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Environmental Impact Assessment (EIA) for the proposed construction and operation of Aquaculture and Fish Farming on Portion 60 (a Portion of Portion 24) of the Farm No 163 Swakopmund, Erongo Region

Environmental Scoping Report

APP-003761

Version - Final

May 2024

Synergy Farms Namibia (Pty) Ltd

GCS Project Number: 23-0989



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aquaculture and fish farming on Portion 60 (a Portion of Portion 24) of the Farm No 163
Swakopmund, Erongo Region**

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EXECUTIVE SUMMARY

Introduction

Synergy Farms Namibia (Pty) Ltd (The Proponent) proposes to construct and operate the proposed aquaculture and fish farming on Portion 60 (a Portion of Portion 24) of the Farm No 163 Swakopmund, Erongo Region.

Need and Desirability

The Proponent's goal is to help the Ministry of Fisheries and Marine Resources (MFMR) create a profitable freshwater fish farming sector while using aquaculture technologies to increase global food security. The proposed aquafarm has the potential to support a lucrative export market and ensure that the demand for freshwater fish is maintained through an aquaculture operation.

Project Description

The Proponent proposes to construct and operate the proposed aquaculture and fish farming on Portion 60 (a Portion of Portion 24) of the Farm No 163 Swakopmund, Erongo Region which is situated approximately 12km east of Swakopmund. As per the Deed of Transfer the ownership of Portion 60 (a Portion of Portion 24) of the Farm No 163 vests with Anthony Bessinger. The subject portion measures approximately 5.9533 hectares in extent. Please refer to **Figure 1-1** for the locality of the proposed Aquaculture and Fish farm.

The Tilapia fish species has a natural distribution from the Orange River System northwards to the Kunene, Hardap Dam, Okavango River, and Zambezi River Systems (Anon., n.d.) These fish species are however alien to the Namibian coastal town of Swakopmund and have the potential to support a lucrative export market and ensure that the demand for freshwater fish is maintained through an aquaculture operation.

Aquaculture, also known as (aquafarming), is the future way to go in which Tilapia farming can be operated in a sustainable way. Synergy Farms Namibia (Pty) Ltd will be constructing and operating an aquaculture farm in Nonidas east of Swakopmund, which will cover an area initially of 0.018 ha with a possible extension for future expansion. Tilapias are hardy and grow rapidly under crowded conditions, but their tropical nature is a major drawback for producers in temperate climates. Various species and strains of tilapia differ in cold tolerance, but growth is generally limited at water temperatures below 22 degrees Celsius. Many producers throughout the world avoid this constraint by growing tilapia in indoor recirculating tank systems (Lutz, 2023).

The Proponent hereby seeks approval for the activity of putting up a Tank-based Tilapia Production in Swakopmund to farm with one (1) indigenous fish species.

The direct benefits and related spin offs of this initiative at this coastal town of Swakopmund by the Proponent include:

- quality tilapia fish of high protein for the export market which will contribute to the GDP of Namibia
- provision of job opportunities from both the skilled and unskilled labour force
- revival of small business related to the fishery sector that had stagnated over the past decade.

Public Consultation

Communication with Interested and Affected Parties (I&APs) about the proposed development was facilitated in English through the following means and in this order:

- A Background Information Document (BID) containing descriptive information about the proposed activities was compiled (**Appendix D**) and sent out to all identified and registered I&APs per email dated 22 November 2023;
- Notices were placed in *The New Era* and *Namib Times* newspapers dated 22 and 29 November 2023, briefly explaining the activity and its locality, and inviting members of the public to register as I&APs (**Appendix E**);
- A site notice was fixed at the site (**Appendix G**).
- A meeting with the Municipality of Swakopmund as well as a public meeting was held on 7 December 2023 in Swakopmund (**Appendix H**).

The scoping report was made available to all I&APs for public review from **30 April 2024 until 16 May 2024**. I&APs had until **16 May 2024** to submit their comments on the project.

Conclusions and Recommendations

The key potential biophysical impacts related to the pre-operational, construction, operational and maintenance and decommissioning phases of the proposed project were identified and assessed. Suitable mitigation measures (where required and possible) were recommended, and the impacts can be summarised as follows:

- **Impacts on biodiversity loss (during pre-construction and construction phase):** The preparation of the site for the proposed development involves clearing of certain areas on site. This may impact the existing biodiversity in the area. The project will be constructed in a disturbed natural area which is home to little vegetation and possibly some fauna. During site preparation it should be ensured that only the areas applicable to the project site area are cleared. The layout of the proposed system should incorporate existing protected trees which may not be removed without a valid permit from the local department of Forestry. However, the impact can be adequately addressed by the recommendations given under subchapter 7.2.1, and management actions given in the EMP (Chapter 3).
- **Impacts on water usage (during construction, and operation phase):** Water is a scarce resource in Namibia and therefore water usage should be monitored and limited in order to prevent unnecessary wastage. The proposed project will make use of water in its construction and operational phase. The impact can be adequately addressed by the recommendations given under subchapters 7.3.3, 7.5.6 and management actions given in Chapter 3 of the EMP.
- **Impacts on soil, surface and groundwater (during construction and decommissioning phase):** Contamination of surface water might occur through oil leakages, lubricants and grease from the equipment and machinery during the installation, construction and maintenance of bulk services at the site. The impact can be adequately addressed by the recommendations given under subchapters 7.3.3, 7.5.6 and management actions given in Chapter 3 of the EMP.
- **Impacts of erosion (during construction and decommissioning phase):** The area/project site is sparsely covered by vegetation. The proposed development activities will not increase the number of impermeable surfaces. The amount of storm water during rainfall events could increase erosion. The impact can be adequately addressed by the recommendations given under subchapters 7.3.4, 7.5.7 and management actions given in Chapter 3 of the EMP.
- **Impacts on archeological and heritage resources (during construction phase):** There are no archeological and heritage resources known to be located on the sites. However, should these be encountered during the construction activities mitigation measures need to be in place to ensure that these resources are not harmed. The impact can be adequately addressed by the recommendations given under subchapter 7.3.5 and management actions given in Chapter 3 of the EMP.

- **Impacts on health and safety (during construction, operation and decommissioning phase):** The safety, security and health of the labour force, employees and general public are of great importance. Safety issues could arise from the earthmoving equipment and tools that will be used on site during the construction phase. This increases the possibility of injuries, and the contractor must ensure that all staff members are made aware of the potential risks of injuries on site. The impact can be adequately addressed by the recommendations given under subchapter 7.3.6, 7.4.6, 7.5.3 and management actions given in Chapter 3 of the EMP.
- **Impacts on noise (during construction, and decommissioning phase):** an increase in ambient noise levels at the proposed site is expected due to the construction and operation activities. Noise pollution due to heavy-duty equipment and machinery might be generated. The impact can be adequately addressed by the recommendations given under subchapter 7.3.7, 7.3.8, 0, **Error! Reference source not found.**, 7.5.5 and management actions given in Chapter 3 of the EMP.
- **Impacts on dust and air quality (during construction and decommissioning phase):** Vehicles transporting goods and staff will contribute to the release of hydrocarbon vapours, carbon monoxide and sulphur oxides into the air. Dust is expected to be worse during the winter months when strong winds occur. The impact can be adequately addressed by the recommendations given under subchapter 7.4.4 and management actions given in Chapter 3 of the EMP.
- **Impacts on waste (during construction, operation and decommissioning phase):** Household waste from the activities at the site and from the staff working at the site will be generated. Improper disposal of waste materials at the site may lead to pollution of the site and resultant environmental degradation. The impact can be adequately addressed by the recommendations given under subchapters 7.3.9, 7.4.5, 7.5.4 and management actions given in Chapter 3 of the EMP.
- **Impact on social environment (during construction, operation and decommissioning phase):** The proposed activity may provide employment opportunities for the local people during construction and operation of the proposed fish farm. The impact can be adequately addressed by the recommendations given under subchapter 7.3.11, 7.4.7, 7.5.1 and management actions given in Chapter 3 of the EMP.

- **Impact on traffic (during pre-construction, construction, operation and decommissioning phase):** Traffic is expected to increase during the construction activities on the site. The impact can be adequately addressed by the recommendations given under subchapter 7.2.2, 7.4.1, 7.5.8 and management actions given in Chapter 3 of the EMP.

Based on the information provided in this report, GCS is confident the identified risks associated with the proposed development can be reduced to acceptable levels, should the measures recommended in the EMP be implemented and monitored effectively. It is therefore recommended that the project receive Environmental Clearance, provided that the EMP be implemented.

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ACRONYMS AND ABBREVIATIONS

CV	Curriculum Vitae
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
GCS	GCS Water and Environmental Engineering Namibia (Pty) Ltd
GG	Government Gazette
GN	Government Notice
I&APs	Interested and Affected Parties
LAC	Legal Assistance Centre
MBBR	Mixed Bed Bioreactor
MEFT	Ministry of Environment, Forestry and Tourism
MFMR	Ministry of Fisheries and Marine Resources
MOL	Ministry of Labour

1 INTRODUCTION

The Proponent proposes to construct and operate the proposed aquaculture and fish farming on Portion 60 (a Portion of Portion 24) of the Farm No 163 Swakopmund, Erongo Region which is situated approximately 12km east of Swakopmund. As per the Deed of Transfer the ownership of Portion 60 (a Portion of Portion 24) of the Farm No 163 vests with Anthony Bessinger. The subject portion measures approximately 5.9533 hectares in extent. The locality of the proposed development is shown in **Figure 1-1** overleaf.

