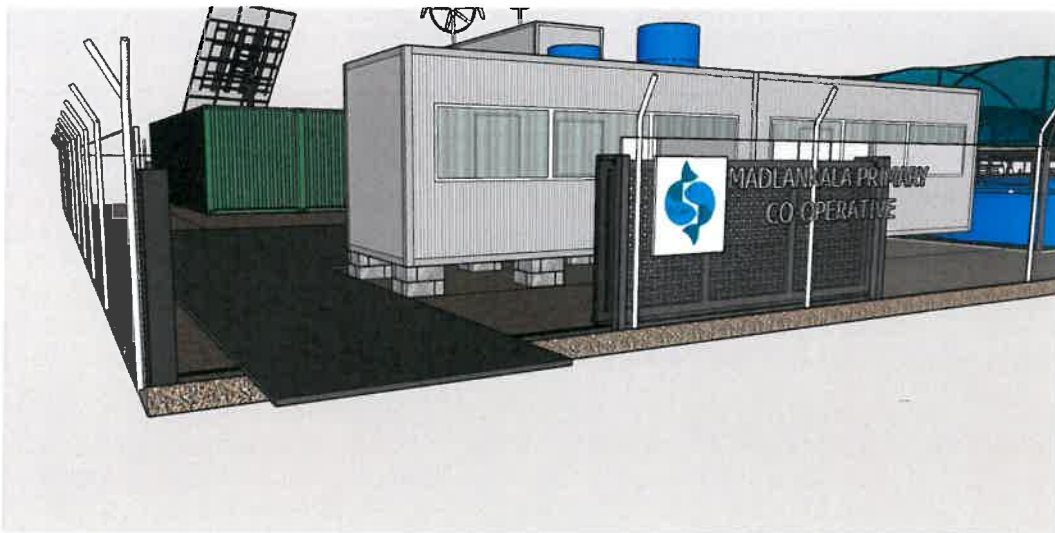


DRAFT BASIC ASSESSMENT REPORT

LAKE QHUBU FISH FARM

Application for Environmental Authorisation for the Proposed Establishment an Intensive Land Based Aquaculture (ILBA) Commercial Freshwater Fish Farm, Esikhaleni, City of uMhlathuze, KwaZulu-Natal.

EDTEA Ref No. DC28/0006/2019



Date: June 2019

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SECTION A: DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

1. NAME AND CONTACT DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Business name of EAP	18Phando Environmental Consulting (PTY) Ltd
Physical Address	02 Christie Rd, Pelham, Pietermaritzburg, 3201
Postal Address	02 Christie Rd, Pelham, Pietermaritzburg, 3201
Contact Details	076 822 0733
Email	info@phando.co.za

2. EXPERTISE OF THE EAP

Name of representative of the EAP	Education qualifications	Professional affiliations	Experience at environmental assessments (yrs)
Jeffrey Maivha	BSc. Hons Botany	South African Council for Natural Scientific Professions (SACNASP) and South African Association of Botanists (SAAB)	9 yrs

3. Names and Expertise of Specialists

Name of specialist	Education qualifications	Field of expertise	Contribution to the Basic Assessment Report	Title of specialist report
Brain Mafela	BSc (Hons)	Forest resources and Wildlife Management	Wetland Habitat Assessment	Report on Proposed Establishment of Commercial Land Based Freshwater Fish Farm at Qhubu Lake, Eskhawini, Umhlathuze Local Municipality, KwaZulu-Natal.
Andrew Briggs	MSc	Conservation Ecology	Wetland Habitat Assessment	Same as above

SECTION B: ACTIVITY INFORMATION

LIST OF ACRONYMS

BAR	Basic Assessment Report
DAFF	Department of Agriculture, Forestry and Fisheries
DEDTEA	Department of Economic Development, Tourism and Environmental Affairs
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GA	General Authorisation
I&AP	Interested and Affected Parties
IDP	Integrated Development Plan
ILBA	Intensive Land Based Aquaculture
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act
PPP	Public Participation Process

GLOSSARY OF ITEMS

ARCHAEOLOGICAL RESOURCES: includes (a) material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures; (b) rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation; wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

AQUACULTURE: is defined as the propagation, improvement, trade or rearing of aquatic organisms (plant and animal) in controlled or selected aquatic environments (fresh, sea or brackish waters) for any commercial, subsistence, recreational or other public or private purpose.

BASIC ASSESSMENT: The process of collecting, organizing, analyzing, interpreting and communicating information that is relevant to the consideration of the application.

BIODIVERSITY: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

CONTRACTOR: companies and/or individual persons appointed on behalf of the applicant to undertake activities, as well as their sub-contractors and suppliers.

DEVELOPMENT: the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.

DEVELOPMENT FOOTPRINT: any evidence of physical alteration as a result of the undertaking of any activity.

ENVIRONMENTAL MANAGEMENT PROGRAMME: a detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of the project. The EMP focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

ENVIRONMENTAL CONTROL OFFICER: an individual nominated through the applicant to be present on site to act on behalf of the applicant in matters concerning the implementation and day-to-day monitoring of the EMP and conditions stipulated by the authorities as prescribed in NEMA.

ENVIRONMENT: in terms of the National Environmental Management Act (NEMA) (No 107 of 1998) (as amended), Environment means the surroundings within which humans exist and that are made up of:

- i. the land, water and atmosphere of the earth;
- ii. micro-organisms, plants and animal life;
- iii. any part or combination of (i) of (ii) and the interrelationships among and between them;
- iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence; and
- v. human health and wellbeing.

ENVIRONMENTAL IMPACT: the change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.

FRESHWATER AQUACULTURE: produces species that are native to rivers, lakes, and streams. U.S. freshwater aquaculture is dominated by catfish but also produces trout, tilapia, and bass. Freshwater aquaculture takes place primarily in ponds and in on-land, manmade systems such as recirculating aquaculture systems.

GENERAL WASTE LANDFILL SITE: a waste disposal site that is designed, managed, permitted and registered to allow for the disposal of general waste.

GENERAL WASTE: waste that does not pose an immediate hazard or threat to health or the environment, and includes -

- Domestic waste;
- Building and demolition waste;
- Business waste; and
- Inert waste.

HAZARDOUS WASTE: hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste have a detrimental impact on health and the environment.

INDIGENOUS VEGETATION: refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

INTERESTED AND AFFECTED PARTY: for the purposes of Chapter 5 of the NEMA and in relation to the assessment of the environmental impact of a listed activity or related activity, an interested and affected party contemplated in Section 24(4) (a) (v), and which includes (a) any person, group of persons or organisation interested in or affected by such operation or activity; and (b) any organ of state that may have jurisdiction over any aspect of the operation or activity.

MARINE AQUACULTURE: refers to the culturing of species that live in the ocean. Marine aquaculture primarily produces oysters, clams, mussels, shrimp, and salmon as well as lesser amounts of cod, moi, yellowtail, barramundi, seabass, and seabream. Marine aquaculture can take place in the ocean (that is, in cages, on the seafloor, or suspended in the water column) or in on-land, manmade systems such as ponds or tanks. Recirculating aquaculture systems that reduce, reuse, and recycle water and waste can support some marine species.

MITIGATION: the measures designed to avoid reduce or remedy adverse impacts.

POLLUTION: the National Environmental Management Act, No. 107 of 1998 defines pollution to mean any change in the environment caused by the substances; radioactive or other waves; or noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

PRIMARY AGRICULTURE: The primary sector includes the production of raw material and basic foods. Activities associated with the primary sector include agriculture (both subsistence and commercial), mining, forestry, farming, grazing, hunting and gathering, fishing, and quarrying.

RECIRCULATING AQUACULTURE SYSTEM (RAS): is essentially a technology for farming fish or other aquatic organisms by reusing the water in the production. The technology is based on the use of mechanical and biological filters, and the method can in principle be used for any species grown in aquaculture such as fish, shrimps, clams, etc. Recirculation technology is however primarily used in fish farming, and this guide is aimed at people working in this field of aquaculture.

SECONDARY AGRICULTURE: The secondary agriculture provides value addition to agricultural products, creating facilities for primary processing and stress management in agriculture and adds value to the basic agro commodities to allow farmers to get better returns from their harvest

WATER POLLUTION: The National Water Act, 36 of 1998 defines water pollution to be the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it less fit for any beneficial purpose for which it may reasonably be expected to be used; or harmful or potentially harmful (a) to the welfare, health or safety of human beings; (b) to any aquatic or non-aquatic organisms; (c) to the resource quality; or (d) to property.

WATERCOURSE: can be a) a river or spring; b) a natural channel or depression in which water flows regularly or intermittently; c) a wetland, lake or dam into which, or from which, water flows; and/or d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.

WETLAND: land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

REHABILITATION: rehabilitation is defined as the return of a disturbed area to a state which approximates the state (wherever possible) which it was before disruption.

EXECUTIVE SUMMARY

18Phando Environmental Consulting has been appointed by Madlankala Primary Cooperative to conduct the Basic Assessment Process in terms of the 2014 EIA Regulations (as amended) for the proposed establishment of a land based commercial fresh water fish farm at Esikhaleni, Richards Bay, within City of uMhlatuze in KwaZulu-Natal.

Currently, the community of ward 13, eMabuyeni (Esikhaleni, Richards Bay), do not have any socio-economic activities within the surroundings to rely on. There is lack of employment, skills and food security in this community, this project will positively serve the community in and will have an advantage in different ways (provide employment, skills, food security etc.).

