



# Environmental Management Plan

Poultry Production and Abattoir on Portion 48 of Farm Stampried 132

# ENVIRONMENTAL MANAGEMENT PLAN FOR POULTRY PRODUCTION AND ABATTOIR ON PORTION 48 OF FARM STAMPRIED 132, STAMPRIET, HARDAP REGION

## PROJECT DETAILS

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01 September 2021

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## TABLE OF CONTENTS

<b>1. INTRODUCTION .....</b>	<b>4</b>
<b>2. PROJECT OVERVIEW .....</b>	<b>5</b>
<b>3. PRODUCTION PROCESS .....</b>	<b>6</b>
HATCHERY.....	6
BROILER HOUSE .....	7
ABATTOIR .....	7
OFF TAKERS .....	7
<b>4. STRUCTURE AND LAYOUT.....</b>	<b>7</b>
HATCHERY.....	7
INCUBATOR .....	8
BROILER HOUSE .....	8
ABATTOIR .....	10
<b>5. PROJECT LOCALITY .....</b>	<b>10</b>
<b>6. APPLICABLE LEGISLATION.....</b>	<b>13</b>
<b>7. ROLES AND RESPONSIBILITIES .....</b>	<b>15</b>
<b>8. PROPONENT’S REPRESENTATIVE .....</b>	<b>15</b>
<b>9. ENVIRONMENTAL CONTROL OFFICER.....</b>	<b>16</b>
<b>10. CONTRACTOR .....</b>	<b>17</b>
<b>11. MANAGEMENT ACTIONS.....</b>	<b>17</b>
<b>12. ASSUMPTIONS AND LIMITATIONS.....</b>	<b>17</b>
<b>13. OPERATION AND MAINTENANCE PHASE .....</b>	<b>18</b>
<b>14. DECOMMISSIONING PHASE.....</b>	<b>32</b>
<b>15. REFERENCE .....</b>	<b>33</b>

## TABLE OF FIGURES

Figure 1: General layout of the hatchery, incubator and broiler houses .....	9
Figure 2: Locality map of Stampriet .....	10
Figure 3: Location of Portion 48 of Farm Stampried 132 on Farm Layout Map .....	11
Figure 4: Location of Portion 48 of Farm Stampried 132 (Google Earth, 2021) .....	12

## LIST OF TABLES

Table 1: Legal provisions relevant to this development.....	13
Table 2: PR’s responsibilities.....	16
Table 3: ECO’s responsibilities.....	16
Table 4: Operation and maintenance management actions .....	18

## ABBREVIATIONS

AIDS	Acquired Immuno-Deficiency Syndrome
PR	Proponent’s Representative
EA	Environmental Assessment
ECC	Environmental Clearance Certificate

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ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
GG	Government Gazette
GIS	Geographic Information System
GN	Government Notice
GPS	Global Positioning System
HIV	Human Immuno-deficiency Virus
I&APs	Interested and Affected Parties
SAR	Southern Africa Railways CC
NHC	National Heritage Council
Reg.	Regulation
S	Section

## 1. INTRODUCTION

ROOTS Development is a project that involves a self-sustaining township development that provides a platform for integration between agriculture, education and other supporting commercial trades in a balanced lifestyle environment. It is located in the Hardap Region in the Village of Stampriet approximately 64 km north-east of Mariental. Stampriet has a current population of about 3 000 people and is considered an oasis in this mostly dry country. The area is renowned for its abundant underground water source in the form of the Stampriet Artesian Aquifer, which recent hydrological studies have confirmed is sustainable against the water requirements for a development of this scale.

The 3 200 hectare farm was converted from farm to townlands in 2016 and the subdivision into 92 plots ranging from 1 to 60 hectares was completed in 2018. The layout allows for a mix of residential, business, agriculture and institutional plots to host the various planned activities. The size, zoning and position of each plot has been strategically designed to provide for all short- and long-term needs to fulfil the objectives of the development.

On the agriculture side a potential for poultry farming was realised given the heavy dependence on food imports for local consumption. This is able to contribute to food security but also has the added advantage of creating several job opportunities. Gemini Poultry Trading Close Corporation obtained Portion 48 of Farm Stampried 132 to establish a poultry production and abattoir facility. The facility has four chicken coops that produce 5 000 broiler chicks per coop per cycle, furthermore there are 6 200 layer hens, the poultry is marketed to Red Dot Catering and Namica.

In order to add value to the production process Gemini Poultry Trading Close Corporation has also established an abattoir on the same Portion 48 of Farm Stampried 132. Chicken stock for slaughter is supplied from its own production facilities on as well as from nearby local producers.

In terms of section 27 of the Environmental Management Act, 2007 (Act 7 of 2007) listed activities may not be undertaken without an Environmental Clearance Certificate (ECC).

While operations on site have commenced, Gemini Poultry Trading Close Corporation has been advised to obtain an ECC in compliance with the legal requirements. It is against this background that Gemini Poultry Trading Close Corporation has appointed Environam Consultants Trading (ECT) to undertake the process of applying for the ECC on their behalf to ensure compliance.

Key to the issuance of an Environmental Clearance Certificate is the submission of an Environmental Management Plan (EMP) which provides for a description of how an activity

might impact on the natural environment in which it occurs and clearly sets out commitments from the proponent on how identified impacts will be avoided, minimised and managed so that they are environmentally acceptable.

An EMP is one of the most important outputs of the Environmental Assessment process as it synthesises all of the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. As part of the application for an ECC, Environam Consultants Trading has developed an EMP that will outline the appropriate actions. The EMP will normally cover a broader spectrum of actions from the planning and design phase, construction, to the operation and maintenance phase, right up to the decommissioning phase. The operations on this site has been ongoing, hence this EMP will only focus on the operation and maintenance, as well as the decommissioning phases of this development.

## 2. PROJECT OVERVIEW

Intensive poultry farming is a system whereby chickens are raised up to slaughter weight in chicken coops with controlled temperatures and fed specialised feed to ensure optimal growth. By using an intensive indoor farming system, more chicks can be monitored compared to when using traditional farming methods. This method ensures:

- Low mortality percentages
- Lowered cost
- Increased productivity
- Optimal growth

Enclosed Broilers houses are well ventilated and the temperature regulated. Broilers are susceptible to heat and cold stress, this controlled environment negates the heat and cold stress. Young chicks are dependent on environmental temperature to maintain optimal body temperature. Chilling or overheating during this casual period can result in poor growth, poor feed conversion and increased susceptibility to disease.

The chicken coops are 40 x 8 m which is stocked at a rate of 15.625 chickens per square meter. The final design came about after three years of meticulous practical planning to incorporate a bio security aspect and to be able to create the most conducive climate within the coops to raise broiler chicks to slaughter weight in the most expedite time frame.

Indoor farms tend to be more productive than outdoor, given the ability to control the feed and the environment. It is possible to achieve greater level of supervision and measurement and therefore control of the many variables in an indoor situation. It is also possible to establish and maintain a high health status and significantly reducing disease risk and other challenges.

Specialised equipment for intensive Broiler production is installed for housing, feeding and climate control, which is crucial and critical for this method of farming.

At Gemini Poultry Trading Close Corporation, biosecurity is strictly enforced without any exception since this is the number one way to protect the farm against disease. Biosecurity is an integral and proactive part of any successful broiler production system. Biosecurity refers to those measures taken to prevent or control the introduction and spread of infectious agents to your flock. Such infectious agents, whether they cause clinical (obvious) or subclinical (hidden) disease, significantly reduce the productivity, profitability and long-term financial viability of a broiler operation. These procedures cover areas of risk common to most broiler operations and appropriate measure to minimise these risks.

Farm-specific biosecurity measures which are taken into account that may impact on the biosecurity of the production area are:

- Restricted access
- The location and layout of property and production area
- Source of water and feed
- Disease status of the district
- Proximity to other production areas with poultry
- Shower before entering a broiler house and abattoir
- Disinfected clothes to be worn in broiler houses and abattoir at all times.

### 3. PRODUCTION PROCESS

The poultry production project has a fully operational broiler system including a hatchery, broiler house, and abattoir.

#### Hatchery

The hatchery consists of parent stock and incubators. This is for the production of 10 000-day old chicks per week to supply the 14 chicken coops to be reared to slaughter weight. The excess day-old chicks are sold to 60 small-scale farmers of the Agri Village.

### Broiler House

14 Broiler houses are constructed, with each house fitted with environmental control, automatic feeders and automatic drinkers. This is to limit human contact and negate the chance of contamination. Each of the 14 chicken coops is stocked with 5 000 day old chicks, with an expected mortality of 2% over a 36 day cycle to reach slaughter weight. Taking into account the disinfection of each coop after each cycle, there will be 8 cycles per year per chicken coop.

### Abattoir

The abattoir has a capacity to slaughter 10 000 chickens a day. It is a state-of-the-art abattoir with a water reclamation and recycling component to ensure a sustainable use of the scares resource of water. All the chicken produced in the 14 chicken coops in addition to those produced by small-scale farmers at the village will be processed through this abattoir.