1.1 The Need for an Environmental Assessment (EA)

Under the 2012 Environmental Impact Assessment (EIA) Regulations of the Environmental Management Act (EMA) No. 7 of 2007, the proposed development is a listed activity that may not be undertaken without an Environmental Clearance Certificate (ECC). This activity is listed under the following relevant sections:

- **AGRICULTURE AND AQUACULTURE**
 - *Activity 7.1 Construction of facilities for aquaculture production, including mariculture and algae farms where the structures are not situated within an aquaculture development zone declared in terms of the Aquaculture Act, 2002.*
 - *Activity 7.8 The introduction of alien species into local ecosystems.*

- **INFRASTRUCTURE**
 - *Activity 10.1 (a) The construction of oil, water, gas and petrochemical and other bulk supply pipelines.*

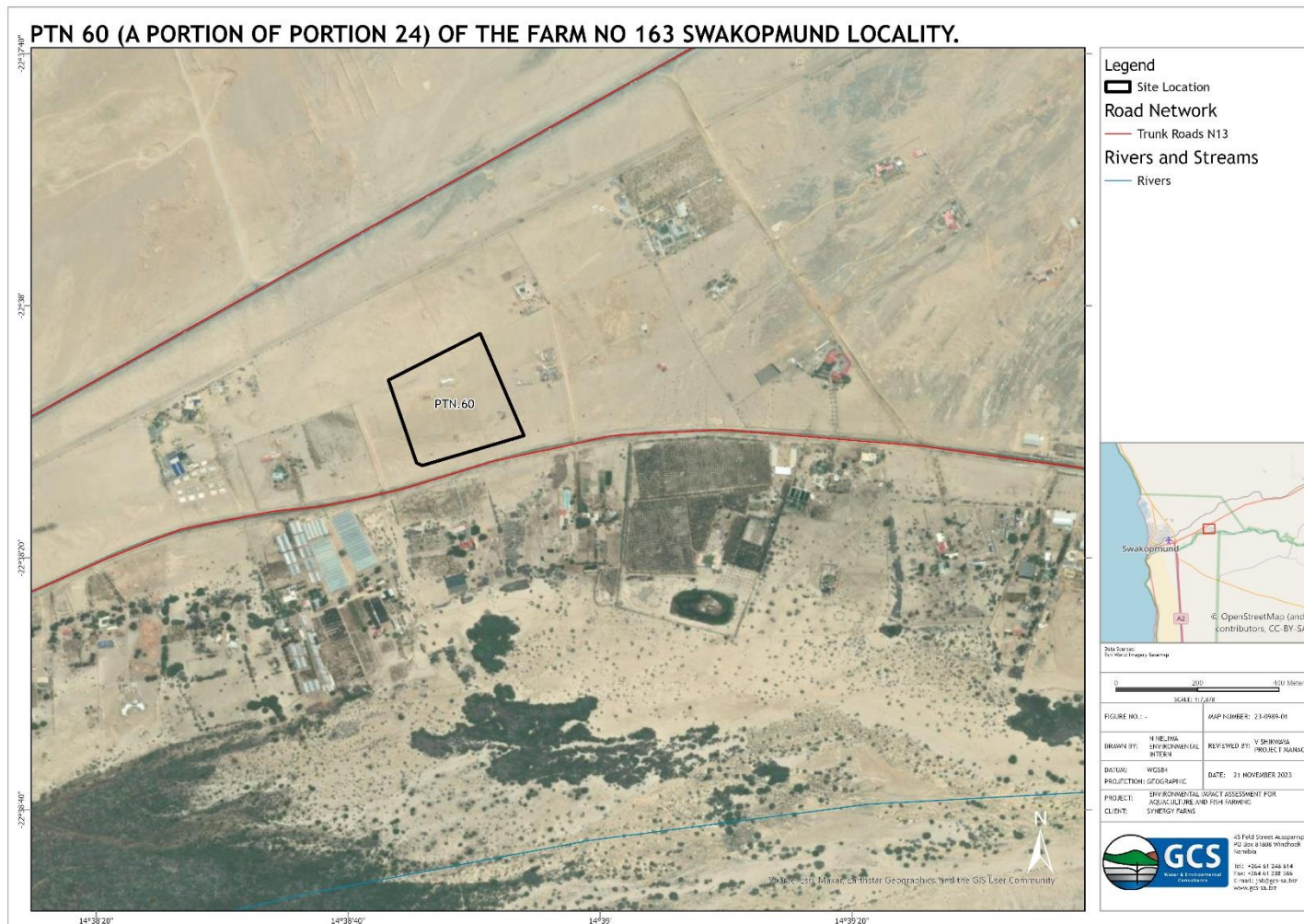


Figure 1-1: Locality map of proposed site

In order to fulfil the requirements of the EMA and its 2012 EIA Regulations, Synergy Farms Namibia (Pty) Ltd appointed GCS Water and Environmental Engineering Namibia (Pty) Ltd (GCS hereafter), an independent Environmental Consultant, to conduct an Environmental Assessment (EA) inclusive of public consultation for the proposed project in Swakopmund. The required documents will be submitted as part of an application for an ECC in terms of the EMA and its EIA Regulations. The findings of the EA process are incorporated into an Environmental Scoping Report (this report) and together with the draft Environmental Management Plan (EMP) will be submitted as part of an application for an ECC to the Environmental Commissioner at the Department of Environmental Affairs (DEA), Ministry of Environment, Forestry and Tourism (MEFT).

Victoria Shikwaya, a qualified Environmental Assessment Practitioner (EAP) conducted this EA process. The team was assisted by Ndesihafela Neliwa, an Environmental Scientist. The CV's of the consultants are attached as **Appendix A** at the end of this report.

1.2 Need and Desirability of the Project

The Proponent's goal is to help the Ministry of Fisheries and Marine Resources (MFMR) create a profitable freshwater fish farming sector while using aquaculture technologies to increase global food security. The proposed aquafarm has the potential to support a lucrative export market and ensure that the demand for freshwater fish is maintained through an aquaculture operation.

1.3 Scope of Work

This scoping study was carried out in accordance with the Environmental Management Act (EMA) (7 of 2007) and its 2012 EIA Regulations (GG No. 4878 GN No. 30). After submitting an application for ECC to the DEA, the first stage in the EA process is to submit a scoping report. **Table 1-1** details the report requirements and relevant sections in this report.

Table 1-1: Report contents based on the 2012 EIA Requirements

Description	Section of the Report
The need and desirability of the proposed project	Subchapter 1.2
Project description and the need for it	Chapter 2
Alternatives considered for the proposed project in terms of the no-go option.	Chapter 3
The relevant laws and guidelines pertaining to the proposed project	Chapter 4
Baseline environment in which the proposed activity will be undertaken	Chapter 5
The public consultation process followed (as described in Regulation 7 of the EMA Act) whereby interested and affected parties (I&APs) and relevant authorities are identified, informed of the proposed activity and provided with a reasonable opportunity to give their concerns and opinions on the project	Chapter 6
The identification of potential impacts, impacts description, assessment, mitigation measures and recommendations	Chapter 7
Recommendations and Conclusions to the report	Chapter 8

The next chapter will be focusing on the description of the proposed project and its associated activities.

2 PROJECT DESCRIPTION

The Proponent proposes to construct and operate the proposed aquaculture and fish farming on Portion 60 (a Portion of Portion 24) of the Farm No 163 Swakopmund, Erongo Region which is situated approximately 12km east of Swakopmund. As per the Deed of Transfer the ownership of Portion 60 (a Portion of Portion 24) of the Farm No 163 vests with Anthony Bessinger. The subject portion measures approximately 5.9533 hectares in extent. Please refer to **Figure 1-1** for the locality of the proposed Aquaculture and Fish farm.

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The Proponent hereby seeks approval for the activity of putting up a Tank-based Tilapia Production in Swakopmund to farm with one (1) indigenous fish species.

The direct benefits and related spin offs of this initiative at this coastal town of Swakopmund by the Proponent include:

- quality tilapia fish of high protein for the export market which will contribute to the GDP of Namibia
- provision of job opportunities from both the skilled and unskilled labour force
- revival of small business related to the fishery sector that had stagnated over the past decade.

2.1 Description of Activity

The proponent intends to use rectangular tanks for the tilapia production. A series of net pens, each with an appropriate-sized mesh, can be suspended within a tank, allowing easy management of size classes throughout the grow out period. The tank will have four filtration units, two on each end. Each will consist of a wedge wire screen sieve plate and a tank holding approximately 2 cubic meters of mixed bed bioreactor (MBBR) media (elevated - by a steel stand or simply a reinforced block structure filled with dirt). Each tank will have two 5.5 kw regenerative blowers to power airlift pumps located a key point on either side of the tank, as well as provide for movement and aeration of the MBBR in the filter units. Distinct size classes of fish will be contained in 4 x 5 x 1.1-meter-deep net pens suspended in the tank with PVC pipe and clamps.

Tilapia fingerlings will be imported from local suppliers around Namibia and from Ministry of Fisheries and Marine Resources (MFMR).



Figure 2-1: The proposed design.

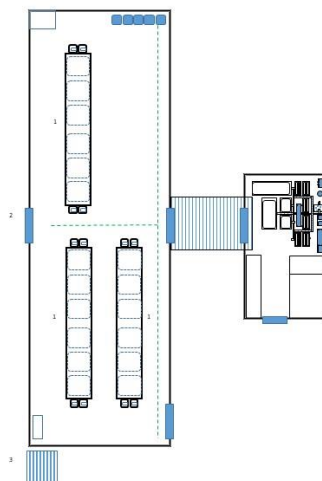


Figure 2-2: The proposed design.