Madlankala Primary Cooperative is proposing to establish an Intensive Land Based Aquaculture (ILBA) Commercial Freshwater Fish Farm to produce fresh and processed fish for human consumption. The Project will be a Primary and Secondary Agriculture Producer focusing on the Production of Freshwater Fish (*Oreochromis moccambicus* aka Mozambique Tilapia) and Value Adding Processing for Human Consumption. The applicant has investigated three (3) alternative sites for the project. These sites are located in close proximity to each other, therefore assessed as one site. The alternative sites fall within a degraded area comprising of gum tree plantation.

The most notable environmental impacts that were identified included disposal, discharge of wastewater containing nutrients such as nitrogen and phosphorus as well as diseases and pathogens into the nearby watercourse (Lake Qhubu). Soil erosion from poor management of stormwater is also highlighted as a cause for concern. These impacts highlight the need for an innovative and efficient wastewater treatment facility, reuse of sludge as fertiliser for example, and an effective stormwater management system.

The public participation process (PPP) involves undertaking of public meetings with the affected communities, consultation with the relevant Government Stakeholders and other Interested and Affected Parties (I&APs). On-site notices were displayed around the proposed sites, the local school, community halls and next to local shops. A media advertisement was placed in Zululand Observer Newspaper in English. The Background Information Document (BID) was also distributed to relevant Government Stakeholders.

The Draft Basic Assessment Report and EMP are currently circulated to all the I&APs and the comments will be incorporated in the final BAR. The Draft BAR has been drafted in accordance with the EIA Regulations 2014 and adheres to the requirements contained in Appendix 1 of GNR 327 of 7 April 2017.

1. INTRODUCTION

18Phando Environmental Consulting has been appointed by Madlankala Primary Cooperative to undertake the Basic Assessment Process in terms of Sections 24(5) and of the National Environmental Management Act, 1998 (Act No.107 of 1998) as read with the Environmental Impact Assessment (EIA) Regulations of 04 December 2014 (as amended). This project is registered with the Department of Economic Development, Tourism and Environmental Affairs (King Cetshwayo District Office).

2. PROJECT TITLE

The Proposed Establishment of a Commercial Intensive Land Based Aquaculture (ILBA) Freshwater Fish Farm, Esikhaleni, City of uMhlathuze, KwaZulu-Natal.

3. PROJECT DESCRIPTION

The Madlankala Primary Cooperative is proposing to establish an Intensive Land Based Aquaculture (ILBA) Commercial Freshwater Fish Farm to produce fresh and processed fish for human consumption. The Project will be a Primary and Secondary Agriculture Producer focusing on the Production of Freshwater Fish (*Oreochromis moccambicus* aka Mozambique Tilapia) and Value Adding Processing for Human Consumption. The proposed development will entail:

- a. site preparation/civils
- b. professional services, licensing applications, etc.
- c. infrastructure supply and build including water extraction from Lake
- d. electrical supply and build (Eskom, solar, wind and generator)
- e. includes all production and processing equipment
- f. Administrative furniture and electronic equipment (3 in 1 Fax/Copier/Scanner plus 2 Desktop Computers and 1 Laptop)
- g. Fencing and Lighting including gates
- h. Car Park and Driveway
- i. 1 ton Insulated LDV for deliveries
- j. 1 x Small Tractor and Trailer for on-farm use
- k. operating inputs for the 1st year of operation
- l. surface moveable pipe between the fish farm and lake for extraction of water from the lake once a month.
- m. digging a Pit/Well into the Ground above the high-water level to below the water table allowing water to seep into it and extract water from there.

A 40 Production Pond System is proposed, which will be housed in 3 x (30m x 10m) Agricultural Type Steel & Plastic Tunnels (Production Units) complete with extensive Filtration and Reticulation Systems. This system will be capable of holding a total of approximately 40,000 Fish (all ages) and expected to be producing a Monthly Harvest (Production Output) of 3.5tons / 3500kg on average. A 53 000 L reservoir has been included to provide storage of reserve water, which will be sourced from Lake Qhubu and provide a minimum 21 day Production Replenishment Water Reserve.

4. ACTIVITY APPLIED FOR IN TERMS OF NEMA, EIA REGULATIONS

Listing Notice	Activity	Description	Relevance to the proposed activity
1	6	The development and related operation of facilities, infrastructure or structures for aquaculture of— (i) finfish, crustaceans, reptiles or amphibians, where such facility, infrastructure or structures will have a production output exceeding 20 000 kg per annum (wet weight)	This system will be capable of holding a total of approximately 40,000 Fish (all ages) and expected to be producing a Monthly Harvest (Production Output “PO”) of 3.5tons / 3500kg on average.
1	13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	The proposed development will host a 53 000 L Reservoir to provide storage of reserve water, which will be sourced from Lake Qhubu.
1	12	The development of— (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	Although the proposed entire footprint of development will be outside 32 meters of a watercourse, the structure for extraction of water from the lake will be located with the 32 meters of a watercourse.
1	19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from (a) watercourse	The proposed development will include structures for extraction of water from the lake, there will be dredging, extraction and removal of soil of more than 10 cubic meters to place the structure.

5. ALTERNATIVES CONSIDERED

Consideration of alternatives is an important element in the EIA process. "Alternatives" are defined in the NEMA EIA regulations, 2014 (GN 327 of 2014) as: In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

- a. property on which or location where the activity is proposed to be undertaken;
- b. type of activity to be undertaken;
- c. design or layout of the activity;
- d. technology to be used in the activity; or
- e. operational aspects of the activity;
- f. and includes the option of not implementing the activity.

The role of the EAP is therefore to provide a framework for sound decision-making based on the principles of sustainable development. Potential alternatives that were considered for the proposed Lake Qhubu Fish Farm are detailed below:

a. Property alternatives

Three (3) alternative sites were considered for the proposed development. See map below for the proposed site alternatives:



Figure 1. Alternatives map, the preferred alternative (red) and alternative 2 in yellow and alternative 3 in Orange for the proposed development.

All alternative sites are within the land leased by the applicant, alternative 1 in red (preferred) is located directly facing the lake and 140 m away from the edge of the lake, while the other alternatives are more inland, with alternative 2 (yellow) located further away from the edge of the lake (160 m away) and alternative 3 located 230 m away from the edge of Lake Qhubu. All the alternatives fall within gum tree plantation and no natural vegetation was identified within these alternatives.

b. Activity alternatives

A variety of alternatives were considered in terms of the activity (type of development). These included; a commercial gum tree plantation, fish farm and a combination of the two.

The preferred alternative (Site 1) is exclusively a Land Based Aquaculture. The site is deemed most appropriate for fish farm for the following reasons:

- The site is located in close proximity to a watercourse (i.e. Lake Qhubu).
- The Project will use latent non-productive land
- The site is easily accessible.
- The activity aims to address the Socio-Economic aspects of the area.
- The project will contribute to food security for the area.
- Relatively high employment opportunities and downstream benefits

c. Design or layout alternatives

The Alternative Layout (Fig. 2 below) was drafted in May 2018. This layout proposes a 40 Production Pond System, which will be housed in 3 x (30m x 10m) Agricultural Type Steel and Plastic Tunnels (Production Units) complete with extensive Filtration and Reticulation Systems.

Total water in circulation in full operation will be 611,000 litres (611 kilolitres) including the Reservoir. The farm will have an estimated water loss of 2,000 litres per day in mid-summer (less in winter) due to evaporation, mechanical loss and filtration related processes. Therefore, the estimated amount of water required to be added to the System (sourced from the Lake) is 60Kl per month in mid-summer reducing to approximately 15Kl in mid-winter.

This system will be capable of holding a total of approximately 40,000 Fish (all ages) and expected to be producing a Monthly Harvest (Production Output) of 3.5tons / 3500kg on average. A 53,000lt Reservoir has been included to provide storage of reserve water, which will be sourced from Lake Qhubu and provide a minimum 21-day Production Replenishment Water Reserve. Converted Containers in a stacked and parallel layout are preferred as structures in which to house administration, processing, storage, workshop and ablution facilities.

An important attribute of the Recirculating Aquaculture System (RAS) is that there will be an extremely low and controlled water exchange back into the environment. Water is continuously circulated through the system passing through an elaborate RAS Filtration System that extracts chemicals and solids (by-product) from the water put into it by the fish. This by-product waste is harvested and

turned into decomposed organic matter (organic compost) through an On-Site Worm Farm. Fish Processing Waste will be converted into either:

- Pet Food,
- Back into a Dried Protein Fish Food Additive, or
- Processed through an underground Bio Digester.

The Project will rely on Eskom supplied electricity as a principal source of power however a Provision has been made in the Budget to set up a Solar and Wind Energy System to reduce reliance on Eskom. Back Up power will be via an On-Site Generator. The net effect of Green Energy should provide a minimum 15% Electricity saving, possibly up to 30%.

