
Kaoko Green Energy Solutions (Pty) Ltd

Environmental and Social Management Plan

**The Proposed “/Hao” Waveroller Pilot Project for the Generation of
Electricity by Utilizing Namibia’s Ocean Waves Using Waveroller
Technology by AW-Energy on Ocean Water**

Wlotzkasbaken Settlement, Erongo Region, Namibia

February 2024





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CONSULTANT’S EXPERTISE

I.N.K Enviro Consultants cc is the independent firm of environmental consultants that has been appointed by Kaoko Green Energy Solutions (Pty) Ltd to conduct the ESIA process.

Immanuel N. Katali, the Environmental Assessment Practitioner holds a B.Arts (Honors) Geography, Environmental Studies and Sociology and has over eight years of relevant experience in conducting/managing Environmental and Social Impact Assessments (ESIAs), and Environmental Compliance/Monitoring Audits in Namibia. Immanuel is certified as an Environmental Assessment Practitioner under the Environmental Assessment Professionals Association of Namibia (EAPAN).

DECLARATION OF INDEPENDENCE AND DISCLAIMER

I.N.K Enviro Consultants cc herewith declare that this report represents an independent assessment of the proposed “/Hao” Waveroller Pilot Project, on the request of Kaoko Green Energy Solutions (Pty) Ltd.

The Environmental Consultant has prepared this report based on an agreed scope of work and acts in all professional manner as an Independent Environmental Consultant to Kaoko Green Energy Solutions (Pty) Ltd and exercises all reasonable skill and care in the provision of its environmental professional services in a manner consistent with the level of expertise exercised by members of the environmental profession.

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LIST OF ACRONYMS, ABBREVIATIONS AND UNITS

Acronyms / Abbreviations / Units	Definition
BID	Background Information Document
DAE	Department of Agricultural Engineering
DEA	Directorate of Environmental Affairs
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
ESMP	Environmental and Social Management Plan
ha	Hectares
I&APs	Interested and Affected Party
m ³ /h	Cubic Metres per Hour
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MHSS	Ministry of Health and Social Services
MLSW	Ministry of Labour and Social Welfare
MME	Ministry of Mines and Energy
NDP	National Development Plan

1 INTRODUCTION

This Environmental and Social Management Plan (ESMP) serves as a managing tool for the operation and maintenance and decommissioning phases of the “/Hao” WaveRoller pilot project. The ESMP is developed to outline measures to be implemented in order to minimise adverse environmental degradation associated with this development.

The EMP serves as a guiding tool for the owner, contractors and workforce on their roles and responsibilities concerning environmental management on site, and also provides an environmental monitoring framework for all project phases of the development. This environmental management plan aims to take a pro-active route by addressing potential problems before they occur.

1.1 Project Background

Kaoko intends to apply for an Environmental Clearance Certificate (ECC) for its proposed “/Hao” WaveRoller pilot project for the generation of electricity by utilizing Namibia’s ocean waves using WaveRoller technology on ocean water. The pilot project proposes to install five (5) WaveRoller devices using its technology to convert wave energy to electricity that will be transmitted via subsea and onshore underground power transmission cables from the offshore site to a Containerized Office and NamPower substation located onshore (A separate ESIA report assessing the underground power cable is compiled).

The proposed development will be an offshore integrated green power and transmission system powered by clean energy, located approximately 1 km from the coastline and 5 km north-west of Wlotzkasbaken settlement, Erongo Region, Namibia (Figure 1). In terms of the bathymetry, the proposed study site lies between 0 - 200 meters (m) below sea level.

Kaoko, is a Namibian private energy-generation assets development company, with its mission anchored in the potent forces of sustainability - wave, solar and wind. The company has identified the power of Namibia’s coastal waves and through a pilot project, WaveRoller devices will be deployed in the Namibia water to generate clean and affordable electricity from ocean waves and then deliver that 200 MWh per year of electricity to communities close to the coast of the Erongo Region in Namibia and tap into Southern Africa Power Pool (SAAP). This development and generation of electricity from WaveRoller devices promises to breathe new life into the Wlotzkasbaken settlement area.

The project will be located in the Atlantic Ocean where the flow of energy through waves is abundantly available both during the day and night. Wave energy changes at a much lower rate and is more predictable than wind and solar. These characteristics prompt the development of the technology and provide security of energy supply.

I.N.K Enviro Consultants cc (I.N.K), an independent firm of environmental consultants, has been appointed to undertake the Environmental and Social Impact Assessment process for this project. For more details on the ESIA process that was followed, please refer to Section 1.3.