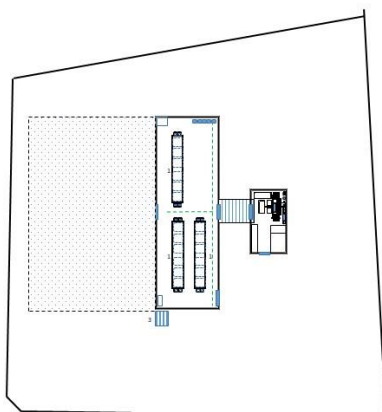


Figure 2-3: The proposed design.

2.2 Engineering Services

The subject site will be connected to the internal reticulation network of the Swakopmund Municipality in terms of water, sewage, and electricity.

Water

The subject site will be connected to the internal network for water supply of the Municipality of Swakopmund.

Electricity

The proponent is to apply to ErongoRed for three phase power connection which is required for the construction of the production system.

Sewage

The proponent is required to apply to the Municipality of Swakopmund for the necessary municipal connections with regards to the required engineering services.

3 PROJECT ALTERNATIVES CONSIDERED

Alternatives are defined as: “different means of meeting the general purpose and requirements of the activity” (Environmental Management Act (2007) of Namibia [and its regulations (2012)]). This chapter will highlight the different ways in which the project can be undertaken and to identify the alternative that will be the most practical but least damaging to the environment. The above-mentioned alternatives considered for the proposed activity are discussed in the following subchapters.

Development alternatives are defined in relation to a proposed activity as different means of meeting the general purposes and requirements of the activity, which may include alternatives to -

- The property on which, or location where it is proposed to undertake the activity;
- The type of activity to be undertaken;
- The design or layout of the activity;
- The technology to be used in the activity;
- The operational aspects of the activity; and
- The option of not implementing the activity.

3.1 Potential Alternatives

No alternate development types, layouts or technologies have been considered, as the proposed technology was deemed to be the best for producing the desired output of aquaculture. The only possible alternatives discussed are location and the no-go option.

3.1.1 No-Go Option

The “No-Go” alternative is the option of not proceeding with the activity, which typically implies a continuation of the status quo. Should the proposed aquaculture and fish farming on Portion 60 (a Portion of Portion 24) of Farm No 163 Swakopmund not be developed, none of the potential impacts (positive and negative) identified would occur. Furthermore, the proposed site will remain undeveloped. The residents of the town will additionally not be able to benefit from possible job opportunities.

3.1.2 Location

No alternative sites were considered during the site selection process. The subject site was the only site available which met the desired criteria. The following conditions deemed the site suitable for the proposed development:

- The site is located on an erf that is appropriately zoned and sized for the intended development.
- The site is relatively flat and it is located in a developed area and as such is clear of

any sensitive fauna or flora.

- The site is easily accessible via an approved access point along the B2 road.

4 LEGAL FRAMEWORK

A review of applicable and relevant Namibian legislation, policies and guidelines to the proposed development are given in this chapter. This review serves to inform the Proponent, Interested and Affected Parties and the decision makers at the DEA of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled in order to undertake the proposed activities.

4.1 The Environmental Management Act No. 7 of 2007

This scoping assessment was carried out according to the Environmental Management Act (EMA) and its Environmental Impact Assessment (EIA) Regulations (GG No. 4878 GN No. 30). The EMA has stipulated requirements to complete the required documentation in order to obtain an Environmental Clearance Certificate (ECC) for permission to undertake certain listed activities.

The full list of all applicable legislation identified and conducted during the EA process are presented in **Table 4-1** below.

Table 4-1: Applicable and relevant Namibian and international legislations, policies and guidelines conducted during the EA process

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Environmental Management Act (EMA) No. 7 of 2007	Requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27). Details principles which are to guide all EAs.	The EMA and its regulations should inform and guide this EA process.
Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878)	Details requirements for public consultation within a given environmental assessment process (GN 30 S21). Details the requirements for what should be included in a Scoping Report (GN 30 S8) and an Assessment Report (GN 30 S15).	
Aquaculture Act No. 18 of 2002	To regulate and control aquaculture activities; to provide for the sustainable development of aquaculture resources; and to provide for related matters	Mr. Johannes Hamukwaya Directorate: Aquaculture and Inland Fisheries Tel: 264-61-205 3084
The Constitution of Namibia Act No. 1 of 1990	According to Legal Assistance Centre (LAC), there is no clear right to health in the Namibian Constitution. But under the Article 95 of the Namibian Constitution that deals with Principles of State Policy, the Namibian Constitution states, “the state shall enact legislation to ensure consistent planning to raise and maintain an acceptable standard of living for the country’s people” and to improve public health.	The Proponent should ensure compliance with the conditions set in the Act.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Water Act No. 54 of 1956	<p>The Water Resources Management Act 11 of 2013 regulations has not been promulgated; therefore, the Water Act No 54 of 1956 is still in force:</p> <ul style="list-style-type: none"> • Prohibits the pollution of water and implements the principle that a person disposing of effluent or waste has a duty of care to prevent pollution (S3 (k)). • Provides for control and protection of groundwater (S66 (1), (d (ii))). <p>Liability of clean-up costs after closure/abandonment of an activity (S3 (l)).</p>	The protection of ground and surface water resources should be a priority during the proposed activities.
Water Resources Management Act No.11 of 2013	<p>The act provides for the management, protection, development, use and conservation of water resources; and provides for the regulation and monitoring of water services and to provide for incidental matters. The objects of this Act are to:</p> <p>Ensure that the water resources of Namibia are managed, developed, used, conserved and protected in a manner consistent with, or conducive to, the fundamental principles set out in Section 66 - protection of aquifers, Subsection 1 (d) (iii) provide for preventing the contamination of the aquifer and water pollution control (Section 68).</p>	

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Soil Conservation Act No. 76 of 1969	The Act makes provision for the prevention and control of soil erosion and the protection, improvement and conservation of soil, vegetation and water supply sources and resources, through directives declared by the Minister.	Duty of care must be applied to soil conservation and management measures must be included in the EMP.
Nature Conservation Ordinance No.4 of 1975	To consolidate and amend the laws relating to the conservation of nature; the establishment of game parks and nature reserves; the control of problem animals; and to provide for matters incidental thereto.	The Proponent should ensure that their activities do not in any way compromise the wildlife in the area of operations and the ordinance requirements are adhered to.
Forestry Act No. 12 of 2001	<p>The Act provides for the management and use of forests and related products / resources. It offers protection to any living tree, bush or shrub growing within 100 metres of a river, stream or watercourse on land that is not a surveyed erven of a local authority area. In such instances, a licence would be required to cut and remove any such vegetation.</p> <p>These provisions are only guidelines.</p>	Should there be a need to remove vegetation on site, a permit to remove protected species will need to be obtained from the Forestry office in Swakopmund.
Public Health Act No. 36 of 1919	Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”	The Proponent and all its employees / contractors should ensure compliance with the provisions of these legal instruments.
Health and Safety Regulations GN 156/1997 (GG 1617)	Details various requirements regarding health and safety of labourers.	

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Labour Act No. 6 of 1992	Ministry of Labour (MOL) is aimed at ensuring harmonious labour relations through promoting social justice, occupational health and safety and enhanced labour market services for the benefit of all Namibians. This ministry insures effective implementation of the Labour Act no. 6 of 1992.	The Proponent should ensure that the proposed activity does not compromise the safety and welfare of workers.
Local Authorities Act No. 23 of 1992	The Local Authorities Act prescribes the manner in which a town or municipality should be managed by the Town or Municipal Council.	The development must comply with provisions of the Local Authorities Act and the local regulation of the Municipality of Swakopmund.
National Heritage Act No. 27 of 2004	The Act is aimed at protecting, conserving and registering places and objects of heritage significance.	All protected heritage resources (e.g., human remains etc.) that may be discovered, need to be reported immediately to the National Heritage Council (NHC) and require a permit from the NHC before they may be relocated.
Roads Ordinance 17 of 1972	<ul style="list-style-type: none"> • Section 3.1 deals with width of proclaimed roads and road reserve boundaries • Section 27.1 is concerned with the control of traffic on urban trunk and main roads • Section 36.1 regulates rails, tracks, bridges, wires, cables, subways or culverts across or under proclaimed roads <p>Section 37.1 deals with Infringements and obstructions on and interference with proclaimed roads.</p>	Adhere to all applicable provisions of the Roads Ordinance.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Nature Conservation Ordinance no. 4 of 1975	<ul style="list-style-type: none"> Chapter 6 provides for legislation regarding the protection of indigenous plants 	Indigenous and protected plants must be managed within the legal confines.
Namibia Urban and Regional Planning Act No 5 of 2018	To 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; to establish the urban and regional planning board; to decentralise certain matters relating to spatial planning; to provide for the preparation, approval and review of the national spatial development framework, regional structure plans and urban structure plans; to provide for the preparation, approval, review and amendment of zoning schemes; to provide for the establishment of townships; to provide for the alteration of boundaries of approved townships, to provide for the disestablishment of approved townships; to provide for the change of name of approved townships; to provide for the subdivision and consolidation of land; to provide for the alteration, suspension and deletion of conditions relating to land; and to provide for incidental matters.	Adhere to all applicable provisions of the Act.
Atmospheric Pollution Prevention Ordinance (No. 11 of 1976)	Part II - control of noxious or offensive gases, Part III - atmospheric pollution by smoke, Part IV - dust control, and Part V - air pollution by fumes emitted by vehicles. The Ordinance provision on air pollution is administered by the Namibian Ministry of Health. In terms of Section 5 any person	The development should consider the provisions outlined in the act. The proponent should apply for an Air Emissions permit from the Ministry of Health and Social Services (if needed).