### Off Takers

GEMINI POULTRY TRADING CLOSE CORPORATION has secured contracts with red dot, Namibian Student Accommodation and NAMICA. GEMINI POULTRY TRADING CLOSE CORPORATION is currently at an advanced stage of discussion to also supply KFC. GEMINI POULTRY TRADING CLOSE CORPORATION believe with the current shortage and ever-growing need for chicken that it will not be able to satisfy the demand of chicken in Namibia with just one chicken farm.

## 4. STRUCTURE AND LAYOUT

The GEMINI POULTRY TRADING CLOSE CORPORATION poultry production and abattoir project is an intensive farming unit that consists of the following:

### Hatchery

The hatchery is necessitated by the need for self-sufficiency in the supply of day-old chicks that will be reared in the broiler houses, on top of securing a guaranteed supply of day old chicks there is the added advantage of reducing costs. Within the hatchery the day-old chicks are produced at a reduced cost, thereby creating a significant saving per chick and eliminating transport costs. This hatchery also cater for the small-scale farmers on Roots Development/Agri Village that are also doing poultry production.

The hatchery is a minimum of 100m away from the broiler houses so as to uphold a strict bio security standard whereby transfer of diseases is curbed. One hatchery is 600 square meters



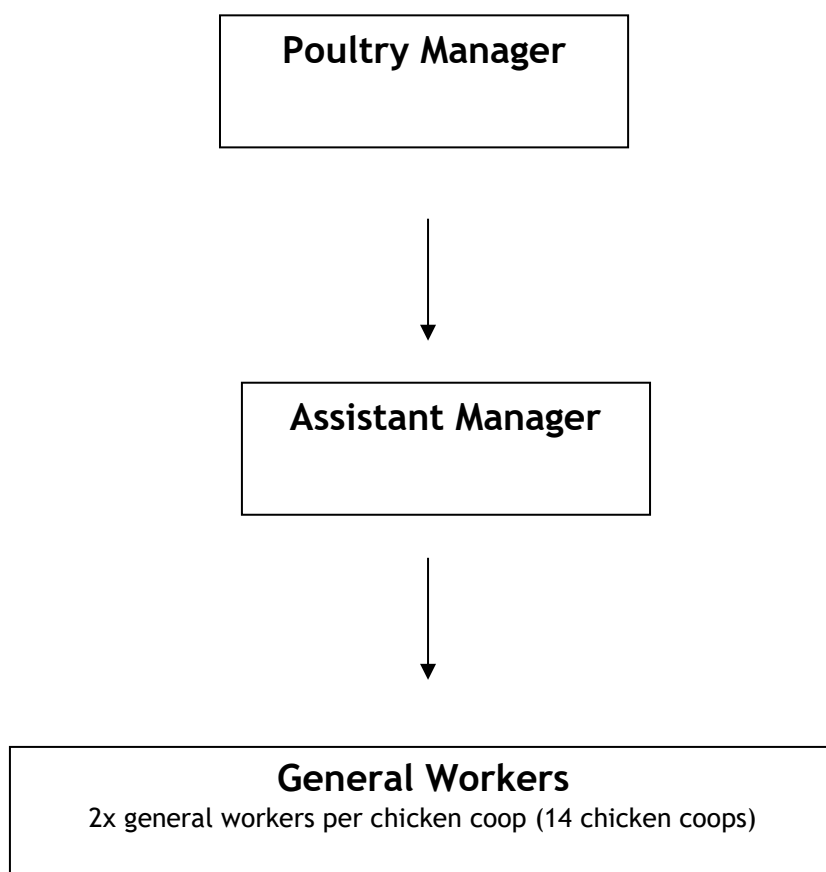
under roof and house 3000 hens and 375 roosters, this combination produces a minimum of 2500 fertilised eggs a day.

### Incubator

The incubation of the fertilised eggs is also a minimum of 100m away from the broiler houses and a minimum of 100m away from the layer houses to uphold bio security standards. This is where the fertilised eggs are sorted, weighed and incubated for 21 days whereafter they hatch.

### Broiler House

The 14 broiler houses are 320 square meters each and each house can accommodate 5000 broilers, they are 25 meters away from each other according to the bio security standard on the poultry production project and managed as indicated in the organogram below:



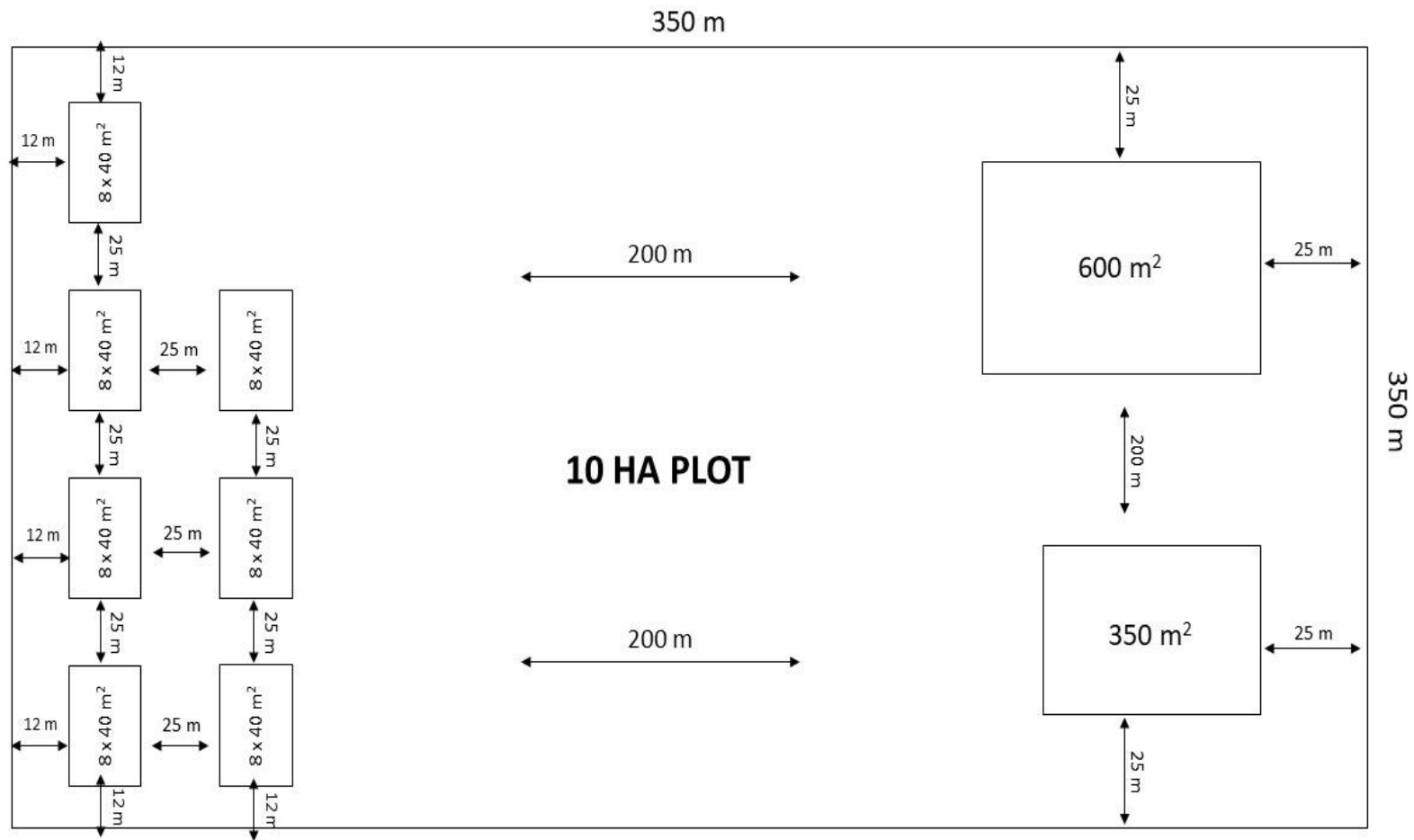


Figure 1: General layout of the hatchery, incubator and broiler houses

### Abattoir

The abattoir is housed in a 1000 square meter building which includes the packaging plant and laboratory to test for salmonella and other diseases. The abattoir has a capacity to slaughter 5000 chickens per 8 hour shift, this abattoir will also cater for the small scale farmers on the roots project that will also do poultry production.

### 5. PROJECT LOCALITY

The site is located on Farm Stampriet No. 132, adjacently north of the existing Township of Stampriet Village. Farm Stampriet No. 132 is bordered to the south by the Auob River, the Elnatan Private School and Stampriet Village Proper. The farm is bordered to the west by Farm Hoogenhout No. 383 and on the east is found several subdivided portions of the Remainder of Farm Stampriet No. 132. Refer to **Figure 2** below for the locality map of Stampriet and **Figures 3 and 4** for the locality map of Portion 48 of Farm Stampriet 132.