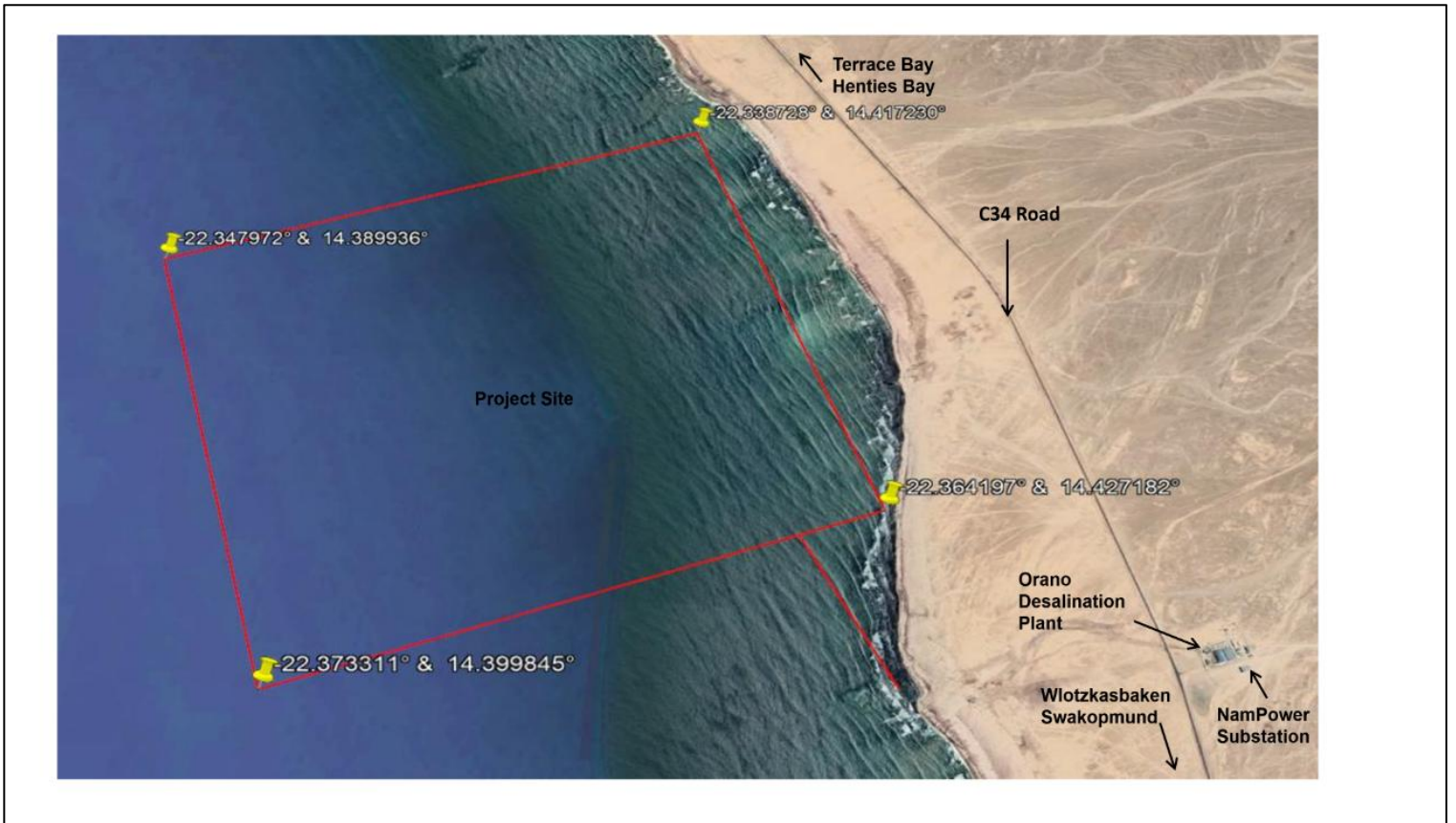


Figure 1: Locality Map

1.2 ESIA Team

I.N.K Enviro Consultants cc is the independent firm of consultants that has been appointed by Kaoko to undertake the Environmental and Social Impact Assessment and related processes. The full ESIA team comprises of various environmental experts and specialists as per the following table below.

Table 1: ESIA Team

Specialist	Designation	Tasks and Roles	Company
Mr. Immanuel N. Katali	Project Manager Social Expert	Management of the process, team members and other stakeholders. Report compilation and process review.	I.N.K Enviro Consultants cc
Mr. Johann Venter	Health and Safety and Risk Assessment Practitioner	Health and Safety Input	I.N.K Enviro Consultants cc
Ms. Fredrika Shagama	Hydrogeology Specialist	Hydrogeology Assessment	Serja Hydrogeo-Environmental Consultants cc
Mr. Nahas Angula	Vegetation Expert	Vegetation Input	Freelance

1.3 Applicable Listed Activities

The EIA Regulations promulgated in terms of the Environmental Management Act, identify certain activities which could have a substantially detrimental effect on the environment. These listed activities require environmental clearance from MEFT prior to commencing. The following activities identified in the regulations apply to the proposed project:

Table 2: Listed activities triggered by the proposed Project

Listed activity
4. The clearance of forest areas, deforestation, afforestation, timber harvesting or any other related activity that requires authorisation in term of the Forest Act, 2001 (Act No.12 of 2001) or any other law.
8.1 The abstraction of ground or surface water for industrial or commercial purposes.

Listed activity
8.3 Any water abstraction from a river that forms an international boundary.
8.7 Irrigation schemes for agriculture excluding domestic irrigation.
8.8 Construction and other activities in water courses within flood lines.
10.1 The construction of-(a) oil, water, gas and petrochemical and other bulk supply pipelines;



2 IDENTIFICATION OF APPLICABLE ENVIRONMENTAL AND SOCIAL GUIDELINES

2.1 Introduction

The Republic of Namibia has five tiers of law and several policies relevant to environmental assessment and protection, which include:

- ◆ The Constitution.
- ◆ Statutory law.
- ◆ Common law.
- ◆ Customary law.
- ◆ International law.

As the main source of legislation, the Constitution of the Republic of Namibia (1990) makes provision for the creation and enforcement of applicable legislation. In this context and in accordance with its constitution, Namibia has passed numerous laws intended to protect the natural environment and mitigate against adverse environmental impacts.

The management and regulation of the activities in the Namibian ocean fall within the jurisdiction of the Ministry of Fisheries and Marine resources. The environmental regulations are guided and implemented by the DEA within the MEFT.

In the context of the proposed project activities, there are several laws and policies currently applicable.