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	<p>carrying on a “scheduled process” within a “controlled area” has to obtain a registration certificate from the administering authority, in this case the Department of Health. The Act lists 72 processes in Schedule 2 which must be registered and a registration certificate (air pollution permit) obtained.</p>	
<p>Public and Environmental Health Act of 2015</p>	<p>This Act (GG 5740) provides a framework for a structured uniform public and environmental health system in Namibia. It covers notification, prevention and control of diseases and sexually transmitted infections; maternal, ante-natal and neo-natal care; water and food supplies; infant nutrition; waste management; health nuisances; public and environmental health planning and reporting. It repeals the Public Health Act 36 of 1919 (SA GG 979).</p>	<p>Contractors and users of the proposed development are to comply with these legal requirements.</p>
<p>Hazardous Substance Ordinance 14 of 1974</p>	<p>To provide for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances; to provide for the division of such substances into groups in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances; and to provide for matters connected therewith.</p>	<p>The handling, usage and storage of hazardous substances on site should be carefully controlled according to this Ordinance.</p>

The environmental baseline (features) of the project area and the surrounding areas are presented and discussed in the following chapter.

5 ENVIRONMENTAL AND SOCIAL BASELINE

The proposed activities will be undertaken in an environment with specific conditions. Prior to any development in an area and as part of an environmental assessment process, it is vital to firstly understand the pre-project/development conditions. This is also important to form a baseline understanding of the area and make reasonable conclusions on certain issues that may arise years later during or after the project's operations. The environmental and social baseline for the project area is presented under the subchapters below.

5.1 Biophysical Environment

5.1.1 *Climate*

The climate of the Swakopmund area can be described as desert characteristic of low rainfall, high humidity and low temperatures. Annual temperatures range between 16-18 °C with the maximum temperatures being less than 20 °C and the minimum temperatures between 8-10 °C (Mendelsohn, Jarvis & Roberts, 2002). Rainfall is recorded to be less than 50 mm for the subject area (Mendelsohn, et al., 2002). Within the coastal belt temperatures are usually above 10 °C due to the coastal winds (Mendelsohn, et al., 2002).

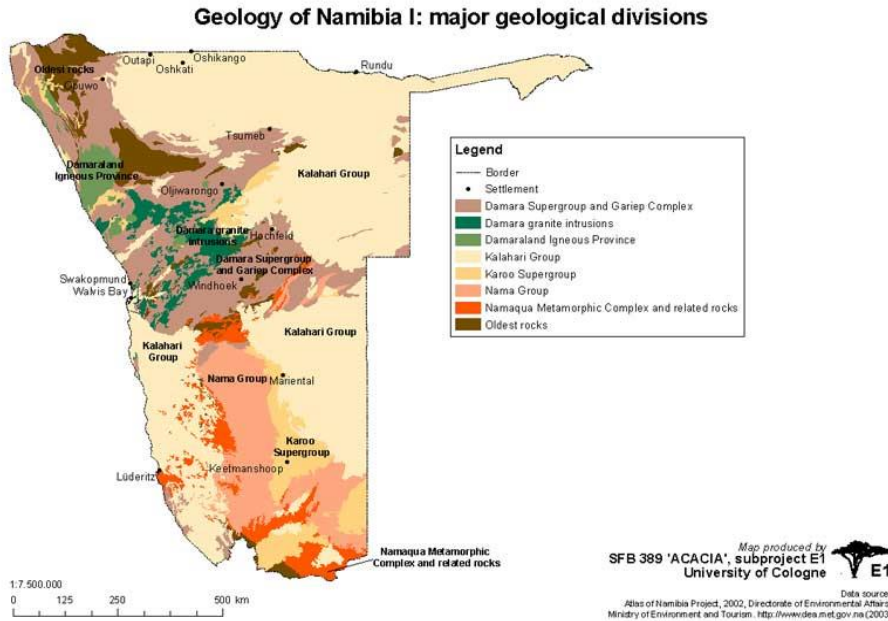
5.1.2 *Topography, Soils and Geology*

The Swakopmund area is relatively flat with an altitude of between 0 to 100 m above sea level. The Swakopmund area forms part of the Swakop Group geological division (Mendelsohn, et al., 2002). The soils in the area comprise mainly of schists.

The dominant soils in the area are characterized as Petric Gypsisols. Gypsisols are characteristic of accumulations of calcium sulphate and are restricted within the arid areas of the central Namib (Mendelsohn, et al., 2002). Gypsisols commonly have low fertility levels and only the toughest of plants can grow in them.

The Erongo Region forms part of the Damara supergroup and Grariiep complex, Damara granite intrusions, Damaraland Igneous province and part of the Kalahari Group Geological division as depicted in pale yellow in **Figure 5-1** below.

Figure 5-1: Geology of Namibia (http://www.uni-koeln.de/sfb389/e/e1/download/atlas_namibia/pics/physical/geology.jpg)



5.1.3 Water Resources: Surface and Groundwater

In terms of groundwater, the area falls within the Central Namib-Windhoek groundwater basin as depicted in Figure 5-2. The hydrogeological Central Namib Basin comprises the Erongo and Khomas Regions and parts of the Otjozondjupa Region (Ministry of Agriculture Water and Rural Development, 2011).

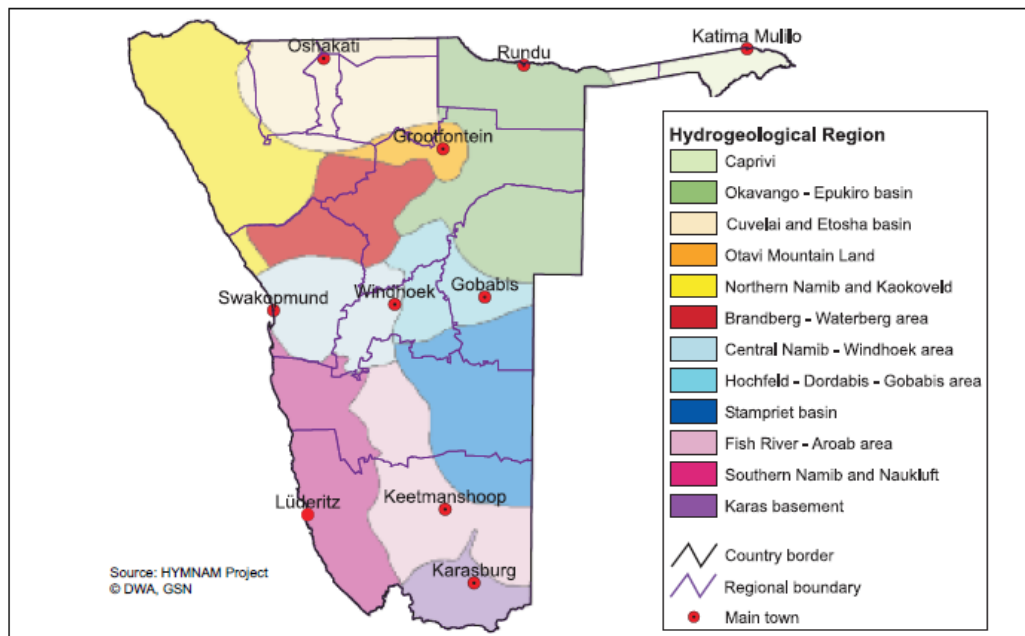


Figure 5-2: Groundwater basins and hydrogeological regions in Namibia (Ministry of Agriculture Water and Rural Development, 2011)

5.1.4 Fauna and Flora

The Swakopmund area forms part of the Namib Desert Biome and is characteristic of the Southern Desert vegetation type. The dominant soils in the area are dune sands which support only a few grasses. The dominant landscape in the area is that of the Namib Sand Sea. Plant diversity in the area is low with less than 50 species, with endemism throughout the area viewed as low (between 2 and 5 species) (Mendelsohn, Jarvis, Roberts, *et al.*, 2002).

No large wild animals are expected to be inhabitants except maybe for small rodents and insects that shelter in burrows and under rocks.

There are no significant fauna and flora found to be located within the development area. The site is presently mostly developed and is situated within an urban area, as such no significant flora or fauna are expected to be found on the proposed site.



Figure 5-3: Common Vegetation in project area

5.1.5 Archaeological and Anthropological Resources

No archaeological and heritage sites are known to be located within the proposed development area. A chance find procedure has been outlined in the EMP should these sites be encountered during development of the site.

5.2 Social Environment

5.2.1 Social Demographics

Based on the 2011 Namibia Population and Housing Census, the population of Swakopmund comprised 44, 725 people. The total population of the Erongo Region was 150, 809 with an annual growth rate of 3.4% (Namibia Statistics Agency, 2011).

5.2.2 *Economy*

Wages and salaries (73%) is the main source of income in this region, while other income sources include farming (3%), business (9%), pension (9%) and cash remittance (5%) (Namibia Statistics Agency, 2011).

6 PUBLIC CONSULTATION

6.1 Objective:

Public consultation forms an important component of an Environmental Assessment (EA) process. Public consultation provides potential Interested and Affected Parties (I&APs) with an opportunity to comment on and raise any issues relevant to the project for consideration as part of the assessment process. Public consultation has been done in accordance with both the EMA and its EIA Regulations.

The public consultation process assists the Environmental Assessment Practitioner (EAP) in identifying all potential impacts and to what extent further investigations are needed. Public consultation can also aid in the process of identifying possible mitigation measures.