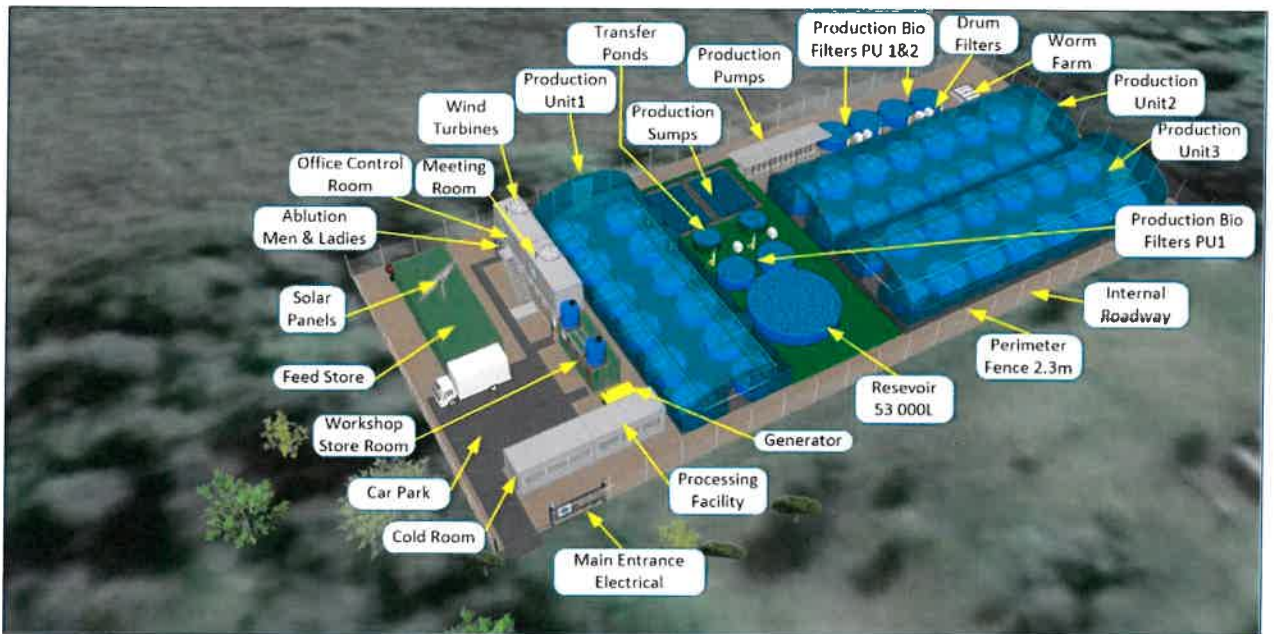


Figure 2: Layout alternative for the proposed Lake Qhubu Fish Farm Development.

d. Technology alternatives

For this project, no alternative technologies were considered, the RAS system as described above is the only technology that will be applied.



Fig 3: Image showing the RAS system to be employed for the Lake Qhubu Fish Farm

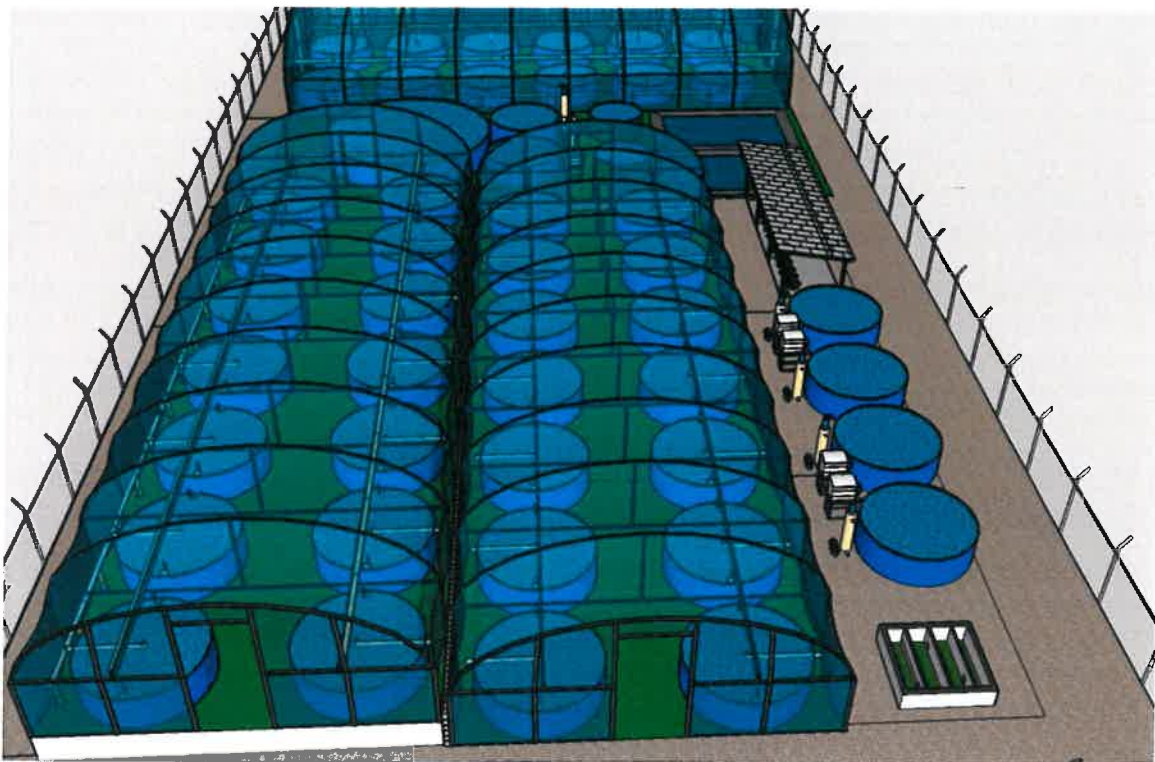


Fig 4: Image showing the RAS system with ponds for fish breeding

e. No-go alternative

The no-go Alternative is the option of not undertaking the proposed fish farm development. The no-go option would contribute to the failure to meet the growing needs for employment, skills and food security in the area. This may have long-term negative repercussions on the socio-economic structure of the population of Madlankala Reserve, including areas outside of the town planning scheme (i.e. the Mabuyeni and Mpembeni area) where there is a significant lack of socio-economic activities.

Of course, the no-go option would result in the site remaining undeveloped. This would result in 100% of the property remaining as a commercial plantation which is impacting on the available water for the area. Parts of the property are currently rife with illegal dumping and hunting. The no-go alternative would see these illegal activities continue.

6. ACTIVITY LOCATION

The chosen site is located on the south-eastern shores of Lake Qhubu, Esikhaleni, City of Mhlathuze, KwaZulu-Natal, South Africa. It is easily accessible and close to arterial, regional and national roads (i.e. N2) and in close proximity to large densely populated areas.



Figure 5. Location of the proposed site, on a regional scale

In terms of the Environmental Services Management Plan (EMSP) for the uMhlathuze Local Municipality the site fall within an area classified as “Development Zone” which means the area is not critical biodiversity support area and development of the site is permitted.



Figure 6. Location of the proposed site, on a local scale. Property boundary in red

7. PHYSICAL SIZE OF THE ACTIVITY

The proposed site is approximately 70m x 30m (total 2100m²) in size. The entire area of 2100m² was identified as ecologically insignificant by the EAP hence the area comprises of commercial plantation.



Figure 7. The proposed site, showing the commercial plantation.

8. SITE ACCESS

The proposed development site will be accessed via the N2, off the Esikhaleni exit towards Esikhaleni Mall, at the Mall robots turn left into Mdletse road and continue straight for 3.7 km, then take the left exit into Lake Qhubu.



Figure 8. Access to the proposed development

a. Traffic Impact

A Traffic Impact Assessment was not conducted for this project due to the anticipated low traffic volumes from this development.

9. ACTIVITY MOTIVATION

a. Socio-economic value of the activity

The socio-economic environment may be described as that part of the environment which has its origin or being in human activities i.e. social, economic, cultural and political objects and processes (DEAT, 1992). The socio-economic improvements which can be expected from the Lake Qhubu Fish Farm Development are described below.

b. Quality of life impacts

Quality of life may be best described in terms of value, standard of living, benefits and advantages that a given community may currently have or may receive in the future. The Lake Qhubu Fish Farm Development can potentially have a significant positive impact on the local residents. The potential quality of life aspects and associated impacts include:

I. Employment opportunities

The direct impact will be the temporary employment of at least 10 people to assist during the Construction Phase (3-5 months) and a further 10 Permanent Employees, who will receive Aquaculture Training, to assist with Farm Production.

These Permanent Employees could potentially become Aquaculture Product Satellite Growers so that they can operate their own Small Scale Aquaculture Production Units with/without Off-Take Agreements back to this Project for Processing or become Retail Fish Mongers in the District Trading Fish products into their respective communities. Should the Permanent Employees choose to venture off to run their own Aquaculture business this will create new employment opportunities within the Project.

This Project, once established, will offer Training in Freshwater Aquaculture which the Members intend registering with Local and Regional Authorities to transfer skills to potential Aquaculturalists. This opportunity will facilitate the setting up of new Satellite Growers and/or Traders as elaborated above.

All of these aspects will contribute greatly toward the establishment of a Regional Freshwater Aquaculture Industry that stimulates economic activity, job creation, assists alleviate poverty and brings a new hope to the region.

No-go alternative: should the development not be approved the employment opportunities will not be realised.

II. Food security for the area

This Project, once established, will stimulate economic activities, job creation, assists alleviate poverty and brings a new hope to the region. The project will also benefit the area in terms of food security for the local population including provincial and national.

No-go alternative: should the development not be approved the food security opportunities will not be realised.

c. Ecological value of the activity

The proposed development will obviously result in the loss of approximately 2100m² of land currently comprising of commercial plantation. Although the property is in close proximity to a watercourse (i.e. Lake Qhubu), there will not be any negative impacts on the lake except for water extractions which will happen once a month or once in two months. Impacts that may potentially arise from water extraction will be discussed further in Section E of this BAR.

There are illegal activities causing environmental degradation and have spiralled out of control. These include;

- Illegal fishing (fishing in the lake with gill nets)
- Hunting (with the aid of hunting dogs and traps),
- Illegal dumping of Domestic refuse, Garden refuse and Building rubble,

The development will prevent unauthorised access to the site and the illegal activities mentioned above. Much of the land intended for development is degraded or transformed, this has obvious impacts on the ecological value of the land and has resulted in a high density of invasive alien plant species. If the development is authorised, 2100m² area will be fenced off and protected.