The Marine resources Act 27 of 2000 provides for the conservation of the marine ecosystem; the responsible utilization, conservation, protection, promotion of marine resources in a sustainable manner and for the control of marine resources for these purposes. The Minister of Fisheries is empowered to make regulations under section 61 on a broad number of topics including “regulating or prohibiting the discharge in the sea or discarding on the seashore and land of specified substances or materials, or substances or materials not complying with specified requirements or having specified properties”

The EIA Policy (1995) is enforced through the Environmental Management Act, 7 of 2007 and the EIA Regulations of 6 January 2012 (EIA Regulations). In terms of this legal framework certain identified activities may not commence without an environmental clearance issued by MEFT.

2.2 Applicable Authorities

2.2.1 Ministry of Environment, Forestry and Tourism

The mission of the Ministry of Environment, Forestry and Tourism is to promote biodiversity conservation in the Namibian environment through the sustainable utilization of natural resources and tourism development for the maximum social and economic benefit of its citizens. MEFT develops, administers and enforces environmental legislation and policy.

The MEFT's Department of Environmental Affairs ("DEA") is mandated to give effect to Article 95L of the Constitution by promoting environmental sustainability. The Environmental Commissioner serves as head of the DEA. The DEA is responsible for, inter alia, the administration of the EIA process undertaken in terms of the Environmental Management Act, 2007 and the EIA Regulations 2012. The DEA will be responsible for issuing a decision on the application for an ECC, based on the recommendations from MFMR and MME. If approved, the DEA will issue an Environmental Clearance Certificate.

2.2.2 Ministry of Fisheries and Marine Resources (MFMR)

The Ministry of Fisheries and Marine Resources is responsible for the management and development of fisheries and aquaculture in Namibia. The Ministry is comprised of four directorates; two of which include the Directorate of Resource Management and Directorate of Operations and Surveillance. The Directorate of Resource Management is responsible for scientific research and providing advice on the state of commercially important marine fish stocks and recommending catch quotas. It is also responsible for managing and regulating species fish size limits, dates of closed fishing seasons, declaring areas closed to fishing and determining fishing gear use.

The Directorate of Operations and Surveillance is responsible for monitoring, controlling and surveillance of fishing-related activities both at sea and onshore.

The MFMR is a key stakeholder in the project and the ESIA process due to the proposed deployment of the WaveRoller technology (refer to Section 4). The WaveRoller technology has the potential to have both negative and positive impact on the marine ecology and the fishing industry.

2.2.3 Ministry of Mines and Energy (MME)

The MME comprises six directorates; one of which is the Directorate of Energy. The Directorate of Energy consists of 2 divisions:

- ◆ Electricity Division
- ◆ Renewable Energy Division

The Directorate of Energy enforces the compliance of legal requirements of energy legislation (Electricity Act, 2007) and regulations and researches new and renewable sources of energy. The National Integrated Resource Plan is a 20-year development plan for Namibia's Electricity Supply Industry, spanning the period between 2016 and 2035. The Directorate conducts functions such as:

- ◆ Implementation of Rural Electrification
- ◆ Implementation of Off-Grid Energisation Master Plan

The mandate of the Energy directorate is to ensure the adequate and affordable energy supply in a sustainable manner taking advantage of Namibia's natural resources in support of the nation's socioeconomic development. The MME is a key stakeholder in the project and the ESIA process due to the proposal for the deployment of the Wave Roller technology to generate electricity and feeding energy into the grid.

The Namibia Power Corporation (Pty) Ltd ("NamPower") is Namibia's national power utility, whose core business is the generation, transmission and energy trading and its mission is to provide for the energy needs of its customers. NamPower supplies bulk electricity to regional electricity distributors, mines, farms and local authorities throughout Namibia.

2.3 The Integrated Coastal Management Bill

Once enacted, the Integrated Coastal Management Bill (2014) aims to establish a system of integrated coastal management in Namibia in order to promote the conservation of the coastal environment, maintaining the natural attributes of the coastal landscapes and seascapes, and ensuring the sustainable development and use of the natural resources within the coastal zone that is also socially, economically and ecologically justifiable.

2.4 Coastal Strategic Environmental Assessments

Two Namibian coastal Strategic Environmental Assessments (SEAs) were undertaken between 2006 and 2008, i.e. one for the northern regions of Kunene and Erongo and another for the southern regions of Karas and Hardap. These draw on international experience and were undertaken at a time of mounting production sector pressures within Namibia. Being an initiative of the Namibian Government through MEFT, the two SEAs seek to inform political and technical decision makers at local, regional and national levels.

The 2008 "SEA for the coastal areas of the Erongo and Kunene Regions" compiled by the Namibian Coast Conservation & Management Project (NACOMA) is aimed at ensuring informed decisions on issues related to biodiversity conservation, land use planning and socio-economic development planning in the Kunene and Erongo coastal regions.

2.5 Relevant Namibian Policies

Namibia's policies provide the framework to the applicable legislation. Whilst policies do not often carry the same legal recognition as official statutes, policies are used in providing support to legal interpretation or guidance for civil servants and other stakeholders in the implementation of government objectives.

2.5.1 The Namibia Vision 2030

The principles that underpin Vision 2030 , a policy framework for Namibia's long-term national development, comprise the following:

- ◆ Good governance;
- ◆ Partnership;
- ◆ Capacity enhancement;
- ◆ Comparative advantage;
- ◆ Sustainable development;
- ◆ Economic growth;
- ◆ National sovereignty and human integrity;
- ◆ Environment; and
- ◆ Peace and security.

Vision 2030 states that natural environments are disappearing quickly. Consequently, the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets. Vision 2030 emphasises the importance of promoting healthy living which includes that the majority of Namibians are provided with safe drinking water. The importance of developing wealth, livelihood, and the economy is also emphasized by Vision 2030. This includes infrastructure provision like transport, communication, water, and electricity.