6.2 Approach:

6.2.1 Interested and Affected Parties (I&APs)

GCS identified specific I&APs, who were considered interested in and/or affected by the proposed activities. The I&APs identified include applicable organs of state (national, regional, and local) and other interested members of the public. These I&APs were contacted directly and registered as I&APs. In addition, notices regarding the project were placed in widely circulated national newspapers for two consecutive weeks inviting members of the public to register as I&APs. The detailed steps regarding the notification of I&APs are presented in Section 6.2.2. A summary of the I&APs identified are presented in Table 6-1. The complete list of I&APs is provided in Appendix C.

Table 6-1: Summary of Pre-Identified IAPs

List of IAPs	Description
	Ministry of Environment, Forestry and Tourism
	Ministry of Fisheries and Marine Resources
	Municipality of Swakopmund
	Roads Authority
	National Heritage Council of Namibia (NHCN)
	National Botanical Research Institute (NBRI)

6.2.2 Communication with I&APs

Regulation 21 of the EIA Regulations details steps to be taken during a given public consultation process and these have been used in guiding this process.

Communication with I&APs about the proposed development was facilitated in English through the following means and in this order:

- A Background Information Document (BID) containing descriptive information about the proposed activities was compiled (**Appendix D**) and sent out to all identified and registered I&APs per email dated 22 November 2023;
- Notices were placed in *The New Era* and *Namib Times* newspapers dated 22 and 29 November 2023, briefly explaining the activity and its locality, inviting members of the public to register as I&APs (**Appendix E**);
- A site notice was fixed at the site (**Appendix G**);
- A meeting with the Municipality of Swakopmund as well as a public meeting was held on 7 December 2023 in Swakopmund (**Appendix H**).

The scoping report was made available to all I&APs for public review from **30 April 2024 until 16 May 2024**. I&APs had until **16 May 2024** to submit their comments on the project. All comments received on the scoping report is compiled in a Comments and Response Report which is included in the final scoping report.

7 IMPACTS IDENTIFICATION, DESCRIPTION AND ASSESSMENT

7.1 Impact Assessment Methodology

The proposed activities have impacts on certain biophysical and social features. The identified impacts were assessed in terms of probability (likelihood of occurring), scale/extent (spatial scale), magnitude (severity) and duration (temporal scale) as presented in **Table 7-1**, **Table 7-2**, **Table 7-3** and **Table 7-4**. To enable a scientific approach to the determination of the environmental significance, a numerical value is linked to each rating scale. This methodology ensures uniformity and that potential impacts can be addressed in a standard manner so that a wide range of impacts are comparable.

It is assumed that an assessment of the significance of a potential impact is a good indicator of the risk associated with such an impact. The following process will be applied to each potential impact:

- Provision of a brief explanation of the impact;
- Assessment of the pre-mitigation significance of the impact; and
- Description of recommended mitigation measures.

The recommended mitigation measures prescribed for each of the potential impacts contribute towards the attainment of environmentally sustainable operational conditions of the project for various features of the biophysical and social environment.

The following criteria were applied in this impact assessment:

7.1.1 Extent (spatial scale)

Extent is an indication of the physical and spatial scale of the impact. **Table 7-1** shows rating of impact in terms of extent of spatial scale.

Table 7-1: Extent or spatial impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Impact is localised within the site boundary: Site only	Impact is beyond the site boundary: Local	Impacts felt within adjacent biophysical and social environments: Regional	Impact widespread far beyond site boundary: Regional	Impact extend National or over international boundaries

7.1.2 Duration

Duration refers to the timeframe over which the impact is expected to occur, measured in relation to the lifetime of the project. **Table 7-2** shows the rating of impact in terms of duration.

Table 7-2: Duration impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Immediate mitigating measures, immediate progress	Impact is quickly reversible, short term impacts (0-5 years)	Reversible over time; medium term (5-15 years)	Impact is long-term	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

7.1.3 Intensity, Magnitude / severity

Intensity refers to the degree or magnitude to which the impact alters the functioning of an element of the environment. The magnitude of alteration can either be positive or negative. These were also taken into consideration during the assessment of severity. **Table 7-3** shows the rating of impact in terms of intensity, magnitude or severity.

Table 7-3: Intensity, magnitude or severity impact rating

Type of criteria	Negative				
	H-(10)	M/H-(8)	M-(6)	M/L-(4)	L-(2)
Qualitative	Very high deterioration, high quantity of deaths, injury of illness / total loss of habitat, total alteration of ecological processes, extinction of rare species	Substantial deterioration, death, illness or injury, loss of habitat / diversity or resource, severe alteration or disturbance of important processes	Moderate deterioration, discomfort, partial loss of habitat / biodiversity or resource, moderate alteration	Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species numbers	Minor deterioration, nuisance or irritation, minor change in species / habitat / diversity or resource, no or very little quality deterioration.

7.1.4 Probability of occurrence

Probability describes the likelihood of the impacts occurring. This determination is based on previous experience with similar projects and/or based on professional judgment. See **Table 7-4** for impact rating in terms of probability of occurrence.

Table 7-4: Probability of occurrence impact rating

Low (1)	Medium/Low (2)	Medium (3)	Medium/High (4)	High (5)
Improbable; low likelihood; seldom. No known risk or vulnerability to natural or induced hazards.	Likely to occur from time to time. Low risk or vulnerability to natural or induced hazards	Possible, distinct possibility, frequent. Low to medium risk or vulnerability to natural or induced hazards.	Probable if mitigating measures are not implemented. Medium risk of vulnerability to natural or induced hazards.	Definite (regardless of preventative measures), highly likely, continuous. High risk or vulnerability to natural or induced hazards.

7.1.5 Significance

Impact significance is determined through a synthesis of the above impact characteristics. The significance of the impact “without mitigation” is the main determinant of the nature and degree of mitigation required. As stated in the introduction to this chapter, for this assessment, the significance of the impact without prescribed mitigation actions was measured.

Once the above factors (Table 7-1, Table 7-2, Table 7-3 and Table 7-4) have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

$$SP = (\text{magnitude} + \text{duration} + \text{scale}) \times \text{probability}$$

The maximum value per potential impact is 100 significance points (SP). Potential impacts were rated as high, moderate or low significance, based on the following significance rating scale (Table 7-5).

Table 7-5: Significance rating scale

<i>SIGNIFICANCE</i>	<i>ENVIRONMENTAL SIGNIFICANCE POINTS</i>	<i>COLOUR CODE</i>
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	<30	L
Neutral	0	N
Low (negative)	>-30	L
Medium (negative)	-30 to -60	M
High (negative)	>-60	H

For an impact with a significance rating of high, mitigation measures are recommended to reduce the impact to a low or medium significance rating, provided that the impact with a medium significance rating can be sufficiently controlled with the recommended mitigation measures. To maintain a low or medium significance rating, monitoring is recommended for a period of time to enable the confirmation of the significance of the impact as low or medium and under control.

The impact assessment for the proposed activities is given in subchapter 7.3, 7.4, 7.4 and 7.5.

7.2 Pre-construction Phase Impact Assessment

The pre-construction phase is mostly concerned with the preparation of the site for the proposed aquaculture and fish farming. The potential impacts during this phase include biodiversity and traffic impacts.

7.2.1 Impact Assessment of Biodiversity Loss

The preparation of the site for the proposed development involves clearing of certain areas on site. This may impact the existing biodiversity in the area. The project will be constructed in a disturbed natural area which is home to little vegetation and possibly some fauna. During site preparation it should be ensured that only the areas applicable to the project site area are cleared. The layout of the proposed development should incorporate existing protected trees as far as practically possible. Should protected tree species need to be removed a valid permit from the local department of Forestry should be obtained. The impact is not expected to be of such a magnitude and/ or significance that it will have irreversible impacts on the biodiversity and endemism of the area and Namibia at large. The assessment of this impact is presented in **Table 7-6**.

Table 7-6: Assessment of the impacts of the proposed activities on biodiversity loss

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 1	M - 1	M - 6	M - 3	L - 24
Post-mitigation	L - 1	L - 1	M/L- 4	M/L - 2	L - 12

7.2.1.1 Mitigations and recommendation to biodiversity loss

- Vegetation should be cleared only where absolutely necessary and the layout of the proposed aquaculture and fish farming should incorporate protected, endemic and near endemic tree/plant species as far as practicably possible.
- Should protected, endemic and near endemic tree/plant species need to be cleared, numbers and location of trees and plants to be removed should be documented by the proponent in collaboration with the local Department of Forestry prior to removal.
- Trees and plants protected under the Forest Act No 12 of 2001 are not to be removed without a valid permit from the local Department of Forestry.

7.2.2 Impact Assessment of Traffic

During site clearance traffic is expected to increase as a result of the trucks and construction vehicles that will be moving to and from the site. Without any mitigation measures implemented, the impact can be rated as of a “low” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-7**.

Table 7-7: Assessment of the impacts of the proposed activities on traffic

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 2	M - 2	M - 6	M - 3	L - 27
Post-mitigation	L - 2	L - 1	M/L - 4	M/L - 2	L - 16

7.2.2.1 Mitigations and recommendation to traffic

- All drivers of delivery vehicles and construction machinery should have the necessary driver's licenses and documents to operate these machines.
- Speed limit warning signs must be erected to minimise accidents.
- Vehicles are to make use of the approved access point.
- Obey speed restrictions and traffic rules.

7.3 Construction Phase Impact Assessment

The construction phase is mostly concerned with the impacts on the biophysical and socio-economic environment that is likely to occur during the construction phase of the development. These potential impacts are likely to be temporary in duration but may have longer lasting effects.

7.3.1 Impact Assessment of Biodiversity Loss

The project will be constructed in a disturbed natural area which is home to little vegetation. Therefore, the impact on fauna and flora will be minimal. Disturbance of areas outside the designated working zone is not allowed. The assessment of this impact is presented in Table 7-9.