**Figure 2:** Locality map of Stampriet

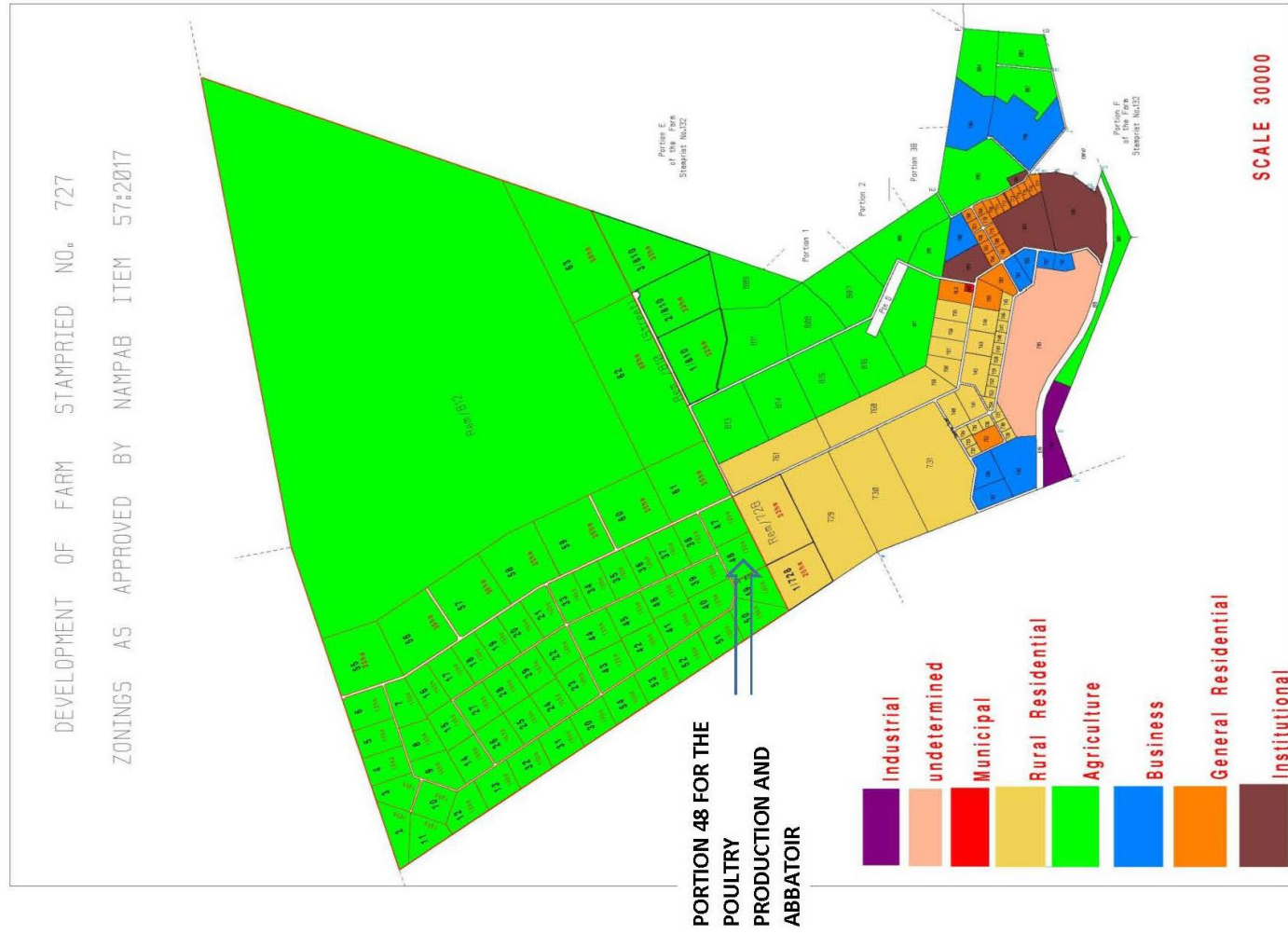


Figure 3: Location of Portion 48 of Farm Stampried 132 on Farm Layout Map

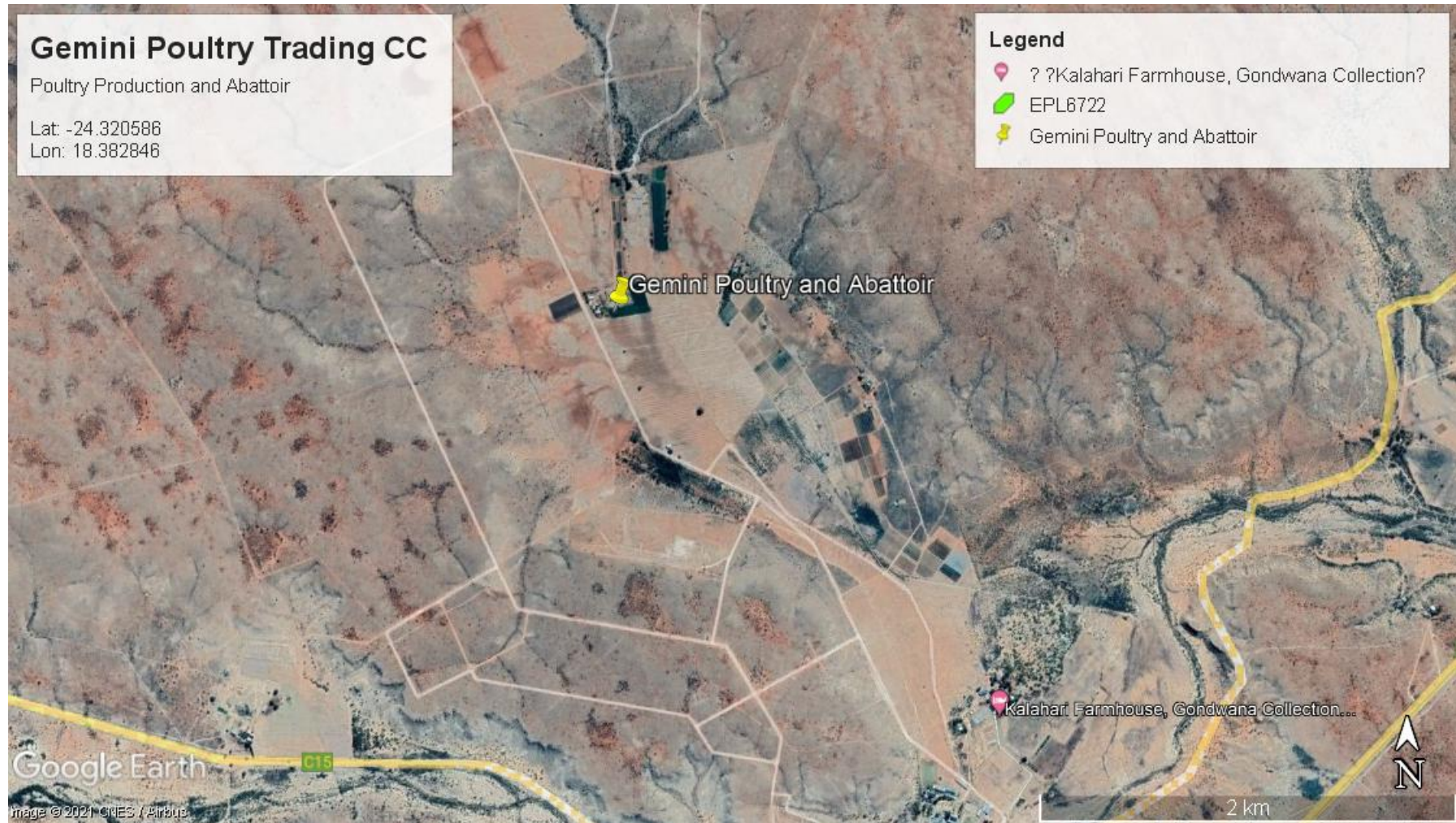


Figure 4: Location of Portion 48 of Farm Stampried 132 (Google Earth, 2021)

## 6. APPLICABLE LEGISLATION

Legal provisions that have relevance to various aspects of these developments are listed in **Table 1** below. The legal instruments, applicable corresponding provisions and relevance details are provided.