2.5.2 The Harambee Prosperity Plan II

The Harambee Prosperity Plan II (HPPII) (covering the period 2021 - 2025) builds on the solid foundation of the inaugural HPP 2016 - 2020. It continues to prioritize the implementation of targeted policy programme in order to enhance service delivery, contribute to economic recovery and engender inclusive growth. HPPII aims to increase local electricity generation capacity from 624 MW (2020) to 879 MW by 2025.

2.6 Other Relevant Local Policies and Legislation

Below (Table 6) is a list of other applicable local policies and legislation for the proposed project.

Table 6: List of local policies and legislation

Legislation	Summary	Environmental principles
Marine Resources Amendment Act no. 9 of 2015, Marine Resources Act 27 of 2000	This act provides for the sovereign exercise of ownership by the State over marine resources; to amend the provisions relating to the total allowable catch and allocation of quotas	Principles of this act is to manage, protect, harvest and utilize marine resources in Namibia.
Marine Traffic Act (no. 2 of 1981) as Amended Namibian Ports Authority Act of 1991	Ships may not be repaired within territorial sea or internal waters outside a harbor or fishing. No person shall sink a ship or dump ship wreck within territorial sea or internal waters outside a harbor or fishing.	Prevention of waste from ship repairs and ship wrecks.
Pollution Control and Waste Management Bill	This Act promote sustainable development; to provide for the establishment of a body corporate to be known as the Pollution Control and Waste Management Agency; to prevent and regulate the discharge of pollutants to the air, water and land; to make provision for the establishment of an appropriate	The environmental principle specific to this Bill is pollution control.

	framework for integrated pollution prevention and control; to regulate noise, dust and odor pollution; to establish a 'system of waste planning and management; and to enable Namibia to comply with its obligations under international law in this regard.	
Territorial sea and exclusive economic zone of Namibia Act 3 of 1990	This Act determines and defines the territorial sea, internal waters, contiguous zone, exclusive economic zone and continental shelf of Namibia and to provide matters incidental thereto.	Minimize the exploitation of natural resources of the sea.
Walvis Bay and Offshore Islands Act 1 of 1994	An Act to make provision for the smooth transfer of control over Walvis Bay and the offshore islands from the Republic of South Africa to the Republic of Namibia effective as of 1 March 1994.	Provide provision for governance; authorization, management and fishing fishery and conservation.
Namibia Ports Authority Act 2 of 1994	To provide for the establishment of the Namibia Ports Authority to undertake the management control of ports and lighthouse in Namibia and the provision of facilities and services related thereto.	To manage and exercise control over the operation of ports and lighthouse and other navigational aids in Namibia and its territorial waters.
Aquaculture Act 18 of 2002	This Act regulate and control aquaculture activities; to provide for the sustainable development of aquaculture resources; and to provide for related matters.	Environmental principles of this act are to promote sustainable aquaculture; management, protection and conservation of marine and onshore aquatic ecosystems.
Animal Health Act 1 of 2011	This Act predominantly deals with <i>prevention, monitoring</i> and <i>control</i> of animal diseases in order to protect public health but it also has other provisions (such as trade) that not relevant to the environment.	To prevent and control animal diseases in public and environment
Urban and Regional Planning Act no. 5 of 2018	This Act consolidate the laws relating to urban and regional planning; to provide for a legal framework for spatial planning in Namibia; to provide for principles and standards of spatial planning.	Environmental principles specific to this act are: harmonization and streamlining of spatial planning in order to avoid land use conflicts, delays in decision making and to minimize negative environmental impacts.
Atmospheric Pollution Prevention Ordinance 11 of 1976	To provide for the prevention of the pollution of the atmosphere	To prevent atmospheric pollution and minimize environmental impacts associated with it.
Water Resources Management Act 11 of 2013	To provide for the management, protection, development, use and conservation of water resources; to provide for the regulation and monitoring of water services and to provide for	Manage water resources, prevent water pollution and control water storage and provision.

	incidental matters.	
Public and Environmental Health Act 1 of 2015	To provide a framework for a structured uniform public and environmental health system in Namibia.	Principles of this act includes protecting individuals and communities from public health risks, encourage community participation in order to create a healthy environment; and provide for early detection of diseases and public health risks.
National Climate Change Policy	This policy identifies technology development and transfer to be a key issue for which strategies and action plans should be developed.	Promote and encourage new and clean technologies to be developed in order to reduce greenhouse gas emissions.

2.7 Relevant International Standards

2.7.1 The EIB’s Statement of Environmental and Social Principles and Standards (EIB, 2009)

The European Investment Bank (EIB) adopted an Environmental Statement in 1996 to underline its commitment to protecting and improving the natural and built environment according to EU policy (EIB, 209). The statement focuses on, a) the principles on which the EIB approach to environmental and social issues are based and b) the environmental and social performance standards that ensure compliance with Bank requirements. The principles and standards are derived from EU policy and law and supplemented by other examples of international good practice. The EIB requires that all the projects it is financing are acceptable in environmental and social terms by applying appropriate safeguards to all its operations.

2.7.2 The EIB’s Environmental and Social Handbook (EIB, 2013)

The EIB Environmental and Social Handbook provides an operational translation of the policies and principles contained in the 2009 EIB Statement of Environmental and Social Principles and Standards (see above). Principles include the Environmental and Social Impact Assessment process of identifying predicting, evaluating a project’s positive and negative environmental and social impact on the biophysical and human environment as well as identifying ways of avoiding, minimizing, mitigating and compensating, including offsetting in the case of the environment and

remediating in the case of social impacts, by applying the mitigation hierarchy. This process includes consultation with direct and indirect stakeholders and the elaboration of an environmental and social management plan detailing the implementation of the mitigation measures.