Table 7-8: Assessment of the impacts of the proposed activities on Biodiversity Loss

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 1	L - 1	M - 6	M - 3	L - 24
Post-mitigation	L - 1	L - 1	M/L - 4	M/L - 2	L - 12

7.3.1.1 Mitigations and recommendation to Biodiversity Loss

- Vegetation should be cleared only where absolutely necessary and the layout of the proposed aquaculture and fish farming should incorporate protected, endemic and near endemic tree/plant species as far as practicably possible.
- Should protected, endemic and near endemic tree/plant species need to be cleared, numbers and location of trees and plants to be removed should be documented by the proponent in collaboration with the local Department of Forestry prior to removal.

- Trees and plants protected under the Forest Act No 12 of 2001 are not to be removed without a valid permit from the local Department of Forestry.

7.3.2 Impact Assessment of Water Usage

Water is a scarce resource in Namibia and therefore water usage should be monitored and limited in order to prevent unnecessary wastage. The proposed project will make use of water in its construction and operational phase. The assessment of this impact is presented in Table 7-9.

Table 7-9: Assessment of the impacts of the proposed activities on Water Usage

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 1	L - 1	M - 6	M - 3	L - 24
Post-mitigation	L - 1	L - 1	M/L- 4	M/L - 2	L - 12

7.3.2.1 Mitigations and recommendation to water usage

- Incorporate water saving principles into all aspects during the design of the project.
- If possible, re-use the water from processes on-site including using water from sinks to clean outdoor equipment or to irrigate plants.
- If there is no alternative to disposing of the water, ensure that this is done safely.

7.3.3 Impact Assessment of Surface and Groundwater Impacts

Contamination of surface water might occur through oil leakages, lubricants and grease from the equipment and machinery during the installation, construction and maintenance of bulk services at the site. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 7-10.

Table 7-10: Assessment of the impacts of the proposed activities on surface and groundwater

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 3	M - 2	M - 6	M - 4	M - 44
Post-mitigation	L - 1	M- 2	M/L- 4	M/L - 2	L - 14

7.3.3.1 Mitigations and recommendation to surface and groundwater

- Machinery should not be serviced at the construction site to avoid spills. All spills should be cleaned up as soon as possible.

- Hydrocarbon contaminated clothing or equipment should not be washed within 25m of any surface water body.
- Care must be taken to avoid contamination of soil and groundwater. Use drip trays when doing maintenance on machinery. Maintenance should be done on dedicated areas with linings or concrete flooring.
- The risk can be lowered further through proper training of staff. All spills must be cleaned up immediately. Excavations should be backfilled and sealed with appropriate material, if it is not to be used further.
- Observation of soil on site for contamination from oil leakages, lubricants and grease from the equipment and machinery.

7.3.4 Impact Assessment of Soil Erosion Impacts

The area/project site is sparsely covered by vegetation. The proposed development activities will not increase the number of impermeable surfaces. The amount of storm water during rainfall events could increase erosion. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-11**.

Table 7-11: Assessment of the impacts of the proposed activities on soil erosion

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 2	M - 2	M - 6	M - 3	M - 30
Post-mitigation	L - 1	L - 1	M/L - 4	M/L - 2	L - 12

7.3.4.1 Mitigations and recommendation to soil erosion

- Erosion control measures (such as barriers) should be implemented to ensure that the topsoil is not washed away.
- Checks must be carried out at regular intervals to identify areas where erosion is occurring.
- Proper storm water management measures should be implemented.
- Where possible, it is recommended that construction activities take place during the dry season/winter months to reduce erosion and sedimentation risks associated with summer rainfall in this region.
- Appropriate remedial actions are to be undertaken wherever erosion is evident.

7.3.5 Impact Assessment of Archaeological and Heritage Impacts

The proposed activity is not taking place in an area that has significant archaeological or heritage resources. However, should these be encountered during the construction activities, mitigation measures need to be in place to ensure that these resources are not harmed. Without any mitigation measures implemented, the impact can be rated as of a “low” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-12**.

Table 7-12: Assessment of the impacts of the proposed activities on Archaeological and Heritage Impacts

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 1	L/M - 2	M/L - 4	L - 1	L - 7
Post-mitigation	L - 1	L - 1	L - 2	L - 1	L - 4

7.3.5.1 Mitigations and recommendation to Archaeological and Heritage Impacts

- All works are to be immediately ceased in an affected area should an archaeological or heritage resource be discovered.
- The National Heritage Council of Namibia (NHCN) should advise with regards to the removal, packaging, and transfer of the potential resource.

7.3.6 Impact Assessment of Health and Safety

The safety, security and health of the labour force, employees and general public are of great importance. Safety issues could arise from the earthmoving equipment and tools that will be used on site during the construction phase. This increases the possibility of injuries and the contractor must ensure that all staff members are made aware of the potential risks of injuries on site. The presence of equipment lying around on site may also encourage criminal activities (theft). Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-13**.

Table 7-13: Assessment of the impacts of the proposed activities on health and safety

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 1	L/M - 4	M/H - 8	M/H - 4	M - 52
Post-mitigation	L - 1	L/M - 4	M/L - 4	L - 2	L - 18

7.3.6.1 Mitigations and recommendation to health and safety

- Workers should be orientated with the maintenance of safety and health procedures, and they should be provided with PPE (Personal Protective Equipment).
- A health and safety officer should be employed to manage, coordinate and monitor risk and hazard and report all health and safety related issues in the workplace.
- The contractor is advised to ensure that the team is equipped with first aid kits and that they are available on site, at all times.
- The contractors should comply with the provisions with regards to health and safety as outlined in the Labour Act (No. 6 of 1992).

7.3.7 Impact Assessment of Noise Generation Impacts

An increase of ambient noise levels at the proposed site is expected due to the construction and operation activities. Noise pollution due to heavy-duty equipment and machinery might be generated. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-14**.

Table 7-14: Assessment of the impacts of the proposed activities on noise generation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 2	M - 2	M - 6	M - 3	M - 30
Post-mitigation	L - 1	L - 1	L - 2	L - 2	L - 6

7.3.7.1 Mitigations and recommendation to noise generation

- Ensure all mufflers on vehicles are in full operational order; and any audio equipment should not be played at levels considered intrusive by others.
- The construction staff should be equipped with ear protection equipment.
- Construction activities should be limited to daytime hours (between 08h00 and 17h00) unless otherwise arranged with community members and businesses in the area.
- No amplified music should be allowed on site.

7.3.8 Impact Assessment of Dust Generation and Air Quality Impacts

Dust generated during the transportation of building materials; construction and installation of bulk services, and problems thereof are expected to be low. Dust is expected to be worse during the winter months when strong winds occur. Release of various particulates from the site during the construction phase and exhaust fumes from vehicles and machinery related to the construction of bulk services are also expected to take place. Dust is regarded as a nuisance as it reduces visibility, affects the human health and retards plant growth.

Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-15**.

Table 7-15: Assessment of the impacts of the proposed activities on dust generation and air quality

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 2	L/M - 2	M - 6	M/H - 4	M - 40
Post-mitigation	L - 1	L - 1	L - 2	M/L - 2	L - 8

7.3.8.1 Mitigations and recommendation to dust generation and air quality

- Dust abatement techniques should be implemented e.g., spraying of water on site to reduce dust levels to an acceptable standard.
- The local community and surrounding businesses should be continuously consulted to ensure that the dust levels are acceptable.
- It is recommended that regular dust suppression be included in the construction activities when dust becomes an issue.
- During high wind conditions the contractor must make the decision to cease works until the wind has settled.
- Workers should be provided with dust masks.

7.3.9 Impact Assessment of Waste Generation Impacts

This can be in the form of rubble, cement bags, pipe and electrical wire cuttings. This may result in blocked waterways should waste be blown into water pipelines; animals may choke on waste when ingested and additionally it may pose a negative visual impact on the surrounding environment. Without any mitigation measures implemented, the impact can be rated as of a “low” significance. After the implementation of the mitigations, the impact will be significantly reduced to low rating. The assessment of this impact is presented in **Table 7-16**.

Table 7-16: Assessment of the impacts of the proposed activities on waste generation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 1	L/M - 2	M/L - 4	M - 4	L - 28
Post-mitigation	L - 1	L - 1	L - 2	L - 1	L - 4

7.3.9.1 Mitigations and recommendation to waste generation

- The waste should be gathered and stored in enclosed containers to prevent it from being blown away by the wind.
- No waste may be buried or burned on site or anywhere else.
- Waste containers (bins) should be emptied during and after the construction and the waste removed from site to the municipal waste disposal site.
- Separate waste containers (bins) for hazardous and domestic / general waste must be provided on site.
- No waste may remain on site after the completion of the project.
- The recycling of waste should be considered and implemented as far as possible.

7.3.10 Impact Assessment of Traffic

During site clearance traffic is expected to increase as a result of the trucks and construction vehicles that will be moving to and from the site. Without any mitigation measures implemented, the impact can be rated as of a “low” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-7**.

Table 7-17: Assessment of the impacts of the proposed activities on traffic

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 2	M - 2	M - 6	M - 3	L - 27
Post-mitigation	L - 2	L - 1	M/L - 4	M/L - 2	L - 16

7.3.10.1 Mitigations and recommendation to traffic

- All drivers of delivery vehicles and construction machinery should have the necessary driver’s licenses and documents to operate these machines.
- Speed limit warning signs must be erected to minimise accidents.
- Vehicles are to make use of the approved access point.
- Obey speed restrictions and traffic rules.