The applicant will implement environmental management measures on the land as per the Environmental Management Programme (EMPr) attached to this BAR. The responsibility would then lie with the applicant during the construction and operational phases. Clearing Invasive Alien Plants will be an important on-going requirement for maintaining the ecological health of the site. As will monitoring and managing soil erosion and waste management (these mitigation measures are explained in greater detail in the EMPr.

The EMPr, includes specific measures to ensure the construction and operation of the Fish Farm Development has minimal adverse impacts on the ecological health of the site and surrounds. Some of the measures include:

- Only indigenous plants will be used for landscaping purposes.
- The site must be kept free of invasive alien plants
- Sufficient waste management will be implemented to encourage recycling and reduce the risk of pollution to the surrounding environment especially to the lake.
- Stormwater management infrastructure must be correctly constructed and constantly maintained to reduce the risk of erosion and degradation of watercourses.

The no-go alternative: will see the 2100m² remain undeveloped. Unless actively prevented, the illegal activities resulting in environmental degradation shall continue.

10. APPLICABLE LEGISLATION

The following legislation is relevant to the application:

- Constitution of South Africa: Act No 108 of 1996
- National Environmental Management Act: Act No 107 of 1998.
- National Environmental Management: Protected Areas Act 57 of 2003
- Environmental Conservation Act: Act No 73 of 1989.
- National Heritage Resources Act: Act No 25 of 1999.
- KZN Heritage Act: Act 4 of 2008.
- National Water Act: Act No 36 of 1998.
- Hazardous Substances Act: Act No 15 of 1973.
- National Environmental Management: Biodiversity Act 10 of 2004.
- Occupational Health and Safety Act: Act No 85 of 1993.
- Natal Nature Conservation Ordinance: Act No 15 of 1974.
- Subdivision of Agricultural Land Act: Act No 70 of 1970.
- Conservation of Agricultural Resources Act: Act No 43 of 1983.
- National Forests Act: Act No 84 of 1998.
- National Environmental Management: Waste Act: No. 59 of 2008

11. WASTE MANAGEMENT, EFFLUENT, STORMWATER, EMISSIONS AND NOISE MANAGEMENT

These will be discussed in greater detail in the Environmental Management Programme (EMPr, Appendix F). A summary is provided below.

a. Solid Waste Management

The site falls within an area that is not covered by municipal service provision. As such, municipal waste collection would be utilised. The City of uMhlatizwe will be contacted to arrange that waste removal services can be made available once plans have been approved by council. Suitable areas for bins must be developed within the site. Solid waste is to be temporarily stored prior to municipal collection. The development will have separate refuse rooms for solid waste storage.

b. Waste water management

The Project will use latent non-productive land. The chosen method of production (i.e. RAS or Recirculating Aquaculture System) is a world leading method of intensive, high yielding production that operates in a Closed System with minimal impact on the environment.

It entails production under highly controlled parameters with water that continuously recirculates through the Farm, passing through extensive Filter Systems that efficiently remove solid and chemical secretion from the Fish. The recirculation nature of the system means that only an extremely limited top-up of naturally sourced (either rain or ground water) new water is required over time to compensate evaporation and minimal mechanical water loss. There is no dumping of water back into the environment.

Through the use of Bio-Digesters and Worm Farms, solids emanating from the Farm can be converted to a usable manure or potentially into a source of gas energy, which in turn can be used for water heating purposes on the Farm.

c. Effluent Management

Normal sewerage will be produced by the development. With regards to treatment of waste from ablution facilities at the site, full waterborne sanitation must be provided to each unit linking to an existing sewer infrastructure. This must be given priority over setting up an onsite treatment plant.

However, In the event that a link cannot be made to an existing sewer infrastructure, the use of an onsite package treatment plant such as activated sludge /extended aeration plant, trickling filter, submerged bio-contactors and rotating bio-contactors will be investigated.

d. Storm water Management

The farm design reflects that all water from the production system will be contained in a closed reticulation system. A large attenuation pond is included to hold up to 30% of the total water volume in circulation at any time and through which production water will pass on regular intervals.

In terms of Stormwater Management, the proposed project is going to be situated on the shore of the lake Qhubu and so all runoff (rain) will eventually end up back in the Lake. On the farm footprint, gutters will be installed as well as surface drains to direct water into the attenuation pond with an overflow into the Lake in a controlled manner.

The following potential negative impacts relating to storm water run-off were identified during a site Assessment;

- Soil erosion and sedimentation;
- Pollution as a result of runoff from the development area entering into the watercourse, and
- Disturbance within the area thereby increasing the encroachment of alien invasive species.

See final engineering drawings (Appendix H) for more information on Stormwater Management.

e. Emissions into the atmosphere

Very little in terms of atmospheric emissions will be generated by the proposed development. During construction phase, dust and exhaust emissions are predicted from vehicles on the dirt road. If earth moving is to take place, it will be during winter months (when ground cover is reduced and the soils are dry) this may generate excessive dust. Considering the close proximity to residential properties, it is imperative that this dust be controlled by splashing water at the construction site.

Where possible, clearing of vegetation should take place at a maximum of two months prior to building. Clearing of vegetation should take place sequentially on portions which will be built on next. This will avoid land being cleared of vegetation long before it will be built on. Plots cleared of vegetation are high risk in terms of dust generation and erosion. If the Environmental Control Officer

deems dust an issue during construction, surface wetting can be considered as a means of controlling dust emission. Building materials of fine particles must be suitably protected from wind dispersion.

f. Generation of noise

Vehicles, construction and workers on site are likely to result in general disturbance and noise generation. It is an important impact to address and mitigate as the site is within close proximity to residential areas. During construction, building activity must be restricted to regular working hours during the week and must be controlled over weekends and public holidays (as per the EMPr).

12. WATER, ELECTRICITY AND ENERGY USE

The proposed project will require a source of water to provide for its initial charge/fill (611 000 litres over the period of 12-month establishment as production is scaled up) and then on-going top up requirements (estimated to be 37 000 litres per month – less in winter more in summer). Abstraction of water will be from Lake Qhubu during operational phase.

All water to be used during construction phases of the project will be from the municipal supply. A Service Level Agreement is still to be obtained; however, a letter has been obtained from the water and sanitation unit of the municipality confirming they have capacity to provide bulk water services for the development.

a. Water-use licence

The proposed project falls within 500 m of a watercourse thereby triggering a water-use licence in terms of *Sections 21c and 21i* of the National Water Act (Act 36 of 1998). The applicant is aware that water use licence is required before any construction can commence and wishes to finalise the Environmental Authorisation process simultaneously with the Water Use License Application. The water-use application will be launched with DWS in June 2019.

b. Electricity supply

The proposed project will rely on Eskom supplied electricity as a principal source of power. Electricity will be supplied from the grid, via City of uMhlathuze's Electricity Unit. A Service Level Agreement is still to be obtained but confirmation of capacity to supply electricity has been obtained.

c. Energy efficiency

Provision has been made in the project budget to set up a Solar and Wind Energy System to reduce reliance on Eskom. Back Up power will be via an On-Site Generator. The net effect of Green Energy should provide a minimum 15% Electricity saving, possibly up to 30%.

SECTION C: DESCRIPTION OF THE BASELINE ENVIRONMENT

a. GRADIENT AND TOPOGRAPHY OF THE SITE

The gradient of the site is as follows:

Gradient	Description
Flat	The entire proposed site can be described as having a relatively flat gradient
1:50 – 1:20	N/A
1:20 – 1:15	N/A
1:15 – 1:10	N/A
1:10 – 1:7,5	N/A
1:7,5 – 1:5	N/A
Steeper than 1:5	N/A

The topographical features and landforms of the site and surrounding area are as follows:

Topographical feature	Description
Ridgeline	N/A
Plateau	N/A
Side slope of hill/mountain	N/A
Closed valley	N/A
Open valley	N/A
Plain	The site and surrounding topography is described as plain
Undulating plain/low hills	N/A
Dune	N/A
Sea-front	N/A

b. GEOLOGY OF THE SITE

The site is underlain by unconsolidated sand of oceanic origin. Given the loose nature of sand, the study area has a soil erodibility score (K-factor) of 0.66 which means it is highly erodible (Schulze, 2007).