2.7.3 World Bank Environmental and Social Framework

The World Bank’s Environmental and Social Framework (ESF) enables the World Bank and Borrowers to better manage environmental and social risks of projects and to improve development outcomes. The ESF offers broad and systematic coverage of environmental and social risks. It makes important advances in areas such as transparency, non-discrimination, public participation, and accountability - including expanded roles for grievance mechanisms. It brings the World Bank’s environmental and social protections into closer harmony with those of other development institutions.

The ESF consists of:

- ◆ The World Bank’s Vision for Sustainable Development.
- ◆ The World Bank’s Environmental and Social Policy for Investment Project Financing (IPF) which sets out the requirements that apply to the Bank.
- ◆ The 10 Environmental and Social Standards (ESS), which set out the requirements that apply to Borrowers.
- ◆ Bank Directive: Environmental and Social Directive for Investment Project Financing
- ◆ Bank Directive on Addressing Risks and Impacts on Disadvantaged or Vulnerable Individuals or Groups.

2.7.4 World Bank’s Pollution Prevention and Abatement Handbook (PPAH)

The Pollution Prevention and Abatement Handbook (PPAH) promotes the concepts of sustainable development by focusing attention on the benefits, both environmental and economic, of pollution prevention, including cleaner production and good management techniques. In many cases, the guidelines provide numerical targets for reducing pollution, as well as maximum emissions levels that are normally achievable through a combination of cleaner production and end-of-pipe treatment. The guidelines are designed to protect human health, reduce mass loading to the environment, draw on commercially proven technologies, be

cost effective, follow current regulatory trends and promote good industrial practices, which offer greater productivity and increased energy efficiency.

2.7.5 Applicable International Finance Corporation (IFC) Performance Standards

IFC’s Environmental and Social Performance Standards define IFC clients' responsibilities for managing their environmental and social risks. The Performance Standards provide guidance on how to identify sustainability risks and impacts and are designed to help avoid, mitigate, and manage them as a way of doing business in a more sustainable way.

The following are the performance standards that are applicable to the construction and operation of the project and are used as the basis of investigation for the ESMP:

Table 7: Applicable Performance Standards

IFC Standard	Performance	Description	Applicable	Not Applicable
1.	Environmental and Social Management System	An environmental and social management system (ESMS) helps companies integrate plans and standards into their core operations—so they can anticipate environmental and social risks posed by their business activities and avoid, minimize, and compensate for such impacts as necessary. A good management system provides for consultation with stakeholders and a means for complaints from workers and local communities to be addressed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.	Labour and Working Conditions	It asks that companies treat their workers fairly, provide safe and healthy working conditions, avoid the use of child or forced labor, and identify risks in their primary supply chain.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.	Pollution Prevention and Control	It guides companies to integrate practices and technologies that promote energy efficiency, use resources—including energy and water—sustainably, and reduce greenhouse gas emissions.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

4. Occupational Health and Safety, Public Health and Security	It helps companies adopt responsible practices to reduce such risks including through emergency preparedness and response, security force management, and design safety measures.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Land Acquisition and Involuntary Resettlement	It advises companies to avoid involuntary resettlement wherever possible and to minimize its impact on those displaced through mitigation measures such as fair compensation and improvements to and living conditions. Active community engagement throughout the process is essential.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Biodiversity and Ecosystems	It recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and managing living natural resources adequately are fundamental to sustainable development.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Rights and Interests of Indigenous People	It seeks to ensure that business activities minimize negative impacts, foster respect for human rights, dignity and culture of indigenous populations, and promote development benefits in culturally appropriate ways. Informed consultation and participation with IPs throughout the project process is a core requirement and may include Free, Prior and Informed Consent under certain circumstances.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. Cultural Heritage	Cultural heritage encompasses properties and sites of archaeological, historical, cultural, artistic, and religious significance. It also refers to unique environmental features and cultural knowledge, as well as intangible forms of culture embodying traditional lifestyles that should be preserved for current and future generations. PS8 aims to guide companies in protecting cultural heritage from adverse impacts of project activities and supporting its preservation. It also promotes the equitable sharing of benefits from the use of cultural heritage.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

2.7.6 International Conventions and Agreements

Below (Table 8) is a list of applicable international conventions and agreements for the proposed project.

Table 8: International conventions and agreements

Legislation	Summary	Environmental principles
2011 Guidelines for the Control and Management of Ship's Biofouling to minimize the Transfer of invasive Aquatic Species.	These guidelines are intended to provide a globally consistent approach to the management of biofouling organisms, which could present a bio-risk in local ports.	Prevent the transfer of invasive species and coordinating a timely and effective response to invasions which requires cooperation and collaboration among governments.
Stockholm Convention on Persistent Organic Pollution (2001)	Is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for longer periods.	To protect human health and the environment from persistent organic pollutants; especially those used in marine paints.
Vienna Convention for the protection of ozone layer (1985)	This Convention is aimed to promote cooperation among nations by exchanging information on the effects of human activities on the ozone layer.	To take control actions to protect the ozone layer.
Montreal protocol (1997)	Is a global agreement to protect the earth's ozone layer by phasing out the chemicals that depletes it.	Control substances and chemicals production that are depleting the ozone layer.
UN Framework on climate change (1992)	This framework was introduced to stabilize greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference	Countries should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.