7.3.11 Impact Assessment of Temporary Employment Creation

The proposed activity may provide employment opportunities for the local people during construction. The impact can be rated as of a “medium” significance. The assessment of this impact is presented in **Table 7-18**.

Table 7-18: Assessment of the impacts of the proposed activities on temporary employment creation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M + 2	L/M + 2	M + 6	M + 3	M + 30

7.3.11.1 Mitigations and recommendation to temporary employment creation

- Should any job opportunities result, they should be made available to the local people in the area as far as reasonably possible.

7.4 Operational Phase Impact Assessment

The potential impacts associated with the operational phase of the activities have been identified and assessed in this subchapter. The main impacts identified are water usage, surface and groundwater, noise, air quality and waste.

7.4.1 Impact Assessment of Biodiversity Loss

Staff and visitors should only make use of walkways and existing roads to minimize the impact on vegetation. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-19**.

Table 7-19: Assessment of the impacts of the activities on Biodiversity Loss

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	M - 3	L/M - 3	M - 6	L/M - 4	M - 48
Post-mitigation	L/M - 2	L/M - 3	L/M - 4	L/M - 2	L - 18

7.4.1.1 Mitigations and recommendation to Biodiversity Loss

- Minimise the area of disturbance by restricting movement to the designated working areas during maintenance.

7.4.2 Impact Assessment of Water Usage

Water is a scarce resource in Namibia and therefore water usage should be monitored and limited in order to prevent unnecessary wastage. The proposed project will make use of water in its construction and operational phase. The assessment of this impact is presented in **Table 7-9**.

Table 7-20: Assessment of the impacts of the proposed activities on Water Usage

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 1	L - 1	M - 6	M - 3	L - 24
Post-mitigation	L - 1	L - 1	M/L- 4	M/L - 2	L - 12

7.4.2.1 Mitigations and recommendation to water usage

- Incorporate water saving principles into all aspects during the design of the project.
- If possible, re-use the water from processes on-site including using water from sinks to clean outdoor equipment or to irrigate plants.
- If there is no alternative to disposing of the water, ensure that this is done safely.

7.4.3 Impact Assessment of Surface and Groundwater Impacts

There may be a potential release of sewage, stormwater or water into the environment due to pipeline/system failure or during maintenance. As a result, the spillage could be released into the environment and could potentially be a health hazard to surface and groundwater especially in cases of large sewer spills. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 7-21.

Table 7-21: Assessment of the impacts of the activities on Surface and Groundwater

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	M - 3	M/H - 4	M- 6	M - 3	M - 39
Post-mitigation	L/M - 2	M/H - 4	L/M- 4	L/M - 2	L - 20

7.4.3.1 Mitigations and recommendation to Surface and Groundwater

- Proper reticulation pipelines and drainage systems should be installed.
- Regular bulk services infrastructure and system inspection should be conducted.
- Proper containment should be used in cases of sewerage system maintenance.

7.4.4 Impact Assessment of Air Quality

Vehicles transporting goods and staff will contribute to the release of hydrocarbon vapours, carbon monoxide and sulphur oxides into the air. These may impact air quality within the subject area. The pre-mitigation impact is assessed to be “medium” in significance and after mitigation the impact is assessed to have a “low” significance. The assessment of this impact is presented in Table 7-22.

Table 7-22: Assessment of the impacts of the activities on air quality

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 2	L/M - 2	M/H - 8	M - 3	M - 36
Post-mitigation	L - 1	L - 1	M - 6	M/L - 2	L - 16

7.4.4.1 Mitigations and recommendation to air quality

- All maintenance of bulk services and infrastructure at the project site has to be designed to enable environmental protection.
- Emissions from the farm are to be monitored to ensure that they are within acceptable levels (South African National Ambient Air Quality Standards).

7.4.5 Impact Assessment of Waste Generation Impacts

Household waste from the activities at the site and from the staff working at the site will be generated. Without any mitigation measures implemented, the impact can be rated as of a “low” significance. After the implementation of the mitigations, the impact will be significantly reduced to low rating. The assessment of this impact is presented in **Table 7-23**.

Table 7-23: Assessment of the impacts of the proposed activities on waste generation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 1	L/M - 2	M/L - 4	M - 4	L - 28
Post-mitigation	L - 1	L - 1	L - 2	L - 1	L - 4

7.4.5.1 Mitigations and recommendation to waste generation

- The site should be kept tidy at all times.
- No waste may be buried or burned on site or anywhere else.
- Waste containers (bins) should be emptied weekly and the waste removed from site to the municipal waste disposal site.
- Separate waste containers (bins) for hazardous and domestic / general waste must be provided on site.
- Workers at the site should be sensitised to dispose of waste in a responsible manner and not to litter.
- The recycling of waste should be considered and implemented as far as possible.

7.4.6 Impact Assessment of Health and Safety

The safety, security and health of the labour force, employees and neighbours are of great importance. Operational activities may cause health and safety risks to people operating on the site. Without any mitigation measures implemented, the impact can be rated as of a “low” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-24**.

Table 7-24: Assessment of the impacts of the proposed activities on health and safety

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 1	L/M - 4	M/H - 8	M/H - 4	M - 52
Post-mitigation	L - 1	L/M - 4	M/L - 4	M/L - 2	L - 18

7.4.6.1 Mitigations and recommendation to health and safety

- Workers should be orientated with the maintenance of safety and health procedures, and they should be provided with PPE (Personal Protective Equipment).
- No open flames, smoking or any potential sources of ignition should be allowed at the project location. Signs such as ‘NO SMOKING’ must be prominently displayed in parts where inflammable materials are stored on the premises.
- The operations should comply with the provisions with regards to health and safety as outlined in the Labour Act (No. 6 of 1992).

7.4.7 Impact Assessment of Social Environment

The operational activities may provide employment opportunities for the local people. The assessment of this impact is presented in **Table 7-25**.

Table 7-25: Assessment of the impacts of the activities on social environment

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 2	H/M - 4	M - 6	M - 3	M - 36

7.4.7.1 Mitigations and recommendation to social environment

- Should any job opportunities result it should be made available to the local people in the area.

7.5 Decommissioning Phase

Should the proposed aquaculture and fish farm be decommissioned, the impacts and mitigation measures discussed below apply.

7.5.1 Impact of the Decommissioning on Employment Losses

The affected employees will no longer be employed at the fish farm. Pre-implementation of the necessary mitigation measures, this impact can be rated as “medium” and with the implementation of the necessary mitigation measures, the impact significance will be “low”. This impact is assessed in **Table 7-26** below.

Table 7-26: Assessment of the impacts of the fish farm decommissioning

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 2	L/M - 2	M - 6	M - 3	M - 30
Post-mitigation	L/M - 2	L - 1	L - 2	L - 1	L - 5

7.5.1.1 Mitigations and recommendation to fish farm decommissioning impact

- Communicate intentions to decommission well in advance (6 months) to enable workers to seek alternate employment in the event that they seek to avoid formal retrenchment.

7.5.2 Impact Assessment on Surrounding Property Owners

During the removal and destruction of the fish farm structure and associated infrastructure, the presence of the construction team will disturb the surrounding property owners. The construction work is not expected to continue for an extended period. Therefore, the likelihood of this impact is low. The assessment of this impact is presented in **Table 7-27**.

Table 7-27: Assessment of the impacts on surrounding property owners

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 2	L - 1	M/L - 4	M - 3	M - 21
Post-mitigation	L - 1	L - 1	L - 2	L - 1	L - 4

7.5.2.1 Mitigations and recommendation to disturbance of surrounding property owners

- Decommissioning work to take place during working hours only (08h00 - 17h00).
- Should work need to be done outside of working hours, neighbouring property owners need to be informed in writing prior to commencing.

7.5.3 Impact Assessment on Health and Safety

The safety, security and health of the labour force, employees and general public are of great importance. Safety issues could arise from the earthmoving equipment and tools that will be used on site during the decommissioning phase. This increases the possibility of injuries and the contractor must ensure that all staff members are made aware of the potential risks of injuries on site. With no mitigation measures in place, this impact will receive a “medium” significance rating. However, the implementation of applicable safety measures, the impact can significantly be reduced to a “low” rating. The assessment of this impact is presented in **Table 7-28**.

Table 7-28: Assessment of the impacts on health and safety

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 1	L/M - 4	M/H - 8	M/H - 4	M - 52
Post-mitigation	L - 1	L/M - 4	M/L - 4	L - 2	L - 18

7.5.3.1 Mitigations and recommendation to health and safety

- A health and safety officer should be employed to manage, coordinate and monitor risk and hazard and report all health and safety related issues in the workplace
- Workers should be orientated with the maintenance of safety and health procedures, and they should be provided with PPE (Personal Protective Equipment).
- The contractor is advised to ensure that the team is equipped with first aid kits and that they are available on site, at all times.
- No workers should be allowed on site if under the influence of alcohol.
- Workers should be trained on how to handle materials and equipment on site (if they do not already know how to) in order to avoid injuries.

7.5.4 Impact Assessment of Waste Generation

The demolition of buildings and infrastructure will result in the generation of waste which leads to environmental pollution, if not properly handled. This may pose a negative visual impact on the surrounding environment. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-29**.

Table 7-29: Assessment of the impacts of waste generation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 1	L/M - 2	M/L - 4	M - 4	L - 28
Post-mitigation	L - 1	L - 1	L - 2	L - 1	L - 4

7.5.4.1 Mitigations and recommendation to waste generation

- The site should be kept tidy at all times.
- All domestic and general waste produced on a daily basis should be cleaned and contained daily.
- No waste may be buried or burned on site or anywhere else.
- Waste containers (bins) should be emptied after the construction and removed from site to the municipal waste disposal site.
- Separate waste containers (bins) for hazardous and domestic / general waste must be provided on site.
- Construction labourers should be sensitised to dispose of waste in a responsible manner and not to litter.
- No waste may remain on site after the completion of the project.