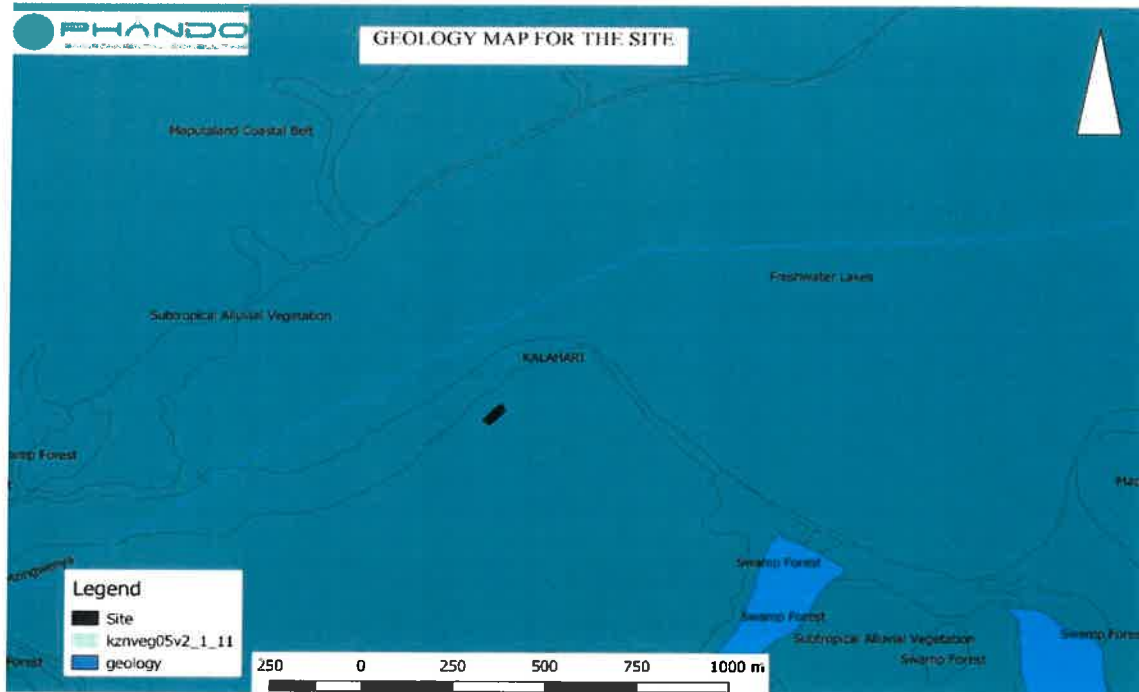


Fig 9: Geology Map for the proposed Lake Qhubu Fish Farm

c. VEGETATION

Effort has been made to ensure the proposed development is largely restricted to parts of the property which have been previously disturbed. Vegetation study was not conducted for this project hence the entire proposed site comprises of Gum Plantation.

1. Biome and vegetation type

The site falls within Maputaland Coastal Belt (CB 1) according to Mucina and Rutherford (2006) Vegetation Map. Distributed within KwaZulu-Natal Province (and continuing also in southern Mozambique): Up to 35 km broad strip along the coast of the Indian Ocean stretching from the Mozambique border in the north to Mtunzini in the south. Altitude varies from about 20–120 m.

Vegetation and Landscape features comprises of flat coastal plain originally probably densely forested in places with a wide range of interspersed non-forest plant communities including dry grasslands (which include palm veld where special conditions prevail), hygrophilous grasslands and thicket groups. Today the vegetation landscape is composed of pockets of various forest types (separated into different vegetation units), thickets, primary and secondary grasslands, extensive timber plantations and cane fields. The belt of the IOCB immediately inland (only a few kilometres wide) and parallel to the line of the Northern Coastal Forest has a characteristic appearance of very irregular dunes with generally open vegetation and *Syzygium cordatum* dotted predominantly on the dunes, with many irregular dune slacks interspersed. There is little to suggest that this part of the vegetation e.g. between Lake Sibaya and Kosi Lake, is secondary. The peculiar CB 2 Maputaland Wooded Grassland – still another vegetation unit embedded within the geographical extent of the Maputaland Coastal Belt

– is treated as a separate vegetation unit. The map below (Figure 10) shows vegetation types within the study area where the proposed project will take place.



Fig 10: Vegetation Map for the proposed site

The site is however completely degraded and transformed to gum tree plantation. There is no natural vegetation occurring on the proposed site. Single standing trees (i.e. *Syzygium cordatum*) were recorded but outside the proposed site. These trees will not be affected by the proposed development.

II. Species composition

Vegetation on site can be categorised as Gum Tree Plantation and Secondary grassland, infiltrated by alien species.

III. Protected species

No protected species identified on site, the entire site comprises of Gum Tree Plantation.

IV. Sensitivity of the site

The site does not fall within an area considered to be CBA Irreplaceable according to the EKZNW CBA Irreplaceable map (see CBA map below – Figure 11). However, the edges of the lake are considered to be sensitive hence they embrace wetland features.

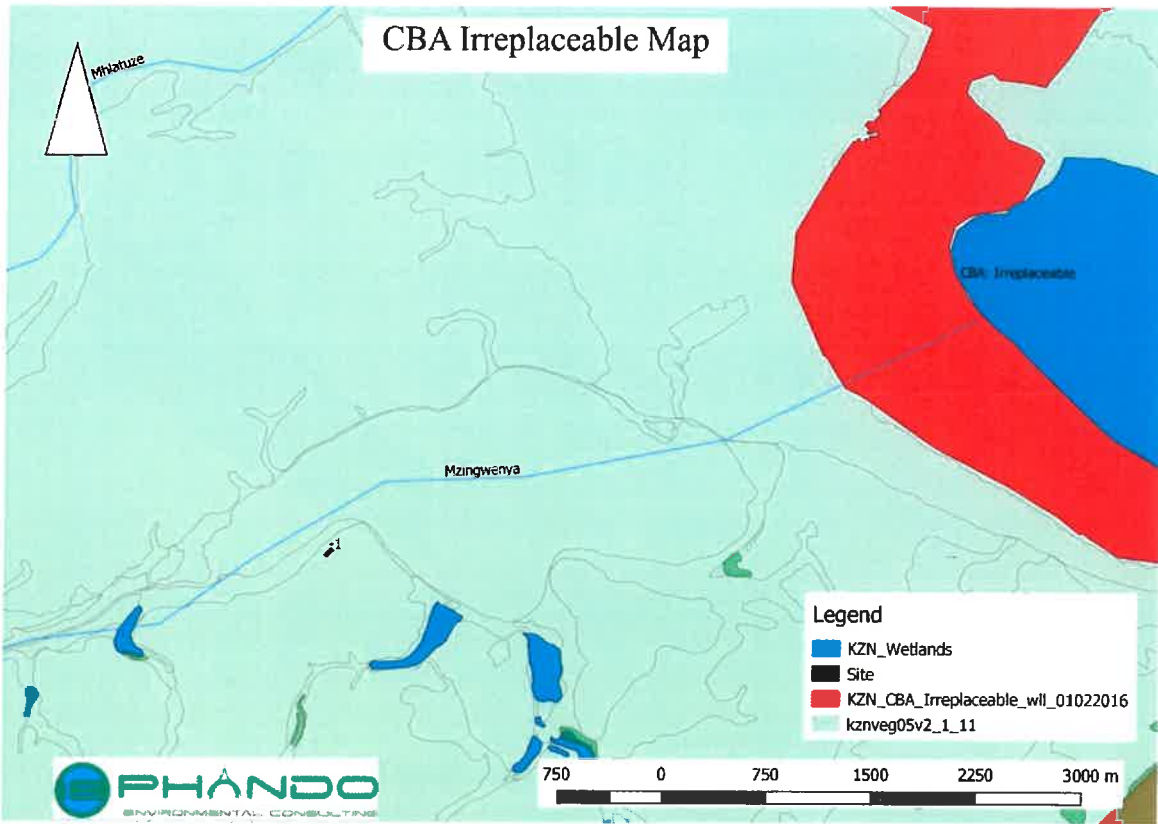


Fig 11: CBA Irreplaceable Map for the area.



Fig 12: Sensitivity Map of the area

d. Conclusions and recommendations made by EAP

The proposed site in its current form is considered degraded based on the presence and of abundance alien species as well as permanent modification due to Gum Tree Plantation and illegal dumping.

It is the opinion of the EAP that the site that is does not comprise primary natural vegetation and be considered for development. The proposed development will prevent illegal dumping and if managed correctly, could prevent further degradation of the site.

e. Wetland Habitats.

Through desktop delineation, the specialist identified a single wetland habitat (Unit S1) and a lake (Unit L1 – Qhubu Lake) within the regulated area for water use licensing (a 500m radius of the study area). The wetland occurs on the fringes of Qhubu Lake, on a gentle slope where subsurface flows break the surface. Water inputs are in the form of subsurface flows and water output is in the form of both subsurface and diffuse surface flows. According to the KZN Vegetation Type Map (EKZNV, 2012), the wetland is characterised by a grassland community that typically grows in alluvium found on lowland floodplains. Typical grasses include *Miscanthus sp*, *Leexia hexandra*, *Imperatea cylindrica* and *Paspalum sp*.

See specialist report attached (Appendix A)

f. Relocation of protected species

There will not be species relocation on this site. If relocation of some of the protected species is required, a permit for their removal will need to be obtained from Ezemvelo KZN Wildlife (from provincially protected species) or DAFF (for Nationally protected species). Their removal should occur during the summer months and with due care, preferably by a qualified botanist or similarly qualified individual. The plants should be relocated into areas with the same aspect, soil conditions and elevation to ensure that the relocations are successful. In addition, the plants should be placed into good-sized holes that are at least twice the size of underground organs. It is very important for survival for underground organs not to be damaged and for plants to be watered for a period of time.

g. CURRENT LAND USE OF THE SURROUNDING AREA

Land use within 500m of the site includes residential, education (primary school and pre-primary school), a place of worship and commercial use (shops and small businesses in eMabuyeni area).

h. CULTURAL, HISTORICAL AND ARCHEOLOGICAL RESOURCES

Based on site visits, information from the, Heritage Specialist, applicant, and the land owner there appears to be no historical or culturally significant features on the property (including graves). Precautions will be included in the EMP to ensure that if contractors find any artefacts on site it will be reported to the provincial heritage agency (Amafa kwaZulu-Natal) before any disturbance occurs.

SECTION D: IMPACT ASSESSMENT

a. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Refer to Appendix E for full issues trail

b. IMPACTS THAT MAY RESULT FROM PHASES OF CONSTRUCTION

b1. Impacts that may result from the planning and design phase

The planning and design phase includes little on-site work or environmental risks, planning and design have largely been desktop exercises.

b2. Impacts that may result from the construction/operational/decommissioning phases

The table below identifies the potential impacts identified for the construction, operation and decommissioning phases of the proposed Lake Qhubu Fish Farm.