	with the climate system.	
Kyoto protocol (1997)	It is also designed to assist countries in adapting to the adverse of climate change. It facilitates the development and deployment of technologies that can help increase resilience to the impacts of climate change.	Reduce GHG emission at least by 18%.
Basel Convention (1992)	To protect human health and the environment against the adverse effects of hazardous wastes.	Reduction of hazardous waste generation and the promotion of environmentally sound management of hazardous wastes
Conventions on Wetland of International Importance (1971)	Conserving wetlands (swamps, marshes, lakes, mudflats, peat bogs and other bodies of water whether natural or artificial, permanent or temporary).	This convention establishes a management framework aimed at conserving the wetland and ensuring its wise use. The Walvis Bay is recognized under this convention.
Paris Agreement (2015)	Is a legally binding international treaty on climate change.	To limit global warming to preferably 1.5 degrees Celsius, compared to pre-industrial levels.
United Nations Convention on Law of the Sea of 1982.	It's a legal framework for marine and maritime activities. It lays down a comprehensive regime of law and order in the world's oceans and seas establishing rules governing all uses of the oceans and their resources.	It provides that coastal States have sovereign rights in a 200-nautical mile Exclusive Economic Zone (EEZ) with respect to natural resources and certain economic activities, and exercise jurisdiction over marine science research and environmental protection.

<p>International Convention for the Control of and Management of Ships’ Ballast Water and Sediments of 2004.</p>	<p>This Convention seeks to prevent the spread of harmful aquatic organisms from one region to another, by the establishment of standards and procedures for the management and control of ships' ballast water and sediments.</p>	<p>Protect the oceans from invasive aquatic species</p>
<p>International Convention for the Prevention of Pollution from Ships (MARPOL) and the protocol of 1978.</p>	<p>This convention is aimed at the prevention of pollution from ships caused by operational or accidental causes.</p>	<p>Prevention of pollution by sewage, oil and garbage from ships in the sea; Prevention of air pollution from ships; prevent pollution by Harmful Substances carried at sea in packaged form.</p>
<p>International Convention of the Safety of life at Sea of 1974 (SOLAS).</p>	<p>SOLAS is an international maritime treaty which sets minimum safety standards in the construction, equipment and operation of merchant ships.</p>	<p>Convention allows for flag states to compel ships under their flags to comply with safety requirements including fire-fighting equipment and nuclear containment facilities in order to prevent impacts associated with risks of transportation of dangerous goods.</p>
<p>Convention on the Prevention of Marine Pollution by dumping of wastes and other matters, 1972 (as amended by the protocol of 1996).</p>	<p>This convention protects the marine environment from human activities such as pollution.</p>	<p>Take practicable steps to prevent pollution of the sea, promote the effective control of all sources of marine environment caused by dumping at sea; (black and grey list).</p>
<p>International Convention on Oil Pollution Preparedness, Response and Co-operation of 1990 (OPRC Convention) with its Protocol of 2000 (OPRC-HNS Protocol).</p>	<p>Convention was developed by the International Maritime Organization (IMO) to further prevent pollution from ships and it requires coastal states to prepare and response to oil spills risks.</p>	<p>Convention compels states to carry onboard oil pollution emergency plan in order to effectively respond to oil pollution incidents.</p>

<p>Nairobi International Convention on removal of wrecks (18 May 2007).</p>	<p>The Convention provides a set of uniform international rules aimed at ensuring the prompt and effective removal of wrecks located beyond the territorial sea. The Convention also includes an optional clause enabling States Parties to apply certain provisions to their territory, including their territorial sea.</p>	<p>It provides a sound legal basis for coastal states to remove wrecks which pose a hazard to the safety of navigation as well as the marine and coastal environments.</p>
<p>Internal Convention on Biological Diversity</p>	<p>Among others, this Convention aims at conservation of biological diversity and promote sustainable development of biological components.</p>	<p>Conservation of biological diversity, sustainable use and equitable sharing of utilization of biodiversity, ecosystem assessment and monitoring and mitigation of adverse environmental impacts.</p>
<p>International Convention on the Control of Harmful Anti-fouling Systems on Ships (2001)</p>	<p>The convention prohibits the use of harmful organotin in anti-fouling paints used and establishes a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems.</p>	<p>It is preferable to minimize the accumulation of biofouling on vessels and movable structures.</p>

2.7.7 Applicable Listed Activities

The EIA Regulations promulgated in terms of the Environmental Management Act, identify certain activities which could have a substantially detrimental effect on the environment. These listed activities require environmental clearance from MEFT prior to commencing. The following listed activities (Table 9) identified in the regulations apply to the proposed project:

Table 9: Listed activities triggered by the proposed Project.

Listed activity
1. Energy generation, transmission and storage activities
1.1 The construction of facilities for - (a) the generation of electricity; (b) the transmission and supply of electricity.



3 ENVIRONMENTAL MANAGEMENT PLAN

3.1 Aims

The aim of the Environmental and Social Management Plan (ESMP) is to detail the actions required to effectively implement mitigation and management measures. These actions are required to minimise negative impacts and enhance positive impacts associated with the operations.

It is important to note that an ESMP is a living document in that it will be updated and amended as new information (e.g. environmental data), policies, authority guidelines, technologies and proposed activities develop. The conceptual management measures proposed to mitigate the potential impacts are detailed in the action plans below.

3.2 Roles and Responsibilities

It is the responsibility of Kaoko to implement the measure (commitments) below and to ensure that all actions are carried out. The successful implementation of these measures is however dependent on clearly defined roles and responsibilities. The company will ensure that it will establish and document clearly defined roles and their associated responsibilities in relation to its key activities.

