the start of the decommissioning task No. incidents of workers who have been affected; Workers sensitized and using PPE always; Qualifications of workers engaged; Ensuring all workers and those present at workplace use PPE; Proper behaviour within the workplace; Appropriate use of tools to intended activities;	Grievance reports Permits and licenses Management Plans	Contractor	Unforeseeable future

	Increase in available land for other uses					

	Increase in employment opportunities Occupational hazards/ accidents Temporary traffic disruption	✞ Employing trained workers; ✞ Provision of workers with appropriate PPES and ensuring they use them; ✞ Ensuring machinery and handled by ✞ qualified and experienced ✞ personnel;				

4. MONITORING AND EVALUATION

Monitoring is an important tool in establishing the success or failure of a project in regards to compliance to environmental safeguards. Evaluation is also important in assessing the achievement of the mitigation measures set out in the Environmental management Act, performance and efficiency of the project in regards to EMP.

Monitoring and evaluation process will involve the assessment of the following benchmarks

- The implementation process of guidelines stipulated in the ESMMP
- Evaluate impact of the project to the environment and social setting within Khorixas Town Council (categorize and weight positive and negative)
- Monitoring of the involvement of the community through public consultations in decision makings and the implementation of the project.
- Monitoring implementation of Environmental Commissioner's licence conditions

The proposed monitoring plan is presented in the table below;

Table 3: Monitoring Plan

Environmenta Component	Parameter	Standard	Location	Frequency	Implementation	Supervision
Way leave acquisition	Signed consent forms and compensation paid per valuation for livelihood restoration	Valuation roll	Transmission Mains and distribution pipelines in town	Monthly until rehabilitation is complete	Contractor	Khorixas Town Council
Noise levels	Complaints; and Noise levels on dB (A) scale	National guidelines on Noise	Selected Active rehabilitation Sites	As directed by the supervision consultant	Contractor	Khorixas Town Council
Water Quality	Turbidity, conductivity and other WHO parameters	WHO guidelines	Intake works	monthly	Contractor	Khorixas Town Council
Air Quality	✞ Total suspended particles ✞ Visible dust	WHO guidelines	Populated areas	Monthly	Contractor.	Supervision Consultant
Soil Erosion	Visual evidence	Soils Report	All rehabilitation areas	Quarterly	Contractor	Supervision Consultant
Surface water width	Width of the rivers	National Guidelines	Rivers and streams	Monthly	Contractor	Khorixas Town Council
Surface water quality – intakes and receiving waters	✞ pH ✞ Salinity (EC) ✞ Nitrates ✞ Phosphorus Pesticide residues Coliforms ✞ BOD ✞ COD	National Guidelines	Intake points and selected points	❖ Monthly ❖ Monthly ❖ 6 months ❖ 6 months ❖ Monthly ❖ Monthly ❖ Monthly ❖ Monthly	Contractor	Khorixas Town Council
Solid waste	Spoils, domestic refuse, metallic scraps, sludge	Disposal sites	Rehabilitation sites	Quarterly	Contractor.	Supervision Consultant
Soil Erosion	Turbidity in rivers and storm water	EMA guidelines	Site, Marjory on river bank and high terrain	During and after the rainy seasons	Contractor	Supervision Consultant

Rehabilitation of work sites	Monitoring to ensure all work sites are progressively rehabilitated	EMP	Site	As required	Contractor	Supervision Consultant

Accidents	Environment, Occupational safety and health officer engaged; Safety	EMP	Project area	Quarterly	Contractor	
Health	Project Health & Safety Plan, posters displayed, health awareness campaigns conducted	EMP	Project area	Quarterly	Contractor	LVSWW DA
Vegetation and habitats	Vegetation structure, species density, diversity, fuel wood usages, commercial forestry and illegal logging incidences	EMP	Project area and environs	Annually	Contractor	Khorixas Town Council
Aquatic environment/ River crossings	✞ Flow velocity Wetted perimeter ✞ PH ✞ Depth ✞ Salinity ✞ Turbidity Habitat connectivity	EMP	All affected rivers	Quarterly	Contractor	Khorixas Town Council

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This EIA project report has set out the potential environmental impacts and effects that may arise as a consequence of the proposed rehabilitation of water infrastructure at Khorixas. During the EIA process, consideration has been given to rehabilitation and operational issues and the need for mitigation measures to manage potential environmental impacts to an acceptable level. The study reveals that the benefits of implementing the project outweigh the potential negative impacts that could arise from the project.

The proponent intends to supply clean, adequate and, safe water, to the residents of Khorixas. To achieve its objectives and to ensure sustainability of the project, environmental and social issues mentioned in this report and others to be identified through project monitoring should be mitigated against. The report has outlined mitigation measures in the this EMP to be implemented during the various project phases.

Rigorous implementation of the Environmental Management Plan will facilitate the mitigation and/or prevention of potentially adverse environmental impacts. Diligence on the part of the Contractor and proper supervision by the Proponent will be crucial for ensuring success of the EMP and for ensuring that the recommended measures are implemented throughout the design, rehabilitation and operational phases in order to avert any negative impacts. To meet the monitoring requirements of the Environmental Management Act (2007), and the associated Regulations (2012) it is recommended that an annual audit report be produced after the commencement of the project to enable the proponent to gauge the changes in the project area baseline conditions.

5.2 Recommendations

With the necessary environmental management in place, it is safe to say that the project is economically feasible, environmentally sound, and socially acceptable. It is recommended that the proposed project be approved subject to the implementation of the proposed environmental management plan to avoid environmental and health pollution during rehabilitation operation of the project. In fact, due to the high demand for clean and safe water, at Khorixas, the completion and operation of this water project will attract other investors who will be encouraged to establish more businesses, agricultural production, and bring more services close to the people. A summary of the recommendations for the prevention and mitigation of potentially adverse environmental and socio-economic impacts are stated below:

- Institute effective communication, education and awareness towards the project beneficiaries to ensure sustainability;
- Ensure proper design and rehabilitation practices in relation to excavations during rehabilitation;
- Once earthworks have been done, restoration of the excavated areas should be carried out immediately by backfilling, professional landscaping/levelling and planting of low grass in open areas), flowers and suitable tree species where possible.
- All solid waste materials and debris resulting from rehabilitation activities must be disposed of at approved dumpsites. The wastes should be properly segregated and separated to encourage recycling of some useful waste materials; i.e. some excavated stone materials can be used as backfills.