**Table 1:** Legal provisions relevant to this development

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
The Constitution of the Republic of Namibia as Amended	<p>Article 91 (c) provides for duty to guard against “the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia.”</p> <p>Article 95(l) deals with the “maintenance of ecosystems, essential ecological processes and biological diversity” and sustainable use of the country’s natural resources.</p>	Sustainable development should be at the forefront of this development.
Environmental Management Act No. 7 of 2007 (EMA)	<p>Section 2 outlines the objective of the Act and the means to achieve that.</p> <p>Section 3 details the principle of Environmental Management</p>	The development should be informed by the EMA.
EIA Regulations GN 28, 29, and 30 of EMA (2012)	<p>GN 29 Identifies and lists certain activities that cannot be undertaken without an environmental clearance certificate.</p> <p>GN 30 provides the regulations governing the environmental assessment (EA) process.</p>	<p><b>Activity 8.1</b> The abstraction of ground or surface water for industrial or commercial purposes.</p> <p><b>Activity 8.2</b> The abstraction of groundwater at a volume exceeding the threshold authorised in terms of a law relating to water resources.</p> <p><b>Activity 8.6</b> Construction of industrial and domestic wastewater treatment plants and related pipeline systems.</p> <p><b>Activity 8.7</b> Irrigation schemes for agriculture excluding domestic irrigation.</p> <p><b>Activity 9.2</b> Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law</p>

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
		governing the generation or release of emissions, pollution, effluent or waste.
The Stampriet Townplanning Scheme	The Stampriet Townplanning Scheme applies to the area as indicated on the scheme maps and corresponds with the Townlands Diagram for Stampriet Town and Townlands.	The Remainder of Farm Stampried No. 132 fall within the area of the scheme.
Convention on Biological Diversity (1992)	Article 1 lists the conservation of biological diversity amongst the objectives of the convention.	The project should consider the impact it will have on the biodiversity of the area.
Draft Procedures and Guidelines for conducting EIAs and compiling EMPs (2008)	Part 1, Stage 8 of the guidelines states that if a proposal is likely to affect people, certain guidelines should be considered by the proponent in the scoping process.	The EMP compilation process should incorporate the aspects outlined in the guidelines.
Pollution Control and Waste Management Bill	This bill is currently in preparation and is included as a guideline only.	Of particular relevance to the development are parts 2, 7 and 8.
Forestry Act (No 2 of 2001)	The Act stipulates that there be a general protection of the receiving and surrounding environment.	The Act specifies that no living tree, bush, shrub, or indigenous plants within 100m from any river, stream or watercourse, may be removed without the necessary license.
Soil Conservation Act (No 76 of 1969)	This Act deals with the combating and prevention of soil erosion. It states that the soil should be conserved, protected and improved.	Proper mitigation measures should be followed during the implementation phases of the project.
Namibia Vision 2030	Vision 2030 states that the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets.	Care should be taken that the development does not lead to the degradation of the natural beauty of the area.
Water Act No. 54 of 1956	Section 23(1) deals with the prohibition of pollution of underground and surface water bodies.	The pollution of water resources should be avoided during construction and operation of the development.
The Ministry of Environment, Forestry and Tourism (MET) Policy on HIV & AIDS	MEFT has recently developed a policy on HIV and AIDS. In addition it has also initiated a programme aimed at mainstreaming HIV and gender issues into environmental impact assessments.	The proponent and its contractor have to adhere to the guidelines provided to manage the aspects of HIV/AIDS.
Township and Division of Land Ordinance 11 of 1963	The Townships and Division of Land Ordinance regulates subdivisions of portions of land falling within a proclaimed Local Authority area.	In terms of Section 19 such applications are to be submitted to the Townships Board
Local Authorities Act No. 23 of 1992	The Local Authorities Act prescribes the manner in which a village, town or municipality should be managed by the Village, Town or Municipal	The development has to be comply with the provisions of the Local Authorities Act

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
	Council. Sections 34-47 make provision for the aspects of water and sewerage.	
Labour Act no 11 of 2007	Chapter 2 details the fundamental rights and protections. Chapter 3 deals with the basic conditions of employment.	Given the employment opportunities presented by the development, compliance with the labour law is essential.
Public Health Act no 36 of 1919	Section 119 prohibits persons from causing nuisance.	Contractors and residents of the proposed extensions are to comply with these legal requirements.
Nature Conservation Ordinance no 4 of 1975	Chapter 6 provides for legislation regarding the protection of indigenous plants	Indigenous and protected plants have to be managed within the legal confines.
Atmospheric Pollution Prevention Ordinance (No. 11 of 1976).	The Ordinance objective is to provide for the prevention of the pollution of the atmosphere, and for matters incidental thereto.	All activities on the site will have to take due consideration of the provisions of this legislation.
Roads Ordinance 17 of 1972	This Ordinance consolidates the laws relating to roads.	The provisions of this legislation have to be taken into consideration in as far as access to the development site is concerned.
Roads Authority Act, 1999	Section 16(5) of this Act places a duty on the Roads Authority to ensure a safe road system.	Some functions of the Roads Ordinance 17 of 1972 have been assigned to the Roads Authority.

## 7. ROLES AND RESPONSIBILITIES

Gemini Poultry Trading Close Corporation (the proponent) is ultimately responsible for the implementation of the EMP, the proponent may however delegate this responsibility through its life cycle. The delegated responsibility for the effective implementation of this EMP will rest on the following key individuals:

- Proponent’s Representative;
- Environmental Control Officer; and
- Contractor (Operations and Maintenance).

## 8. PROPONENT’S REPRESENTATIVE

The Proponent should assign the responsibility of managing all aspects of the operations (including all contracts for work outsourced) to a designated member of staff, referred to in this EMP as the Proponent’s Representative (PR). The PR’s responsibilities are shown in **Table 2** below:



**Table 2** PR’s responsibilities

Making sure that the necessary approvals and permissions laid out in <b>Table 1</b> are obtained/adhered to;
Suspending/evicting individuals and/or equipment not complying with the EMP;
Issuing fines for contravening EMP provisions.

## 9. ENVIRONMENTAL CONTROL OFFICER

The PR should assign the responsibility of overseeing the implementation of the whole EMP on the ground during the operation and maintenance phases to a designated member of staff, referred to in this EMP as the Environmental Control Officer (ECO). The proponent may also outsource this component to an independent Environmental Consultant. The ECO will have the following responsibilities outlined in **Table 3**:

**Table 3** ECO’s responsibilities

<ul style="list-style-type: none"> <li>• Management and facilitation of communication between the Proponent, PR, the contractors, and Interested and Affected Parties (I&amp;Aps) with regard to this EMP;</li> </ul>
<ul style="list-style-type: none"> <li>• Monitor and audit the implementation of the EMP;</li> </ul>
<ul style="list-style-type: none"> <li>• Submitting bi-annual reports to the Environmental Commissioner.</li> </ul>
<ul style="list-style-type: none"> <li>• Assisting Contractors in finding solutions with respect to matters pertaining to the implementation of this EMP;</li> </ul>
<ul style="list-style-type: none"> <li>• Advising the PR on the removal of person(s) and/or equipment not complying with the provisions of this EMP;</li> </ul>
<ul style="list-style-type: none"> <li>• Making recommendations to the PR with respect to the issuing of fines for contraventions of the EMP.</li> </ul>

## 10. CONTRACTOR

Contractors appointed by the Proponent are automatically responsible for implementing all provisions contained within the relevant chapters of this EMP. Contractors will be responsible for the implementation of this EMP applicable to any work outsourced to subcontractors. **Table 4** refers to those contractors appointed during the operation and maintenance phase. In order to ensure effective environmental management the aforementioned chapters should be included in the applicable contracts for outsourced operation and maintenance work.

The tables in the following chapter detail the management measures associated with the roles and responsibilities that have been laid out in this chapter.

## 11. MANAGEMENT ACTIONS

The aim of the management actions in this chapter of the EMP is to avoid potential impacts where possible. Where impacts cannot be avoided, measures are provided to reduce the significance of these impacts.

The following table provide the management actions recommended to manage the potential impacts:

- Operation and maintenance phase management actions (**Table 4**).

The responsible persons at the Proponent's team should assess these commitments in detail and commit to the specific management actions where indicated in the tables below.

## 12. ASSUMPTIONS AND LIMITATIONS

This EMP has been drafted based on the brief for the Poultry Production and Abattoir facilities on Portion 48 of Farm Stampried 132, as presented by the proponent. ECT will not be held responsible for the potential consequences that may result from any alterations to the information presented.

### 13. OPERATION AND MAINTENANCE PHASE

The management actions included in Table 4 below apply during the operation and maintenance phase of this development.

**Table 4:** Operation and maintenance management actions

OPERATIONAL PHASE IMPACTS	
Impact	Mitigation Measures
<b>Lack of environmental knowledge among employees</b>	<ul style="list-style-type: none"> <li>• All employees are required to attend onsite Environmental Awareness/Training prior to commencing work on site.</li> <li>• Follow-up Environmental Awareness/Training may be required from time to time as new employees commence work or for specific activities that may potentially impact the environment.</li> <li>• The poultry manager is to maintain accurate records of any training undertaken.</li> <li>• The ECO shall monitor the poultry managers' compliance with the requirement to provide sufficient environmental awareness training to all site staff.</li> <li>• Training is to cover all aspects of the EMP and procedures to be followed</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>• An Environmental Control Officer should monitor the implementation of the EMP.</li> <li>• The Environmental Control Officer should inspect the site on a regular basis (preferably monthly or bi-monthly).</li> <li>• Biannual reports are to be submitted to the Ministry of Environment, Forestry and Tourism.</li> <li>• The above functions may be outsourced to an Independent Environmental Practitioner.</li> </ul>
<b>Dust generation</b>	<ul style="list-style-type: none"> <li>• Dust suppression equipment need to be onsite to water down dusty road.</li> <li>• Speed bumps or traffic speed signs need to be erected to reduce speeding onsite that could result in the generation of dust.</li> <li>• Regular maintenance of vehicles to address wear of tires and breaks. Optimal engine combustion will allow for "cleaner" exhaust emissions.</li> </ul>