3.3 As Low As Reasonably Possible (ALARP) Principle

For a risk to be ALARP, it must be possible to demonstrate that the cost involved in reducing the risk further would be grossly disproportionate to the benefit gained. The ALARP principle arises from the fact that infinite time, effort and money could be spent in the attempt of reducing a risk to zero; not the fact that reducing the risk in half would require a finite time, effort and money. It should not be understood as simply a quantitative measure of benefit against detriment. It is more a best common practice of judgement of the balance of risk and societal benefit.

3.4 Training and Awareness

The purpose of the job specific environmental awareness training is to ensure that employees are equipped to implement the actions committed to in the ESMP. The staff involved in operations will receive training regarding the requirements of this ESMP.

Four main forms of training will be provided on site:

- ◆ Site induction

- ◆ Environmental management training – general and targeted
- ◆ Environmental Toolbox Talks
- ◆ Poster awareness

The following will be done to ensure all employees, contractors, suppliers and visitors receive the appropriate training/awareness:

Four main forms of training will be provided on site:

- ◆ Site induction
- ◆ Environmental management training – general and targeted
- ◆ Environmental Toolbox Talks
- ◆ Poster awareness

The following will be done to ensure all employees, contractors, suppliers and visitors receive the appropriate training/awareness:

3.4.1 Environmental Site Induction

All new members of staff receive a Environmental Induction along with the obligatory Health & Safety induction. The induction gives a general overview of the environmental challenges faced by the project, how we are managing them, and general tips for reducing our impact in the workplace.

The main reason for environmental induction is to encourage new staff to be environmentally aware right from the beginning of their employment. This will ensure that environmental initiatives are successful by eliminating bad habits from the start.

Before working on site, all personnel and sub-contractors will undertake a site induction incorporating environmental requirements. The induction will address a range of environmental awareness issues specific to the Irrigation Project.

As a minimum, training shall include:

- ◆ Explanation on the importance of complying with the ESMP and environmental implications should the ESMP not be effectively implemented.
- ◆ Discussion of the potential environmental impacts of operational activities, recognition of environmental risks e.g. oil spill, etc. and how to control these risks.
- ◆ The benefits of improved personal performance, understanding of what to do in case of an environmental event or exposure.

- ◆ Employees’ roles and responsibilities, including emergency preparedness.
- ◆ Explanation of the mitigation measures that must be implemented when carrying out operational activities.
- ◆ Explanation of the requirements of the ESMP and its specification (no-go areas, etc.)
- ◆ Explanation of the management structure of individuals responsible for matters pertaining to the ESMP.

The training will generally be prepared by the Environmental Manager or delegated responsible party.

3.4.2 Environmental Awareness training

Targeted environmental management training will be provided to individuals or groups of workers with a specific authority or responsibility for environmental management or those undertaking an activity with a high risk of environmental impact. This environmental training will aim to achieve a level of awareness and competence appropriate to their assigned activities. This training will take place monthly i.e., all staff will undergo awareness training at least once a month.

3.4.3 Toolbox talks

‘Toolbox’ talks will assist in communicating relevant information to the workforce and providing feedback on issues of interest or concern. Toolbox talks shall be held on a weekly basis. Environmental topics shall (as far as possible) be sent out to all employees and contractors to be discussed at the toolbox talks.

Environmental work procedures detail the required subjects to be addressed in ‘toolbox’ talks topics may also include:

- ◆ The efficient use of materials.
- ◆ Waste management, minimisation and recycling.
- ◆ Management of hazardous materials.
- ◆ Protection of Marine Environment
- ◆ Management of pollution.
- ◆ Work methods.

Records of toolbox talk topics and persons attending will be retained on site in a register.

3.5 Monitoring

The following monitoring will take place:

Environmental impacts	Monitoring
Disturbance of Sensitive Lichen Fields in Wlotzkasbasken Area during initial phase of project	Areas where lichen fields are large should be avoided and where not possible lichens should be relocated to non-disturbed areas.
Disturbance to cetacean movements due to underwater noise generation during potential blasting operations to set the seabed for laying of WaveRolleRemoval of kelp as rock outcrops become disturbed during operations	Since this may not be avoided or prevented, the proponent should implement a monitoring program to assess disturbance of cetacean movements.
Introduction of artificial hard substratum due to installation of WaveRollers	Monitor accumulation of marine fauna on hard substratum including invertebrates.
Physical damage to the seabed and alteration of sediment structure	Monitoring.
Disturbance of spawning and migratory route for Silver kob	Monitoring.
Seismic sounds from wave rollers	Monitoring.
Disturbance of zooplankton communities due to sediment resuspension	Monitoring.

3.6 Management and Mitigation Measures

The management and mitigation measures for the proposed irrigation projected are outlined in the table below.

Environmental Issue	Management & Mitigation Measures	Applicable Project Activity	Applicable Project Phase
Air Quality/Dust	Keep installation footprint to a minimum.	WaveRoller Device Deployment and Power Transmission Cables	Installation
	Ensure all installation equipment is subject to an Inspection & Maintenance programme to ensure proper combustion.		
	Should dust be generated by installation activities or due to cleared land then dust	Power Transmission Cables	