The potential impacts are described and assessed for significance. Significance is assessed by scoring each impact based on four variables, including probability, severity, duration and spatial implications.

On the understanding that a significant impact is one which, whether in isolation or in combination with other impacts, could have a material influence on the decision-making process, including the specification of mitigation measures; significance in this report is scaled according to impact scores as follows:

- Low (scoring 9 or less)
- Medium (scoring between 10 and 15)
- High (Scoring 16 or more)

The four variables, with their score criteria are detailed below:

Frequency / Probability (FR)

(Frequency or likelihood of activities impacting on the environment)

- 1: Almost Never / impossible
- 2: Very seldom / highly unlikely
- 3: Infrequent / Seldom
- 4: Often / Regular
- 5: daily / Highly regular

Severity (SV)

(Degree of change to the baseline environment in terms of reversibility of impact; sensitivity of receptor, duration of impact and threat to environment and health standards)

- 1: Insignificant / not harmful
- 2: Small / potentially harmful
- 3: Significant / slightly harmful
- 4: Great / harmful
- 5: Disastrous / extremely harmful

Duration (DR)

(Length of time over which activities will cause change to the environment)

- 1: One day to a month
- 2: One month to a year
- 3: One year to ten years
- 4: Life of project
- 5: Post closure

Spatial Scope (SS)

(Geographic overage)

- 1: Activity Specific
- 2: Site specific
- 3: Area
- 4: Regional
- 5: National

Nature of Impact	Frequency		Severity		DR	SS	Impact	Significance
	Unmitigated	Mitigated	Unmitigated	Mitigated				
Construction Phase								
Traffic and access	5	4	2	2	2	2	10	Medium
Soil erosion	4	3	5	3	2	2	10	Medium
Groundwater Pollution	3	2	3	2	2	3	9	Low
Surface Water	5	4	5	4	2	2	12	Medium
Noise and Disturbance	5	4	4	3	2	2	11	Medium
Destruction of Flora	2	1	2	1	2	2	6	Low
Disturbance of Fauna	4	2	3	1	2	2	7	Low
Health and Safety	5	3	4	2	2	2	9	Low
Waste and litter	5	3	3	2	2	2	9	Low
Visual Impacts	5	4	4	3	2	3	12	Medium
Total	43	30	35	23	20	21	94	
Operational Phase								
Traffic and access	5	5	2	2	4	2	13	Medium
Soil erosion	3	2	3	2	4	2	10	Medium
Groundwater Pollution	2	1	3	2	4	3	10	Medium
Surface Water	5	2	5	2	5	3	12	Medium
Noise and Disturbance	4	4	1	1	4	3	12	Medium
Destruction of Flora	2	1	2	1	1	1	4	Low
Disturbance of Fauna	3	2	3	1	2	2	7	Low
Health and Safety	5	3	4	2	2	1	9	Low
Waste and litter	5	3	3	2	2	2	9	Low
Visual Impacts	5	4	3	2	4	3	13	Medium
Total	39	27	29	17	32	22	98	
Decommissioning Phase								
Traffic and access	3	2	2	2	2	3	9	Low
Soil erosion	5	3	5	2	5	2	10	Medium
Groundwater Pollution	5	3	5	3	2	3	11	Medium
Surface Water	5	3	5	4	5	3	15	High
Noise and Disturbance	5	3	4	3	2	3	11	Medium
Destruction of Flora	2	1	2	1	2	2	6	Low
Disturbance of Fauna	3	2	3	1	2	2	7	Low
Health and Safety	5	3	4	2	2	1	8	Low
Waste and litter	5	2	4	2	2	2	8	Low
Visual Impacts	5	4	3	2	4	3	13	Medium
Total	43	26	37	22	28	24	100	

c. MITIGATION MEASURES

Mitigation means to make something less severe – this may be by implementation of practical measures to reduce, limit and eliminate adverse impacts.

The potential environmental concerns have been considered and mitigation measures have been proposed. In many cases, the planning phase for the proposed development has already addressed potential impacts, particularly where specialist input has been fed into the design and planning. The layout has taken into account sensitive areas and recommended buffers.

The mitigation measures below have been categorised according to impacts they address, during the construction and operational phases respectively. Further mitigation measures are presented in the Environmental Management Programme (*Appendix I*)

Phase	Mitigation measure
Traffic and access	
Construction Phase	<p>Vehicle access routes must be established and marked prior to commencing on-site construction. It is recommended that poles and colourful (clearly visible) rope are used to mark the edges of the access roads to prevent gradual widening which commonly occurs on construction sites.</p> <p>Only the proposed access from the Esikhaleni Mall Intersection is to be used as access route for construction phase.</p> <p>Earthworks/stabilisation of roads must be carried out prior to heavy use of the roads, especially the access from eMabuyeni/Mpembeni road.</p> <p>Measures must be put in place (fencing/security) to prevent unauthorised access to the site, for the sake of safety, security, and potential environmental degradation that may occur.</p> <p>Careful consideration must be made to traffic flow on the eMabuyeni/Mpembeni Rd. No construction vehicles are allowed to park on the roadside as this will disrupt traffic flow and endanger pedestrians. Access to the site (Esikhaleni/Mpembeni Rd) must be passable in time for 1st delivery of building materials to allow vehicles to move well beyond the road. Building materials must not be stored on the road side.</p> <p>Any damage to public or private roads caused by the contractor during the construction phase will be repaired.</p> <p>Relating to construction of the entrance gate: access will need to be recessed by 6 m from the back of the boundary line to accommodate vehicles turning.</p>

	<p>Key Responsibilities:</p> <ul style="list-style-type: none"> • Site manager, under supervision of ECO – ensure approved access roads are demarcated prior to heavy construction traffic. • Consulting engineer – confirm stability of the Esikhaleni/Mpembeni to site road prior to use by any vehicle exceeding 3 tons. • Site Manager/ECO – daily inspection of access road demarcation and possible deviation of vehicles outside of roads/development footprint. Monthly audit checks on this by ECO. Advice on other areas possible requiring demarcation as no go areas.
Operational Phase	<p>Internal road speed limits must be enforced</p> <p>The entrance gate must be kept in working order, to prevent traffic backing up into the road.</p> <p>Internal roads must be kept clear of leaves and sediments to prevent stormwater inlets from becoming blocked.</p> <p>No street packing on the eMpembeni/Mabuyeni road is permitted as road reserve does not allow space.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Applicant – to display speed limit signs, ensure gate is maintained and roads are regularly swept.
Soil Erosion	
Construction Phase	<p>No go areas must be physically demarcated with danger tape throughout the construction phase. This will deter activities on the steep slopes where erosion is likely. Identified no go areas must be included in the Environmental Awareness Training for all on site personnel (to be carried out by the ECO).</p> <p>Correct stockpiling and stockpile location to avoid erosion. Stockpile should not be too high or too steep.</p> <p>Stockpiles should be located around the perimeter of the project, away from the construction activity, but avoid no go areas. Do not located piles in or immediately adjacent to watercourses, or such that any runoff from the piles will end up in Lake Qhubu.</p>

	<p>Where it is not possible to move a top soil/raw material stockpile upland, place the soil behind a berm to prevent erosion. This is especially important on steep slopes.</p> <p>Silt fences must be used where there is a risk of top soil/raw material being lost through runoff. The appointed ECO will be able to advise contractors on where and how these are to be installed.</p> <p>On areas, susceptible to erosion, temporary stormwater structures must be put in place during construction. These can include swales (which should be vegetated with grass), infiltration trenches (typically filled gravel), detention ponds (excavated ponds for temporary storage of stormwater runoff), temporary seeding, mulching, surface roughening. The ECO should be consulted to advice on suitable temporary structures.</p> <p>Dirt tracks created by vehicles become compacted, reducing permeability and leading to surface runoff. Access roads and internal roads must be temporarily overlain with gravel during construction. This increase surface roughness, promoted infiltration, protects the soil surface from rainfall and runoff, and therefore greatly reduces the likelihood of erosion.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Site manager – must ensure all construction activities and staff movements is kept outside od no go areas. • Site Manager – must determine suitable locations for stockpiled materials. • ECO – monitor signs of erosion on slopes, access roads, internal roads and stockpiles. • ECO – monthly monitoring of structural integrity and efficacy of stormwater erosion structures (the rock mattress scour aprons) once installed. Report to consulting engineers should structures be damaged or ineffective.
Operational Phase	<p>Regular monitoring for signs of erosion throughout the site.</p> <p>Grass or other ground cover must be maintained on any open areas to protect the soil from erosion.</p> <p>Clearing of vegetation in the close wetland areas is prohibited.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Applicant – must monitor erosion and appoint suitable contractor to rectify if erosion is encountered.