<b>OPERATIONAL PHASE IMPACTS</b>	
<b>Impact</b>	<b>Mitigation Measures</b>
	<ul style="list-style-type: none"> <li>• If the soil is compacted, open areas should be ripped, fertilised and re-vegetated as soon as possible using suitable grass species</li> </ul>
<b>Infrastructure services</b>	<ul style="list-style-type: none"> <li>• It is recommended that alternative and renewable sources of energy be explored and introduced into the proposed development to reduce dependency on the grid.</li> <li>• Solar geysers and panels, and biogas should be introduced to provide for general lighting and heating of water and buildings, such as broiler houses.</li> <li>• Other ‘green’ technologies to reduce the proposed development’s dependency on fossil fuel should be explored where possible.</li> <li>• Designs and building materials should be as such to reduce dependency on artificial heating and cooling in order to limit the overall energy necessities.</li> <li>• Water saving mechanisms should be incorporated within the proposed development’s design and plans in order to further reduce water demands.</li> <li>• Re-use of treated waste water should be considered wherever possible to reduce the consumption of potable water.</li> <li>• Introduce energy management systems, in the development, as well as energy saving awareness to encourage energy wastage.</li> <li>• Keep drains clean.</li> <li>• Adhere to water quality guidelines in terms of The Water Act, 1956.</li> </ul>
<b>Generation of noise</b>	<ul style="list-style-type: none"> <li>• The site workers and contractors will adhere to the requirements of the Labour Act Nr 11 of 2007 regarding hearing protection and noise control measures.</li> <li>• Regular maintenance of vehicles, back-up generators and equipment.</li> <li>• All equipment and machinery should be fitted with adequate silencers.</li> </ul>

<b>OPERATIONAL PHASE IMPACTS</b>	
<b>Impact</b>	<b>Mitigation Measures</b>
	<ul style="list-style-type: none"> <li>• No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is permitted on site.</li> <li>• If work is to be undertaken outside of normal work hours permission must be obtained from the ECO and the poultry manager.</li> <li>• No noisy work is to be conducted over the weekends or on public holidays.</li> </ul>
<b>Surface and Ground Water</b>	<ul style="list-style-type: none"> <li>• A no-go buffer area of at least 50 m should be allocated to any water bodies in the area.</li> <li>• No dumping of waste products of any kind in or in close proximity to any surface water bodies.</li> <li>• Contaminated runoff from the various operational activities such as greases, fuels, oils etc. should be prevented from entering any surface or ground water bodies, and where these occur, that they are appropriately and immediately dealt with.</li> <li>• Ensure that surface water accumulating on-site are channelled and captured through a proper storm water management system to be treated in an appropriate manner before disposal into the environment.</li> <li>• Wastewater should not be discharged directly into the environment.</li> <li>• All toilets must be flush-type and be linked to their own French Drain/Septic Tank.</li> <li>• Users to be educated not to flush foreign objects down the toilet.</li> <li>• The service infrastructure should be designed and constructed by suitably qualified engineering professionals.</li> <li>• Develop and implement a preventative maintenance plan for the service infrastructure.</li> <li>• Drip trays must be placed underneath heavy vehicles and machinery when not in use to contain all oil that might be leaking from these equipments.</li> <li>• Should it be necessary to wash equipment this should be done at an area properly suited and prepared to receive and contain polluted water.</li> </ul>

OPERATIONAL PHASE IMPACTS	
Impact	Mitigation Measures
	<ul style="list-style-type: none"> <li>• Disposal of waste from the various activities should be disposed of properly at the designated landfill.</li> <li>• Prevent fuel spills: look at work practices, staff training, equipment and storage.</li> <li>• Consider the use of environmentally friendly degreasers for washing and cleaning.</li> <li>• In the instance of an accidental fuel spill, the effluent should be contained as far as possible.</li> </ul>
<b>Waste management.</b>	<ul style="list-style-type: none"> <li>• Develop a waste management plan.</li> <li>• Take note that hazardous waste includes litter, mortalities, ash, empty hazardous chemical substance containers, soil and material (e.g. cloths) contaminated by hazardous chemical substances, etc.</li> <li>• The waste management plan should consider the type of waste, description, source, storage, disposal method, disposal facility and responsible person.</li> </ul> <p><b>The implementation of the waste management plan should ensure:</b></p> <ul style="list-style-type: none"> <li>• Installation of sufficient waste bins, skips or bulk containers, where necessary.</li> <li>• All containers (bins, skips or bulk containers) shall be kept in a clean and hygienic manner.</li> <li>• Containers (bins, skips or bulk containers) utilised for the disposal of general and hazardous waste must be demarcated accordingly.</li> <li>• Waste material may only be temporarily stored at areas demarcated for such storage.</li> <li>• General waste shall be stored in a manner that prevents the harbouring of pests.</li> <li>• General and hazardous waste should always be stored and disposed of separately.</li> <li>• General and hazardous waste should be disposed of in appropriately demarcated bins. Bins are then emptied into appropriately demarcated skips or bulk containers once a day or more often, if required.</li> </ul>

OPERATIONAL PHASE IMPACTS	
Impact	Mitigation Measures
	<ul style="list-style-type: none"> <li>• Skips or bulk containers should be removed to a nearby landfill site on a weekly basis or more often, if required.</li> <li>• Safe disposal certificates should be requested from general and hazardous landfill sites with every waste disposal.</li> <li>• These safe disposal certificates should be kept on file to illustrate compliance with the cradle to grave principle.</li> <li>• The ECO shall monitor the compliance with the cradle to grave principle.</li> <li>• No incineration of any kind of waste will be permitted onsite.</li> </ul>
<p><b>Poor waste (chicken mortality) management.</b></p>	<p>Note: The management of chicken mortalities should be included in the waste management plan.</p> <p><b>Temporary storage of mortalities</b></p> <ul style="list-style-type: none"> <li>• The temporary storage area for mortalities must be a covered area that has access control, preventing the unlawful removal of mortalities. In the event of temporary storage, mortalities must be stored in sealed bins prior to disposal.</li> </ul> <p><b>Disposal of mortalities</b></p> <ul style="list-style-type: none"> <li>• Mortalities must be disposed of as soon as possible.</li> </ul> <p><b>Disposal of mass mortalities In the event of a disease outbreak</b></p> <ul style="list-style-type: none"> <li>• Notify the state vet.</li> <li>• The state vet must visit the site.</li> <li>• The state vet will place the property, or the specific chicken site or house that is infected, under quarantine.</li> <li>• Depending on the disease and severity, the chickens can be slaughtered on site or transported to an abattoir with a permit.</li> </ul>

<b>OPERATIONAL PHASE IMPACTS</b>	
<b>Impact</b>	<b>Mitigation Measures</b>
	<ul style="list-style-type: none"> <li>Alternatively, mortalities can be covered with lime and buried.</li> </ul>
<b>Poor waste (litter) management.</b>	<p>Note: The management of chicken litter should be included in the waste management plan.</p> <ul style="list-style-type: none"> <li>Maintain good litter conditions by keeping the litter dry throughout the production cycle.</li> <li>Litter should be collected and bagged immediately after a production cycle and prior to removal.</li> <li>The chicken coops must be dry cleaned efficiently to remove as much litter as possible and to reduce the amount of wash water used.</li> <li>The removal of manure will occur after every cycle to prevent accumulation on site, keeping the nutrient rich manure from polluting surface and groundwater bodies, avoiding offensive smells and ensuring the hygiene and health of the new flock.</li> <li>Litter will be preserved in a dry area, covered by sheeting or within a shed to protect it from rain and leaching. This is to prevent the formation of noxious odours and ammonia.</li> </ul>
<b>Run off of contaminated water</b>	<ul style="list-style-type: none"> <li>The chicken coops and abattoir are cleaned after each cycle.</li> <li>After litter is bagged and stored, high-pressure hoses should be used in the washing of the chicken coops, to minimise the amount of water used.</li> <li>High-pressure hoses should be used in the washing of the chicken coops, abattoir and equipment, to minimise the amount of water used.</li> <li>Wash and sanitise chicken coops, abattoir and equipment with biodegradable soaps and disinfectants.</li> <li>Use biodegradable soaps and disinfectants in the footbath and showers.</li> <li>Use biodegradable soaps and disinfectants for washing of vehicles.</li> <li>Do not dispose the wash water from cleaning the chicken coops and abattoir into the environment.</li> </ul>