	<p>suppression will be carried out.</p> <p>Pay attention to the dust created: use water or dust suppressants when substantial dust is blowing offsite.</p> <p>Develop and implement a complaints register to record any 3rd party complaints relating to the release of dust from exposed areas. Complaints must be investigated and actions developed.</p>		
Noise	<p>Restrict installation activities to daylight hours.</p> <p>Avoid unnecessary activities during the night when noise impacts are generally more significant.</p>	WaveRoller Device Deployment and Power Transmission Cables	
Hydrocarbons and Spillages	<p>Hazardous waste (including hydrocarbons) will be disposed of at a licensed hazardous waste disposal facility in Walvisbay.</p> <p>Hydrocarbon and chemical contaminated materials (soils, rags, containers, filters etc.) are considered hazardous waste and will be handled and disposed of accordingly.</p>		Installation, Operations and Decommission.
Visual	<p>No litter or waste accumulation will be permitted on site.</p> <p>Ensure immediate clean-up of all spills/leakages</p>	WaveRoller Device Deployment and Power Transmission Cables	
Biodiversity	<p>The footprint of the area will be minimised As Low As Reasonably Possible (ALARP). Use only the area that is needed.</p>		Installation
	<p>Areas where lichen fields are large should be avoided and where not possible lichens should be relocated to non-disturbed areas.</p> <p>Management will implement a zero tolerance policy concerning the killing or collecting of any plants or animals. This applies to people directly employed by Kaoko as well as any contractors working on their behalf. Develop a policy that limits independent movements of all workers into the veld. Strictly prevent poaching, harvesting or possession of any such wildlife resources without an appropriate permit.</p>	Power Transmission Cables	Installation, Operations and Decommission.
	<p>Keep removal of Lichens and species of the Hummock Belt to a minimum. Strictly control vehicle and machinery movement in the area where lichens and individual plants occur</p>		Installation

	<p>Limit disturbances (e.g. human presence, vehicles, machinery) within the active flow channels of the tributaries as far as is practicable, especially where denser vegetation or hummocks occur. Where the channel needs to be diverted, minimize its length and limit disturbance of dense perennial vegetation during its construction.</p> <p>Map lichen-dominated areas in more detail, use to guide planning of infrastructure positions.</p> <p>If areas with lichens are directly affected, implement special rehabilitation methods such as salvaging lichens and biotic crust and re-applying these on rehabilitated areas</p> <p>Rehabilitate and restore hummocks in critical areas.</p> <p>Backfill excavated areas continuously.</p> <p>Maintain track discipline – i.e. slow speeds (e.g. 40km/h) and no off-road driving throughout the area.</p> <p>Ensure erosion control on all tracks.</p>		
Heritage/Archaeology	<p>In the event that archaeological resources are discovered during Installation, a chance find emergency procedure will be implemented which includes the following:</p> <ul style="list-style-type: none"> o All work at the find will be stopped to prevent damage; o An appropriate heritage specialist will be appointed to assess the find and related impacts; and o Permitting applications will be made to the necessary authorities, if required. 	Power Transmission Cables	
Maritime Traffic - Interference and possible collision with vessels and boats	Visible light signals should be installed on the devices at all times to indicate it's presence and prevent collisions with boats, most particularly during the night.	WaveRoller Device Deployment and Power Transmission Cables	Operations
Health and Safety	<p>Suitable First Aid equipment must be provided for use by qualified first aid personnel.</p> <p>Suitable shaded facilities must be provided for employees to use during breaks.</p> <p>Clean drinking water must be provided in sufficient quantities at all times.</p>	Power Transmission Cables	Installation, Operations and Decommission.

	<p>Ablution Facilities with septic tanks should be made available during installation. Personnel may not relieve themselves in the area.</p> <p>At least 1 portable toilet per 15 workers is required on site.</p> <p>An effective emergency response procedure must be in place to be initiated by competent personnel.</p>		
		WaveRoller Device Deployment and Power Transmission Cables	Installation and Operations
Groundwater	<p>Maintain equipment to prevent leakages of contaminants.</p> <p>Dispose of materials properly at a suitable disposal site.</p>	Power Transmission Cables	Installation
Surface water	<p>No installation of power cables within deep drainage lines</p> <p>Maintain natural water channels (particularly the drainage lines)</p>		
Waste and Sewerage Management	<p>Ensure proper removal of general waste from site and disposal at Walvis Bay Hazardous Waste site. Obtain records of safe disposal.</p> <p>Recycling will be promoted on site.</p> <p>Bins with labels according to waste type, and with lids in order to prevent wind-blown litter, will be provided at strategic locations through the site and will be emptied regularly in order to ensure no overflows.</p> <p>No litter will be permitted on site. All domestic waste generated must be collected and removed regularly from the site and disposed of at a registered waste disposal site in Swakopmund. No litter must be left at the development site(s) as this would stimulate illegal dumping activities.</p>		
		Power Transmission Cables	Installation and Operations
		WaveRoller Device Deployment and Power Transmission Cables	Installation, Operations and Decommission.
Social and Economic	<p>Local people must be preferentially selected for jobs to encourage social growth and development.</p> <p>Recruit a balanced gender and age workforce – not only youth (under 35 years) but also people with experience of different ages, to minimise workplace social problems.</p> <p>Foster good labour relations and take responsibility to respect employees’ human rights.</p>		Installation and Operations

	House construction staff off-site		Installation

3.7 Decommissioning and Closure Phases

- ◆ Remove, or dispose of in a suitable manner, all equipment, waste, temporary structures, etc. From site.
- ◆ Fill and/or reshape all disturbed areas to their original contours, or to blend in with the surrounding landscape. .
- ◆ Cover disturbed areas with previously collected topsoil and spread evenly
- ◆ Replant any previously removed indigenous vegetation in disturbed areas.
- ◆ No invasive alien plant species to be introduced to the area.
- ◆ Eradicate all invasive aliens germinating on site.
- ◆ Monitor the success of reintroductions and overall rehabilitation every six months for up to two years after rehabilitation.
- ◆ Make results of this rehabilitation available to the public. This can then also be used for future similar projects.