	<ul style="list-style-type: none"> • Applicant – rules must prohibit clearing of vegetation anywhere other than within the development footprint.
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Groundwater pollution

<p>Construction Phase</p>	<p>Secondary containment must be in place for all hazardous goods stored on site. This can be in the form of a temporary bund area, trays or containers. Secondary containment must be large enough to contain 110% of the volume of goods stored.</p> <p>Hazardous goods (e.g. fuels and solvents) stored on site must be securely locked to prevent theft, and harm to persons or the environment through misuse.</p> <p>The relevant hazardous warning signs/stickers must be displayed. A spill response kit must be kept on site and accessible throughout construction period.</p> <p>Environmental awareness training must include prevention and response to hazardous spills.</p> <p>A suitable area must be designated for waste storage during construction, with specific accommodation for hazardous waste</p> <p>Hazardous waste volumes are expected to be low for the development but may include empty paint tins, rags containing oil or solvents, spent oil etc. This waste is to be stored on a hardstand surface and protected from rain.</p> <p>Waste must be inaccessible to scavengers and unauthorised person. Hazardous waste may not be disposed of at any municipal landfill.</p> <p>Hazardous waste must be disposed of at a licensed facility. A third party can be used for removal and disposal of hazardous waste. A receipt or certificate of safe disposal must be kept by the site manager or ECO in the on-site environmental file.</p> <p>Vehicles and machinery to be kept well maintained and serviced to prevent fuel/oil spills.</p> <p>No servicing of vehicles is permitted on site.</p>
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	<p>Drip trays must be in place for earth moving equipment, vehicles and generators kept on site.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Site Manager – must ensure correct waste storage areas are available from the start of the construction phase. • Site manager – Must maintain the on-site environmental file, including records of safe disposal of all hazardous waste collected. • Site manager and contractors – Are responsible for ensuring the day to day operating of equipment and machinery is done in such a way as to prevent hazardous spills; drip drays, secondary containment, vehicles maintained and serviced. • ECO – Must monitor monthly to confirm hazardous goods and hazardous waste are being correctly handled, stored and disposed of. • ECO – to include groundwater pollution prevention measures in environmental awareness training.
Operational Phase	<p>No hazardous chemicals (fuels, cleaning detergents etc.) may be stored outside within the sectional title properties or body corporate grounds. Hazardous goods must be kept on hard stand surfaces, undercover and locked to prevent tampering.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Applicant – to include the above in body corporate rules and monitor residents' compliance
Surface Water	
Construction Phase	<p>All mitigation measures mentioned above apply to surface water as well as groundwater, as any contaminants on site will either infiltrate into groundwater or be removed with stormwater runoff, which will ultimately enter drainage lines and Lake Qhubu, or tributaries thereof.</p> <p>Construction of the sewer pipe to be done under close supervision. Columns to be constructed as far on either side of the drainage line as structurally possible. Any cement mixing to be done for construction must not take place in the drainage line.</p> <p>Apart from contaminants, surface water quality can be impacted by sedimentation resulting from erosion and subsequent runoff. As such, the erosion control measure listed above are of relevance to surface water preservation.</p> <p>A silt fence is a temporary sediment control device used on construction sites to protect water quality in nearby watercourses from sediment in</p>

	<p>stormwater runoff. Silt fences should be erected where vegetation has been removed on a slope water naturally drains (i.e. a disturbed drainage line).</p> <p>If erosion and sedimentation is deemed to be an issue during construction, temporary stormwater structures must be urgently implemented, such as those listed under erosion control measures above. Any mitigation measure that retains water, slows runoff velocity, and promotes infiltration will reduce sedimentation as well as erosion.</p> <p>All materials for construction must be sourced from sustainable and appropriately licenced stock (sand, stone etc.), as this will reduce the indirect impact of the development on surface water quality at the point of mineral extraction.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • As per erosion and ground water sections above • Site manager – ongoing monitoring for signs of erosion/sedimentation. Relaying information to ECO • ECO – Monthly audit must include thorough examination of the perimeter of the development footprint (the steep slopes of the valley/conservation servitude) drainage lines, stockpiles and roads for signs of erosion. • ECO – Must be available to advise on immediate implantation of erosion control measures where necessary.
<p>Operational Phase</p>	<p>Roads must be kept clear of sediment to prevent water quality impacts through stormwater discharged into the environment.</p> <p>Regular monitoring of the sump, pump and generator for sewer reticulation is essential. A third party must be contracted to maintain and services the system. An automated alarm system must be in place to alert the Applicant of potential blockages or pump failure. The system must remotely notify the contracted party, with whom a 24/7 response arrangement is in place.</p> <p>Automatic generator switchover must be in place in case of main power failure.</p> <p>Stored fuels for the generator must be within secondary containment, undercover and locked.</p> <p>Key responsibilities:</p>

	<ul style="list-style-type: none"> • Applicant – is responsible for appointing the contractor for maintaining the sewer system, and ensuring fuels are correctly stored
Noise and Disturbance	
Construction Phase	<p>Construction is to be limited to standard working hours (07H00-17H00) only. No construction may take place during weekends and public holidays.</p> <p>Construction vehicles will be fitted with standard silencers prior to the beginning of construction.</p> <p>Equipment that is fitted with noise reduction facilities (e.g. Side flaps, silencers etc.) will be used</p> <p>Dust suppression measures must be available if required; during windy, dry conditions or when high volumes of construction vehicles are expected on gravel access roads. Surface wetting will suffice for this development.</p> <p>No fires will be permitted for any purposes whatsoever.</p> <p>Lime, concrete and other powders must not be mixed during excessively windy conditions.</p> <p>Bulk earth moving must not coincide with windy conditions, especially during the dry winter season.</p> <p>A complaints register must be kept by the site manager in the environmental file. Any complaints received regarding noise, dust and other possible disturbances must be recorded in the complaints register.</p> <p>No activity is to occur on neighbouring land unless written consent and arrangements have been made with land owners prior to commencing the development.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Site manager – ensure working hours are adhered to. • Site manager – implement dust suppression measures when required. • Site manager – Keep concise record of complaints received and actions implanted to address the complaints. • ECO – to monitor on a monthly basis, review complaints register and advise on additional mitigation measures

Operational Phase	<p>Noise must be kept to reasonable levels so as to not disturb neighbour within and outside the complex. Loud music should not be played past 11pm unless permission from the body corporate is obtained in advance.</p> <p>Speed limits must be adhered to and unnecessary revving of vehicles is not permitted.</p> <p>Bon fires (burning of garden refuse) is not permit.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Applicant – to include the above in body corporate rules and enforce
Destruction of Flora	
Construction Phase	<p>No go areas must be clearly marked and indicated to all contractors and on-site personnel (during environmental awareness training) to avoid disturbance to sensitive areas within / around Lake Qhubu. This is where there is highest biodiversity of flora.</p> <p>A suitably qualified person must be appointed to earmark and where necessary relocate protected plant species. These must be relocated to a suitable area surrounding the site. As per EAP's recommendations;</p> <ul style="list-style-type: none"> ➤ relocation must take place during summer, ➤ holes must be at least twice the size of the plants' underground organs and ➤ plants should be watered following planting until established. <p>Before removal of protected species, relevant licenses will need to be obtained. For nationally protected species, the issuing authority would be the Department of Agriculture, Forestry and Fisheries (DAFF). For provincially protected species which may be encountered, a permit must be obtained from Ezemvelo KZN Wildlife.</p> <p>The listed invasive alien plants are to be controlled as stipulated by their category in the National Environmental Management: Biodiversity Act (10/2004): Alien and Invasive Species List, 2014. The applicant is responsible for clearing of invasive alien plants during the construction phase (to be monitored by the ECO). This responsibility applies to controlling invasive alien plants within the development footprint, in the body corporate conservation area, as well as the conservation servitude (until such time as the rights to this servitude are donated to the Municipality).</p>

	<p>Care must be taken once clearing of current vegetation has begun, as disturbance to the soil creates a habitat for opportunistic invasive plants, which can be detrimental to the ecological integrity of the area.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Contractor – to abide by rules regarding no go areas– • Site manager – To ensure daily activities are kept within development footprint • Applicant – to appoint suitably qualified persons to control alien invasive plants • ECO – To monitor compliance with above and other measures in the EMPr
Operational Phase	<p>Fences around the sensitive areas must be maintained to prevent access.</p> <p>No person is permitted to remove any plant from the conservation servitude or body corporate conservation area unless part of a management plan (i.e. for removal of alien plants).</p> <p>A suitably experienced company must be appointed to regularly clear invasive alien plants within the body corporate conservation area, and the conservation servitude (until such time that the municipality obtains full rights to use.)</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Applicant – must maintain fencing, prohibit access to conservation servitude and appoint person/s to clear invasive alien plants.
Disturbance to Fauna	
Construction Phase	<p>No trapping/hunting is to be permitted on site, and no fishing is permitted in Lake Qhubu.</p> <p>All construction activity, storage of materials, movement of construction worker etc. must be restricted to the development footprint as per the layout. Any activity within no go areas is strictly prohibited and must be enforced.</p> <p>Waste must be correctly stored in a suitably constructed structure to prevent wildlife gaining access to waste.</p> <p>Any hazardous goods must be securely stored to prevent potential harm to fauna.</p> <p>Key responsibilities:</p>

	<ul style="list-style-type: none"> • Contractor – to abide by rules regarding no go areas • Site manager – To ensure daily activities are kept within development footprint • ECO – To monitor compliance with above and other measures in the EMPr
Operational Phase	<p>Fences around the conservation servitude and body corporate conservation area must be maintained to prevent access.</p> <p>Strict rules regarding hunting or trapping wildlife must be included in body corporate rules</p> <p>Key responsibilities:</p> <p>1. Applicant – Applicant’s rules relating to above measures must be enforced.</p>
Health and Safety	
Construction Phase	<p>All relevant Health and Safety legislation as required in South Africa should be strictly adhered to including the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).</p> <p>Personal Protective Equipment (PPE) must be provided for all on-site personnel.</p> <p>Potentially hazardous areas (i.e. trenches) must be demarcated and clearly marked.</p> <p>Sufficient toilets must be made available for workers during construction.</p> <p>The conditions of the Environmental Management Programme (refer to Appendix I) must be implemented and monitored.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Contractors – to ensure they comply with Occupational Health and Safety Act. • Contractors – to ensure all staff have PPE • Site manager – to ensure potential hazards on site are marked. • ECO – To include review of all Health and Safety measures in monthly audit
Waste and litter	
Construction Phase	All relevant legislation with regards to the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) must be adhered to.