<b>OPERATIONAL PHASE IMPACTS</b>	
<b>Impact</b>	<b>Mitigation Measures</b>
<b>Stormwater management</b>	<ul style="list-style-type: none"> <li>• Clean storm water runoff from the surrounding environment must be channelled away from “dirty” areas. These “dirty” areas include chemicals storage areas and all waste storage areas.</li> <li>• Clean storm water should be diverted and kept in the environment surrounding the site.</li> <li>• Storm water measures should be inspected on a regular basis in order to ensure that the structures are functional and not causing soil erosion.</li> <li>• Where necessary place culverts underneath road foundations.</li> </ul>
<b>Hazardous substances</b>	<ul style="list-style-type: none"> <li>• Identify all chemical substances used onsite including fuel, greases, vaccines, detergents etc.</li> <li>• Obtain the material safety data sheet of each of these chemical substances.</li> <li>• Ensure that the material safety data sheets have sufficient information to enable the user to take the necessary measures to protect his/her health and safety and that of the environment.</li> <li>• Material Safety Data Sheets for all hazardous chemical substances must be readily available on site.</li> <li>• Develop and implement a dangerous goods management plan based on the material safety data sheets of all identified chemical substances and the Hazardous Substances Ordinance (No. 14 of 1974).</li> <li>• Keep a stock inventory register of all chemicals in the store.</li> <li>• Powders must be stored above liquids.</li> <li>• Proper storage of chemicals in a lockable, well ventilated building.</li> <li>• Ensure adequate access control for the storage area.</li> <li>• Storage areas for hazardous chemicals are to comply with standard fire safety regulations.</li> <li>• Safety signage including “No Smoking”, “No Naked Lights” and “Danger”, and product identification signs, are to be clearly displayed in areas housing chemicals.</li> </ul>

<b>OPERATIONAL PHASE IMPACTS</b>	
<b>Impact</b>	<b>Mitigation Measures</b>
	<ul style="list-style-type: none"> <li>• Appropriate equipment to deal with emergency spill incidents is to be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for equipment and/or machinery leaks, drums or containers for contaminated water.</li> <li>• Chemicals are to be properly labelled and handled in a safety conscious manner.</li> <li>• All personnel handling hazardous chemicals and hazardous materials are to be issued with the appropriate Personal Protective Equipment (PPE).</li> <li>• Ensure that diesel or fuel tanks are in a bunded area with capacity of holding 110% of the total storage volume.</li> <li>• The removal of only the daily-required amount of chemicals to be used from the shed.</li> <li>• If refuelling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel.</li> <li>• Use of drip trays during filling of machinery or equipment. Drip trays should be emptied into secondary containers on a regular basis.</li> <li>• Ensure that any spilled chemical cannot exit the designated storage area by constructing a berm or bump at the exit, or store chemicals in a spill tray.</li> <li>• Immediately clean all spillage of fuels, lubricants and other petroleum based products.</li> <li>• The contaminated material must be disposed of in accordance with the waste management procedure.</li> <li>• No hazardous chemical must be discarded in the sewage or storm water system.</li> <li>• Train staff on the use of chemicals in accordance with the risks as described in the material safety data sheets.</li> <li>• Soil contaminated with hazardous chemical substances shall be treated as hazardous waste and removed from site.</li> </ul>

<b>OPERATIONAL PHASE IMPACTS</b>	
<b>Impact</b>	<b>Mitigation Measures</b>
<b>Hydrocarbon pollution of soil, surface - and groundwater.</b>	<ul style="list-style-type: none"> <li>• Inspection and maintenance of equipment, generators and vehicles owned by the proponent shall take place on a regular basis.</li> <li>• Designated personell shall inspect vehicles (such as those that belong to the proponent) on entering the facility to ensure vehicles are in sound condition. This will reduce the risk of oil or diesel spillages.</li> <li>• Equipment, generators and vehicles are to be repaired immediately upon developing leaks.</li> <li>• Generators must be stored on a concrete floor in a bunded area.</li> <li>• Drip trays shall be supplied for all repair work undertaken on machinery on site.</li> <li>• Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to contain incidental spills and pollutants.</li> <li>• Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow.</li> <li>• Appropriate equipment to deal with emergency spill incidents is to be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for equipment and/or machinery leaks, drums or containers for contaminated water.</li> <li>• Soil contaminated with hazardous substances, fuel or oil shall be treated as hazardous waste and removed from site.</li> <li>• If refueling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel.</li> <li>• All liquid fuels (petrol and diesel) are to be stored in tanks or containers with lids.</li> </ul>
<b>Unsanitary conditions on site.</b>	<ul style="list-style-type: none"> <li>• Sufficient ablution facilities shall be provided - minimum of 1 toilet per 15 workers.</li> <li>• The location of toilets is to be approved by the ECO prior to site establishment, but shall be located within 100m of any work point.</li> </ul>

<b>OPERATIONAL PHASE IMPACTS</b>	
<b>Impact</b>	<b>Mitigation Measures</b>
	<ul style="list-style-type: none"> <li>• Ablution facilities shall be inspected and maintained to prevent or minimise blockage and leakages.</li> <li>• Ablution facilities are to be serviced weekly or more frequently if required.</li> <li>• Toilets should have properly closing doors and should have toilet paper at all times.</li> <li>• Awareness of the importance of proper hygiene should be created among employees.</li> <li>• Excreting anywhere other than in the toilets shall not be allowed.</li> <li>• A septic tank system should be considered instead of French drains.</li> </ul>
<b>Outbreak of poultry diseases.</b>	<ul style="list-style-type: none"> <li>• All chickens should originate from a closed bio-security compartment.</li> <li>• All chicks should originate from disease free sources.</li> <li>• Chicks from another farm should not be mixed with chickens in the flock.</li> <li>• Access control to and from the premises and access to the premises should only be by prior arrangement.</li> <li>• Installation of footbaths with disinfectant at all the entrances to each of the chicken slaughtering facilities.</li> <li>• Installation of showers for all staff working on site.</li> <li>• Use a sound vaccination program.</li> <li>• Never permit contaminated equipment from other poultry farms in the buildings.</li> <li>• Keep wild birds, rodents and predators away from the chicken coops.</li> <li>• Installation of rodent bait traps and flytraps.</li> <li>• Clean and sanitise chicken coops, abattoir and equipment after each cycle with biodegradable soaps and disinfectants.</li> <li>• Monitoring and auditing of processes by a contracted veterinarian or State Vet.</li> <li>• Obtain a reliable diagnosis before starting treatment for a certain disease.</li> </ul>

<b>OPERATIONAL PHASE IMPACTS</b>	
<b>Impact</b>	<b>Mitigation Measures</b>
	<ul style="list-style-type: none"> <li>• Seek advice of a trained poultry diagnostician when it is apparent that a disease is present in the flock.</li> <li>• When submitting a sample to a diagnostic laboratory, submit a sample of the problem flock. The sample should include two or more sick birds and freshly dead birds, if any. Take care to preserve dead specimens by cooling and preventing decomposition. It is not recommended to freeze dead birds as this may cause cell rupture and make diagnosis more difficult.</li> <li>• Proper handling, storage and disposal of litter and mortalities, in demarcated areas, away from foot traffic or vehicles entering and leaving the premises.</li> </ul>
<b>Inefficient and redundant use of electricity.</b>	<ul style="list-style-type: none"> <li>• Ensure that all employees have been informed on the importance of natural resources (proper environmental training and awareness).</li> <li>• Inspect operations regularly to determine areas of improvement with regards to resource consumption.</li> <li>• Monitoring of resource consumption.</li> <li>• Identify areas where resource consumption can be minimised.</li> <li>• Set targets to try and minimise resource consumption.</li> <li>• Identify technologies and practices that may reduce resource consumption.</li> <li>• Implementation of technologies and practices that can reduce resource consumption.</li> <li>• Save electricity by turning off lights and computers when leaving the office.</li> <li>• Halogen light bulbs convert approximately 80% of the energy used into heat rather than light. Replace spent light bulbs with energy saving CFLs (compact fluorescent lights) or newer and more efficient LEDs (light-emitting diodes).</li> </ul>
<b>Inefficient and redundant use of water.</b>	<ul style="list-style-type: none"> <li>• Ensure that all employees have been informed on the importance of natural resources (proper environmental training and awareness).</li> </ul>

<b>OPERATIONAL PHASE IMPACTS</b>	
<b>Impact</b>	<b>Mitigation Measures</b>
	<ul style="list-style-type: none"> <li>• Regular site inspection by supervisors.</li> <li>• Inspect operations regularly to determine areas of improvement with regards to resource consumption.</li> <li>• Regular maintenance and inspection of equipment such as hose pipes, to prevent leaks.</li> <li>• Monitoring of resource consumption.</li> <li>• Identify areas where resource consumption can be minimised.</li> <li>• Set targets to try and minimise resource consumption.</li> <li>• Identify technologies and practices that may reduce resource consumption.</li> <li>• Implementation of technologies and practices that can reduce resource consumption.</li> <li>• Use high pressure hoses to clean the chicken coops, abattoir and equipment.</li> <li>• Regular inspection and maintenance of all boreholes, water tanks, toilets, water pipes and taps.</li> <li>• Leaking water tanks, taps, toilets and pipes must be repaired immediately.</li> <li>• Running water taps and pipes may not be left unattended.</li> <li>• Each time you flush the toilets approximately 20 litres of water is used, therefore use the toilets wisely.</li> <li>• All pipe, hose and tap connections are to be fitted with correct and appropriate plumbing fittings.</li> <li>• Ensure that Water Abstraction permits are in place and kept current.</li> </ul>
<b>Air quality. Odour from animal slaughtered, handling of meat and domestic waste.</b>	<ul style="list-style-type: none"> <li>• Ensure meat and meat products are kept at correct cold storage temperatures.</li> <li>• Manage wastewater efficiently through regular maintenance of wastewater systems.</li> </ul>
<b>Sewage</b>	<ul style="list-style-type: none"> <li>• Discharge of wastewater into the environment is prohibited.</li> <li>• The septic tank system shall be kept in a good state of repair at all times.</li> </ul>