7.5.5 Impact Assessment of Dust and Noise Generation Impacts

Decommissioning activities and the presence of construction vehicles may lead to the generation of dust and noise which could impact the local residents and businesses negatively, if not properly handled. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-30**.

Table 7-30: Assessment of the impacts of the proposed activities on dust and noise generation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 2	L/M - 2	M - 6	M/H - 4	M - 40
Post-mitigation	L - 1	L - 1	L - 2	M/L - 2	L - 8

7.5.5.1 Mitigations and recommendation to dust and noise generation

- Dust abatement techniques should be implemented e.g., spraying of water on site to reduce dust levels to an acceptable standard.
- The local community and surrounding businesses should be continuously consulted to ensure that the dust levels are acceptable.
- Residents and businesses should be informed prior to decommission commencing so that they are aware of the planned decommission.
- During high wind conditions the contractor must make the decision to cease works until the wind has settled.
- Workers should be provided with dust masks.

- Decommissioning activities should be limited to daytime hours (between 08h00 and 17h00) unless otherwise arranged with community members and businesses in the area.
- No amplified music should be allowed on site.
- Technology such as silencers should be installed on machinery.

7.5.6 Impact Assessment of Surface and Groundwater Impacts

Contamination of surface and groundwater might occur through oil leakages, lubricants and grease from the equipment and machinery at the site. Leakages from vehicles and machines during decommissioning activities may also contribute to soil and groundwater contamination. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-31**.

Table 7-31: Assessment of the impacts of the proposed activities on surface and groundwater

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 3	M - 2	M - 6	M - 4	M - 44
Post-mitigation	L - 1	M- 2	M/L- 4	M/L - 2	L - 14

7.5.6.1 Mitigations and recommendation to surface and groundwater

- Machinery should not be serviced at the project site to avoid spills. All spills should be cleaned up as soon as possible.
- Hydrocarbon contaminated clothing or equipment should not be washed within 25m of any surface water body.
- Care must be taken to avoid contamination of soil and groundwater. Use drip trays when doing maintenance on machinery. Maintenance should be done on dedicated areas with linings or concrete flooring.
- The risk can be lowered further through proper training of staff. All spills must be cleaned up immediately. Excavations should be backfilled and sealed with appropriate material, if it is not to be used further.
- Observation of soil on site for contamination from oil leakages, lubricants and grease from the equipment and machinery.

7.5.7 Impact Assessment of Soil Erosion Impacts

Soil erosion is likely to occur on site during the deconstruction of the facility given the characteristics of the site. The amount of storm water during rainfall events could increase erosion. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-32**.

Table 7-32: Assessment of the impacts of the proposed activities on soil erosion

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 2	M - 2	M - 6	M - 3	M - 30
Post-mitigation	L - 1	L - 1	M/L - 4	M/L - 2	L - 12

7.5.7.1 Mitigations and recommendation to soil erosion

- Erosion control measures (such as barriers) should be implemented to ensure that the topsoil is not washed away.
- Checks must be carried out at regular intervals to identify areas where erosion is occurring.
- Proper storm water management measures should be implemented.
- Where possible, it is recommended that construction activities take place during the dry season/winter months to reduce erosion and sedimentation risks associated with summer rainfall in this region.
- Appropriate remedial actions are to be undertaken wherever erosion is evident.

7.5.8 Impact Assessment of Traffic

During removal of materials and infrastructure from site traffic is expected to increase as a result of the trucks and vehicles that will be moving to and from the site. Without any mitigation measures implemented, the impact can be rated as of a “low” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in **Table 7-33**.

Table 7-33: Assessment of the impacts of the proposed activities on traffic

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L - 2	M - 2	M - 6	M - 3	L - 27
Post-mitigation	L - 2	L - 1	M/L - 4	M/L - 2	L - 16

7.5.8.1 Mitigations and recommendation to traffic

- All drivers of delivery vehicles and construction machinery should have the necessary driver’s licenses and documents to operate these machines.
- Vehicles are to make use of the approved access point.

- Speed limit warning signs must be erected to minimise accidents.
- Obey speed restrictions and traffic rules.

8 RECOMMENDATIONS AND CONCLUSION

8.1 Conclusion

The key potential biophysical impact related to the pre-operational, construction, operational and maintenance and decommissioning phases of the proposed project were identified and assessed. Suitable mitigation measures (where required and possible) were recommended, and the impacts can be summarised as follows:

- **Impacts on biodiversity loss (during pre-construction and construction phase):** The preparation of the site for the proposed development involves clearing of certain areas on site. This may impact the existing biodiversity in the area. The project will be constructed in a disturbed natural area which is home to little vegetation and possibly some fauna. During site preparation it should be ensured that only the areas applicable to the project site area are cleared. The layout of the proposed development should incorporate existing protected trees which may not be removed without a valid permit from the local department of Forestry. However, the impact can be adequately addressed by the recommendations given under subchapter 7.2.1, and management actions given in the EMP (Chapter 3).
- **Impacts on water usage (during construction, and operation phase):** Water is a scarce resource in Namibia and therefore water usage should be monitored and limited in order to prevent unnecessary wastage. The proposed project will make use of water in its construction and operational phase. The impact can be adequately addressed by the recommendations given under subchapters 7.3.3, 7.5.6 and management actions given in Chapter 3 of the EMP.
- **Impacts on soil, surface and groundwater (during construction and decommissioning phase):** Contamination of surface water might occur through oil leakages, lubricants and grease from the equipment and machinery during the installation, construction and maintenance of bulk services at the site. The impact can be adequately addressed by the recommendations given under subchapters 7.3.3, 7.5.6 and management actions given in Chapter 3 of the EMP.
- **Impacts of erosion (during construction and decommissioning phase):** The area/project site is sparsely covered by vegetation. The proposed development activities will not increase the number of impermeable surfaces. The amount of storm water during rainfall events could increase erosion. The impact can be adequately addressed by the recommendations given under subchapters 7.3.4, 7.5.7 and management actions given in Chapter 3 of the EMP.

- **Impacts on archeological and heritage resources (during construction phase):** There are no archeological and heritage resources known to be located on the sites. However, should these be encountered during the construction activities mitigation measures need to be in place to ensure that these resources are not harmed. The impact can be adequately addressed by the recommendations given under subchapter 7.3.5 and management actions given in Chapter 3 of the EMP.
- **Impacts on health and safety (during construction, operation and decommissioning phase):** The safety, security and health of the labour force, employees and general public are of great importance. Safety issues could arise from the earthmoving equipment and tools that will be used on site during the construction phase. This increases the possibility of injuries, and the contractor must ensure that all staff members are made aware of the potential risks of injuries on site. The impact can be adequately addressed by the recommendations given under subchapter 7.3.6, 7.4.6, 7.5.3 and management actions given in Chapter 3 of the EMP.
- **Impacts on noise (during construction, and decommissioning phase):** an increase in ambient noise levels at the proposed site is expected due to the construction and operation activities. Noise pollution due to heavy-duty equipment and machinery might be generated. The impact can be adequately addressed by the recommendations given under subchapter 7.3.7, 7.3.8, 0, Error! Reference source not found., 7.5.5 and management actions given in Chapter 3 of the EMP.
- **Impacts on dust and air quality (during pre-construction, construction, and decommissioning phase):** Vehicles transporting goods and staff will contribute to the release of hydrocarbon vapours, carbon monoxide and sulphur oxides into the air. Dust is expected to be worse during the winter months when strong winds occur. The impact can be adequately addressed by the recommendations given under subchapter 7.4.4 and management actions given in Chapter 3 of the EMP.
- **Impacts on waste (during construction, operation and decommissioning phase):** Household waste from the activities at the site and from the staff working at the site will be generated. Improper disposal of waste materials at the site may lead to pollution of the site and resultant environmental degradation. The impact can be adequately addressed by the recommendations given under subchapters 7.3.9, 7.4.5, 7.5.4 and management actions given in Chapter 3 of the EMP.

- **Impact on social environment (during construction, operation and decommissioning phase):** The proposed activity may provide employment opportunities for the local people during construction and operation of the proposed fish farm. The impact can be adequately addressed by the recommendations given under subchapter 7.3.11, 7.4.7, 7.5.1 and management actions given in Chapter 3 of the EMP.
- **Impact on traffic (during pre-construction, construction, operation and decommissioning phase):** Traffic is expected to increase during the construction and operational activities on the site. The impact can be adequately addressed by the recommendations given under subchapter 7.2.2, 7.4.1, 7.5.8 and management actions given in Chapter 3 of the EMP.

8.2 Recommendation

Based on the information provided in this report, GCS is confident the identified risks associated with the proposed development can be reduced to acceptable levels, should the measures recommended in the EMP be implemented and monitored effectively. It is therefore recommended that the project receive Environmental Clearance, provided that the EMP be implemented.

9 REFERENCES

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APPENDIX A

CV'S OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

APPENDIX B

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

APPENDIX C

LIST OF INTERESTED AND AFFECTED PARTIES

APPENDIX D

BACKGROUND INFORMATION DOCUMENT

APPENDIX E

NEWSPAPER ADVERTS

APPENDIX F

NOTIFICATIONS EMAILS AND LETTERS

APPENDIX G

PROOF OF SITE NOTICES

APPENDIX H

MEETING PRESENTATION, MINUTES AND ATTENDANCE REGISTER

APPENDIX I

COMMENTS RECEIVED