	<p>Ensure correct waste management, sorting and recycling of materials used for construction. Waste should be stored in scavenger proof bins.</p> <p>Bins must be secured in an area specifically designed, constructed and maintained for such purpose.</p> <p>No dumping of litter or construction rubble is permitted anywhere. Waste may only be disposed of at a licensed landfill.</p> <p>Hazardous waste must be disposed of at a licensed facility. A third party can be used for removal and disposal of hazardous waste. A receipt or certificate of safe disposal must be kept by the site manager or ECO in the on-site environmental file.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Site manager- to ensure suitable waste collection points are provided and waste is stored as per EMPr. • Site manager- to ensure regular removal of waste from the storage area for disposal at a registered landfill or by a 3rd party in the case of hazardous waste. • Site manager- must obtain and file safe disposal certificates for hazardous waste • ECO - To monitor and report on state of waste management practices
Operational Phase	<p>The lake and its sensitive areas and the verge/entrance must be kept clear of litter</p> <p>Refuse rooms are to be suitably maintained to contain litter, keep refuse dry and prevent access by scavengers.</p> <p>Recycling should be encouraged within the complex.</p> <p>Applicant must ensure that refuse is neatly placed on kerb side for weekly municipal collection.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Applicant – to include the above in body corporate rules and maintain the refuse rooms
Visual Impact	
Construction Phase	<p>Construction site must be kept clean and orderly at all times.</p> <p>No litter or rubble should be allowed to accumulate on site.</p>

	<p>No raw materials are to be stored on the verge or anywhere that may be visually offensive to neighbours or traffic.</p> <p>The entrance to the development site must be kept clean.</p> <p>Esikhaleni/Mpembeni/Mabuyeni Roads must be kept clean. Any sediment on the road emanating from the development site must be regularly swept up.</p> <p>Any complaints received regarding visual impact of construction activities must be recorded in the complaints register.</p> <p>Additional measure (e.g. screening with shade cloth) must be put in place should complaints be received.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Site manager – to ensure all measures necessary are in place to keep the site and adjoining roads clean. • ECO – Monitor and report on the state of the construction site and complaints register.
Operational Phase	<p>The appearance of the housing development must be maintained.</p> <p>Applicant's rules must include the fact that the body corporate maintains the authority to advise a resident or owner to take necessary action for upkeep of the sectional titles; including keeping gardens maintained, free of litter and external walls clean.</p> <p>The entrance and access road must be kept in clean and litter free.</p> <p>Key responsibilities:</p> <ul style="list-style-type: none"> • Applicant – body corporate rules must adequately address the need for mitigating adverse visual impacts.

d. SIGNIFICANT RECOMMENDATIONS MADE BY THE EAP

The proposed activity is not anticipated to have significant environmental impacts hence all 3-alternatives at present are largely transformed and comprises of gum tree plantation. The proposed development (Alternative 1, Alternative 2 or Alternative 3) is not deemed to be a fatal flaw on condition that the stormwater management infrastructure is designed by a qualified engineer and managed appropriately to effectively deal with the volume of stormwater and run-off prior to being discharged into the lake and associated river. Thus, the anticipated stormwater volumes and

pollutants from the proposed paving area should determine the most appropriate design, which shall be certified by a suitable engineer.

The following recommendations should be implemented in order to ensure that potential impacts associated with the establishment and operation of the site are minimised:

- a. No Construction activities are permitted within sensitive areas along the Lake Qhubu.
- b. Any areas disturbed during construction and operation of the firm farm must be rehabilitated.
- c. Construction to take place during working hours
- d. On completion of the project all litter and construction debris shall be immediately removed from the site.
- e. Earthworks and drainage measures should be designed in such a way as to prevent ponding of, or high concentrations of, stormwater or groundwater anywhere on the site, both during and after the development.
- f. Attenuation of stormwater from the development site is important to reduce the velocity of runoff into the downstream wetland area and into the Lake Qhubu.
- g. All waste generated during construction is to be disposed of as per an Environmental Management Programme (EMPr) and washing of containers, wheelbarrows, spades, picks or any other equipment that has been contaminated with cement or chemicals in the identified watercourses must be strictly prohibited.
- h. Waste disposal during the operational phase must ensure no litter or other contaminants on site are deposited in the downstream watercourse environment.
- i. Waste disposal during the operational phase must ensure no litter or other contaminants from the fish farm on site are deposited in the downstream watercourse environment.
- j. Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately.
- k. Ongoing alien plant control must be undertaken after the construction phase and during the operational phase. An ongoing management plan must be implemented for the clearing/eradication of alien species.
- l. Fauna and flora species anticipated on site during construction and operational phases should not be disturbed without the consent of the ECO.
- m. It is recommended that indigenous species are planted in the landscaped areas to control the spread of alien species outside of the development area.
- n. The Project is going to be situated on the Shore of Lake Qubhu therefore all runoff (rain) will eventually end up back in the Lake. On the Farm Footprint gutters should be installed as well as Surface Drains to direct Water into the Attenuation Pond with an Overflow into the Lake in a controlled manner

SIGNIFICANT RECOMMENDATIONS MADE BY THE WETLAND HABITAT SPECIALIST.

See the attached Wetland Habitat Assessment Report (Appendix A)

e. PROPOSED MONITORING AND AUDITING

Construction phase:

It is recommended that monitoring be done by an appointed independent Environmental Control Officer through monthly construction monitoring and audits ensuring compliance with an Environmental Management Programme (EMPr), conditions of the Environmental Authorisation and recommendation made by the EAP and authorities.

Operation phase:

Post construction monitoring/audits should be undertaken annually for the first two years of operation to ensure the EMPr requirements have been met.

Decommissioning phase:

In the possible event of decommissioning, monitoring/audits should be undertaken monthly during the decommissioning process to ensure the EMPr requirements for decommissioning are being adhered to.

f. ENVIRONMENTAL IMPACT STATEMENT

It is the opinion of the EAP that the proposed Fish Farm development should be constructed. The footprint of the proposed development (Alternative 1, 2 and 3) are largely limited to previously disturbed (Gum Plantation) land and/or areas currently impacted on by large-scale dumping, and unauthorised operations. Provided the mitigation measures in the Basic Assessment Report and the EMPr are adhered to, we envisage minimal adverse impacts to the property that is of low ecological importance. This opinion is based on information in this report.

It is therefore the opinion of the EAP that the preferred site (Alternative 1) is selected for the proposed Lake Qhubu Fish Farm project, the footprint is considered favourably, provided that all of the mitigation measures as listed within this BAR are strictly adhered to.

SECTION E: PUBLIC PARTICIPATION

a. ADVERTISEMENTS

Guidelines for public participation were followed according to section 24J of the National Environmental Management Act, 1998: (see Appendix D for photographs, adverts).

- A notice to register as an interested and affected party was advertised in the local newspaper, the Zululand Observer on the 31st May 2019.
- Neighbouring land owners were informed of the development.
- Ward Councillor was given a Background Information Document and Basic Assessment Report for the development.
- A site visit was conducted with KZN Department of Economic Development, Tourism and Environmental Affairs, EIA Component representatives on the 17th May 2019.
- A meeting was held with KZN Department of Economic Development, Tourism and Environmental Affairs, EIA Component representatives on 15 June 2018 and 21 June 2018.
- Community organisations were contacted via email, direct contact and telephone on 11th May 2019.
- The draft Basic Assessment Report was made available at the Mabuyeni Traditional Council Hall for a period of 30 days from to 10 June 2019 with a notice on the public notice board indicating the location of the report.
- All application documents and other background information was displayed and publicly available on the 18Phando Environmental Consulting website at www.phando.co.za/public-documents

The following organisations or individuals registered as interested and affected parties.

b. COMMENTS AND RESPONSE REPORT

Refer to Appendix B: comments and response table

Municipalities	Name	Title
City of uMhlathuze	Sharin Govender	Environmental Manager
King Cetshwayo District Municipality		
Provincial Government Departments	Name	Title
Department of Economic Development Tourism and Environmental Affairs	Thandeka Nkala	EIA Component
Department of Economic Development Tourism and Environmental Affairs	Muzi Mdamba	EIA Component
Ezemvelo KZN Wildlife	Dominic Wieners	Biodiversity Planner
National Government Departments	Name	Title
Department of Water and Sanitation	Colleen Moonsamy	
Department of Water and Sanitation	Lwandle Sibande	
Department of Agriculture Forestry and Fisheries	Ayanda Mnyungula	ASD: Forestry regulations and Support
Department of Agriculture Forestry and Fisheries	Ayanda Goba	ASD: Forestry regulations and Support
Department of Transport	Judy Reddy	
Department of Transport	Roy Ryan	
Other Stakeholders		
Umhlathuze Water Board	Xolile Dube	Environmental Manager
Amafa akwaZulu-Natali	Bernadet Phawandiwa	
Amafa akwaZulu-Natali	Weziwe Tshabalala	
WESSA	Di Jones	
RBCAA	Sandy Camminga	
WWF	Candice Webb	
KZN Coastal Watch		

c. PARTICIPATION BY DISTRICT, LOCAL AND TRADITIONAL AUTHORITIES

Additional contact details for these persons are provided in Appendix B

d. CONSULTATION WITH OTHER STAKEHOLDERS

Letters were delivered to neighbours surrounding the site and a register was signed by neighbours at a public meeting held on the 11th May 2019. Evidence thereof can be found in Appendix E