<b>OPERATIONAL PHASE IMPACTS</b>	
<b>Impact</b>	<b>Mitigation Measures</b>
	<ul style="list-style-type: none"> <li>• Seepage of the septic tank into the underground should be avoided at all costs.</li> <li>• Obtain relevant permits for the installation of septic tank system.</li> <li>• In the instance that they become full, effluent should be disposed off at a proper sewage works e.g. Stampriet Village Council Wastewater Works.</li> <li>• Official arrangements to that effect should be in place (in writing).</li> </ul>
<b>Visual and Sense of Place</b>	<ul style="list-style-type: none"> <li>• The structures on the site have to be aesthetically pleasing and designed to blend in with the natural surrounds.</li> <li>• It is recommended that more 'green' technologies be implemented within the architectural designs and building materials of the structures where possible in order to minimise the visual prominence of such a development within the more natural surrounding landscape.</li> <li>• Natural colours and building materials such as wood and stone should be incorporated as well as the use of indigenous vegetation in order to beautify the development.</li> </ul>
<b>Archaeology and Heritage</b>	<ul style="list-style-type: none"> <li>• The proponent or PR should promptly report any archaeological or heritage finds to the relevant authorities such as the National Heritage Council.</li> </ul>
<b>Health, Safety and Security</b>	<ul style="list-style-type: none"> <li>• Ensure that all personnel are properly trained depending on the nature of their work.</li> <li>• Provide for a first aid kit and a properly trained person to apply first aid when necessary.</li> <li>• A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases.</li> <li>• Provide free condoms in the workplace.</li> <li>• Facilitate access to Antiretroviral medication.</li> <li>• Adhere to the existing protocols in terms of Covid-19.</li> <li>• Restrict unauthorised access to the site and implement access control measures</li> <li>• Clearly demarcate dangerous areas and no go areas on site.</li> </ul>

<b>OPERATIONAL PHASE IMPACTS</b>	
<b>Impact</b>	<b>Mitigation Measures</b>
	<ul style="list-style-type: none"> <li>• Staff and visitors to the site must be fully aware of all health and safety measures and emergency procedures.</li> <li>• The proponent must comply with all applicable occupational health and safety requirements.</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>• Ensure locals enjoy priority in terms of job opportunities for skills that are available locally, to the extent possible.</li> <li>• Ensure local procurement where commodities are available locally.</li> </ul>
<b>Traffic</b>	<ul style="list-style-type: none"> <li>• Limit and control the number of access points to the site.</li> <li>• Ensure that road junctions have good sightlines.</li> <li>• Adhere to the speed limit.</li> <li>• Implement traffic control measures where necessary.</li> <li>• Minimise the movement of heavy vehicles during peak time.</li> </ul>



## 14. DECOMMISSIONING PHASE

The viability of the establishment of the poultry and abattoir facilities is based on the increased demand for chicken in Namibia. This is driven by an ever increasing population and a high reliance of food imports from outside of the country. It is therefore highly unlikely that the facility will be decommissioned and closed in the foreseeable future. However, if closure is considered, an extensive closure and rehabilitation plan will be drafted and sent to the Environmental Commissioner prior to commencement.

## 15. REFERENCE

Gemini Poultry Trading CC Poultry Production and Abattoir Business Plan. 2021.

SMS, 2013. Shangoni Management Services (Pty) Ltd. Expansion of the Rodekraal free-range chicken farm.

Google Earth, 2021. Google Earth.

## **Appendix A - Water Quality Guidelines**

# **THE WATER ACT, 1956 (ACT 54 OF 1956 ) AND ITS REQUIREMENTS IN TERMS OF WATER SUPPLIES FOR DRINKING WATER AND FOR WASTE WATER TREATMENT AND DISCHARGE INTO THE ENVIRONMENT**

## **1. INTRODUCTION**

The provisions of the Water Act are intended, amongst other things, to promote the maximum beneficial use of the country's water supplies and to safeguard water supplies from avoidable pollution.

The drinking water guidelines are not standards as no publication in the Government Gazette of Namibia exists to that effect. However the Cabinet of the Transitional Government for National Unity adopted the existing South African Guidelines (461/85) and the guidelines took effect from 1 April 1988 under the signature of the then Secretary for Water Affairs.

The sections of the Water Act that relate to the discharge of industrial effluents are:

- Section 21(1) which states that
  - The purification of waste water shall form an integral part of water usage and
  - that purified effluents shall comply with the General Standard Quality restrictions as laid out in Government Gazette R553 of 5 April 1962 and
- Section 21(2) which further stipulate that this purified effluent be returned as close as possible to the point of abstraction of the original water.

Where a local authority has undertaken the duty of disposing of all effluents from an industrial process the provisions of Section 21(1) and 21(2) apply to the local authority and not the producer of the effluents. If there is difficulty in complying with these provisions then the applicant may apply for an exemption from the conditions in terms of Section 21(5) and 22(2) of the Water Act. The Permanent Secretary after consultation with the Minister may grant the issuance of a Waste Water Discharge Permit under Sections 21(5) and 22(2) subject to such conditions as he may deem fit to impose.

After independence, the Government of the Republic of Namibia decided that for the interim the existing guidelines will continue to be valid and to remain in use until a proper study has been conducted and new standards have been formulated (Article 140 of Act 1 of 1990).

## **2. GUIDELINES FOR THE EVALUATION OF DRINKING-WATER QUALITY FOR HUMAN CONSUMPTION WITH REGARD TO CHEMICAL, PHYSICAL AND BACTERIOLOGICAL QUALITY**

Water supplied for human consumption must comply with the officially approved guidelines for drinking-water quality. For practical reasons the approved guidelines have been divided into three basic groups of determinants, namely:

- Determinants with aesthetic / physical implications: TABLE 1.
- Inorganic determinants: TABLE 2.
- Bacteriological determinants: TABLE 3.

### **2.1 CLASSIFICATION OF WATER QUALITY**

The concentration of and limits for the aesthetic, physical and inorganic determinants define the group into which water will be classified. See TABLES 1 and 2 for these limits. The water quality has been grouped into 4 quality classes:

- Group A: Water with an excellent quality
- Group B: Water with acceptable quality
- Group C: Water with low health risk
- Group D: Water with a high health risk, or water unsuitable for human consumption.

Water should ideally be of excellent quality (Group A) or acceptable quality (Group B), however in practice many of the determinants may fall outside the limits for these groups.

If water is classified as having a low health risk (Group C), attention should be given to this problem, although the situation is often not critical as yet.

If water is classified as having a higher health risk (Group D), urgent and immediate attention should be given to this matter.

Since the limits are defined on the basis of average lifelong consumption, short-term exposure to determinants exceeding their limits is not necessarily critical, but in the case of toxic substances, such as cyanide, remedial measures should immediately be taken.

The overall quality group, into which water is classified, is determined by the determinant that complies the least with the guidelines for the quality of drinking water.

**TABLE 1: DETERMINANTS WITH AESTHETIC / PHYSICAL IMPLICATIONS**

DETERMINANTS	UNITS*	LIMITS FOR GROUPS			
		A	B	C	D**
Colour	mg/l Pt***	20			
Conductivity	mS/m !at 25 °C	150	300	400	400
Total hardness	mg/l CaCO <sub>3</sub>	300	650	1300	1300
Turbidity	N.T.U****	1	5	10	10
Chloride	mg/l Cl	250	600	1200	1200
Chlorine (free)	mg/l Cl	0,1- 5,0	0,1 – 5,0	0,1 – 5,0	5,0
Fluoride	mg/l F	1,5	2,0	3,0	3,0
Sulphate	mg/l SO <sub>4</sub>	200	600	1200	1200
Copper	µg/l Cu	500	1000	2000	2000
Nitrate	mg/l N	10	20	40	40
Hydrogen Sulphide	µg/l H <sub>2</sub> S	100	300	600	600
Iron	µg/l Fe	100	1000	2000	2000
Manganese	µg/l Mn	50	1000	2000	2000
Zink	mg/l Zn	1	5	10	10
pH****	pH-unit	6,0 – 9,0	5,5 – 9,5	4,0 – 11,0	4,0 – 11,0

\* In this and all following tables "l" (lower case L in ARIAL) is used to denote dm<sup>3</sup> or litre

\*\* All values greater than the figure indicated.

\*\*\* Pt = Platinum Units

\*\*\*\* Nephelometric Turbidity Units

\*\*\*\*\* The pH limits of each group exclude the limits of the previous group

**TABLE 2: INORGANIC DETERMINANTS**

DETERMINANTS	UNITS	LIMITS FOR GROUPS			
		A	B	C	D*
Aluminium	µg/l Al	150	500	1000	1000
Ammonia	mg/l N	1	2	4	4
Antimonia	µg/l Sb	50	100	200	200
Arsenic	µg/l As	100	300	600	600
Barium	µg/l Ba	500	1000	2000	2000
Beryllium	µg/l Be	2	5	10	10
Bismuth	µg/l Bi	250	500	1000	1000
Boron	µg/l B	500	2000	4000	4000
Bromine	µg/l Br	1000	3000	6000	6000
Cadmium	µg/l Cd	10	20	40	40
Calcium	mg/l Ca	150	200	400	400
Calcium	mg/l CaCO <sub>3</sub>	375	500	1000	1000
Cerium	µg/l Ce	1000	2000	4000	4000
Chromium	µg/l Cr	100	200	400	400
Cobalt	µg/l Co	250	500	1000	1000
Cyanide (free)	µg/l CN	200	300	600	600
Gold	µg/l Au	2	5	10	10
Iodine	µg/l I	500	1000	2000	2000
Lead	µg/l Pb	50	100	200	200
Lithium	µg/l Li	2500	5000	10000	10000
Magnesium	mg/l Mg	70	100	200	200
Magnesium	mg/l CaCO <sub>3</sub>	290	420	840	840
Mercury	µg/l Hg	5	10	20	20
Molybdenum	µg/l Mo	50	100	200	200
Nickel	µg/l Ni	250	500	1000	1000
Phosphate	mg/l P	1	See note below	See note below	See note below
Potassium	mg/l K	200	400	800	800
Selenium	µg/l Se	20	50	100	100
Silver	µg/l Ag	20	50	100	100
Sodium	mg/l Na	100	400	800	800
Tellurium	µg/l Te	2	5	10	10
Thallium	µg/l Tl	5	10	20	20
Tin	µg/l Sn	100	200	400	400
Titanium	µg/l Ti	100	500	1000	1000
Tungsten	µg/l W	100	500	1000	1000
Uranium	µg/l U	1000	4000	8000	8000
Vanadium	µg/l V	250	500	1000	1000

\* All values greater than the figure indicated.

**Note FOR Table 2 on phosphate:** Phosphates are not toxic and essential for all life-forms. Natural water will, however, seldom contain phosphate; it is generally seen as an indicator of pollution and is usually accompanied by other pollutants. Wherever drinking water is combined with or consists wholly of reclaimed or recycled water, it may be expected to contain phosphate. The general guideline for a concentration level to be aimed at is 1 mg/l as P. But in many cases this may be difficult to achieve technically. For this reason the Department will allow a phosphate concentration level of up to 5 mg/l as P in water intended for human consumption. Please refer also to the “Note on Phosphate” under Section 3: General Standards for Waste/Effluent.

## 2.2 BACTERIOLOGICAL DETERMINANTS

The bacteriological quality of drinking water is also divided into four groups, namely:

- Group A: Water which is bacteriological very safe;
- Group B: Water which is bacteriological still suitable for human consumption;
- Group C: Water which is bacteriological risk for human consumption, which requires immediate action for rectification;
- Group D: Water, which is bacteriological unsuitable for human consumption.

**TABLE 3: BACTERIOLOGICAL DETERMINANTS**

DETERMINANTS	LIMITS FOR GROUPS			
	A**	B**	C	D*
Standard plate counts per 1 ml	100	1000	10000	10000
Total coliform counts per 100 ml	0	10	100	100
Faecal coliform counts per 100 ml	0	5	50	50
<i>E. coli</i> counts per 100 ml	0	0	10	10

\* All values greater than the figure indicated.

\*\* In 95% of the samples.

NB If the guidelines in group A are exceeded, a follow-up sample should be analysed as soon as possible.

## 2.3 FREQUENCY FOR BACTERIOLOGICAL ANALYSIS OF DRINKING-WATER SUPPLIES

The recommended frequency for bacteriological analysis of drinking water is given in Table 4.

**TABLE 4: FREQUENCY FOR BACTERIOLOGICAL ANALYSIS**

POPULATION SERVED	MINIMUM FREQUENCY OF SAMPLING
More than 100 000	Twice a week
50 000 – 100 000	Once a week
10 000 – 50 000	Once a month
Minimum analysis	Once every three months



### 3 GENERAL STANDARDS FOR WASTE / EFFLUENT WATER DISCHARGE INTO THE ENVIRONMENT

All applications in terms of Section 21(5) and 22(2), for compliance with the requirements of Section 21(1) and 21(2) of the Water Act (Act 54 of 1956) that purified water shall comply with the General Standard as laid out in Government Gazette Regulation R553 of 5 April 1962.

**TABLE 5 GENERAL STANDARDS FOR ARTICLE 21 PERMITS (EFFLUENTS)**

DETERMINANTS	MAXIMUM ALLOWABLE LEVELS
Arsenic	0,5 mg/l as As
Biological Oxygen Demand (BOD)	no value given
Boron	1,0 mg/l as B
Chemical Oxygen Demand (COD)	75 mg / l as O
Chlorine, residual	0,1 mg/l as Cl <sub>2</sub>
Chromium, hexavalent	50 µg/l as Cr(VI)
Chromium, total	500 µg/l as Cr
Copper	1,0 mg/l as Cu
Cyanide	500 µg/l as CN
Oxygen, Dissolved (DO)	at least 75% saturation**
Detergents, Surfactants, Tensides	0,5 mg/l as MBAS – See also Note 2
Fats, Oil & Grease (FOG)	2,5 mg/l (!gravimetric method)
Fluoride	1,0 mg/l as F
Free & Saline Ammonia	10 mg/l as N
Lead	1,0 mg/l as Pb
Oxygen, Absorbed (OA)	10 mg / l as O*
pH	5,5 – 9,5
Phenolic Compounds	100 µg/l as phenol
Phosphate	1,0 mg/l as P - See also Note 1
Sodium	not more than 90 mg/l Na more than influent
Sulphide	1,0 mg/l as S
Temperature	35°C
Total Dissolved Solids (TDS)	not more than 500 mg / l more than influent
Total Suspended Solids (TSS)	25 mg/l
Typical faecal Coli.	no typical coli should be counted per 100 ml
Zinc	5,0 mg/l as Zn

\* Also known as *Permanganate Value* (or *PV*).

\*\* In Windhoek the saturation level is at approx. 9 mg/l O<sub>2</sub>.

**Note (1) on phosphate:** Phosphates are not toxic and essential for all life forms. Natural water will seldom contain phosphate; it is generally seen as an indicator of pollution and is usually accompanied by other pollutants. Wherever drinking water is combined with or consists wholly of reclaimed or recycled water, it may be expected to contain phosphate. There is no general guideline for phosphate contained in the Regulation 553. But generally it is assumed that eutrophication or algal bloom in dams is promoted by nutrient concentrations as low as 0,01 mg/l as P; generally a phosphate concentration limit for dams of 0,1 mg/l is recommended. All water that is consumed and subsequently discharged, will eventually end up in rivers, dams or

groundwater – that is why for potable water, a concentration level of 1 mg/l as P is aimed at.

But, again, in many cases of waste and effluent treatment, this may be difficult to achieve technically, or the required waste and effluent treatment infrastructure is not available; as the required infrastructure is sophisticated and expensive. The current situation calls for a compromise and for this reason, this Department will judge each application individually on its merits and allow, in certain cases, a phosphate concentration level of up to 15 mg/l as P in any effluent or waste stream to be discharged into the environment. This regulation is subject to be reviewed every two years, calculated from the date of approval of this document.

**Note (2) on detergents, surfactants and ten sides:** The MBAS (or methylene blue active substances) – test does not encompass all surface active compounds currently, commercially available. The limit given is therefore only a guideline. Many of the cleaning agents are toxic to biological life-forms in rivers and dams.

It should be taken into consideration that some commercial products interfere with the effective removal of oil, fat and grease by grease and fat traps, by breaking up such long-chain molecules into shorter ones. These cleaning agents thus effectively allow such components to pass through the traps and land into sections of a treatment plant further down the line and interfere with the process there.

Many cleaning agents contain very powerful disinfectants, and/or biocides. Such substances may interact with biological treatment processes. They may reduce the effectiveness of such treatment or 'kill' it completely, if they land in septic tanks, biofilters or even activate-sludge plants. Their activity may be attenuated by dilution.

#### **4. AUTHORIZATION**

Herewith, the Guidelines for the Evaluation of Drinking Water for Human Consumption with regard to Chemical, Physical and Bacteriological Quality, as well as the General Standards for Article 21\* Permits, amended for detergents, surfactants, ten sides, as well as phosphates, are confirmed and remain in force until further notice.

Issued under my hand with the authority vested in my office, within the Ministry for Agriculture, Water and Rural Development,

**PERMANENT SECRETARY**  
**Dr V Shivute**

**WINDHOEK,**

**DATE STAMP**