Updated Environmental Management Plan Operations of an Abattoir on Portion 808 of Farm Stampried 132, Stampriet, Hardap Region

FRESHFRUIT FARMING (PTY) LTD

ABATTOIR

ECT
ENVIRONAM CONSULTANTS TRADING

ENVIRONMENTAL MANAGEMENT PLAN FOR THE OPERATIONS OF AN ABATTOIR ON PORTION 808 OF FARM STAMPRIED 132, STAMPRIET, HARDAP REGION

PROJECT DETAILS

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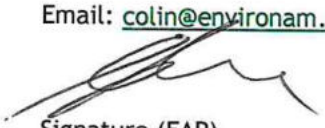

Signature (EAP)

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ABBREVIATIONS

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

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 3 388 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. FRESH FRUIT FARMING (PTY) LTD obtained Portions 811, 814 and 815 of Farm Stampried 132 to establish a poultry production facility. The facility has four chicken coops that produce 5 000 broiler chicks per coop per cycle, furthermore there are 6 200 layer hens, all the poultry is marketed to Red Dot Catering and Namica.

In order to add value to the production process FRESH FRUIT FARMING (PTY) LTD has established an abattoir on Portion 808 of Farm Stampried 132. Chicken stock for slaughter is supplied from production facilities on Portions 811, 814 and 815 of the same Farm Stampried 132.

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).

In line with the above, FRESHFRUIT FARMING (PTY) LTD applied for an Environmental Clearance Certificate (ECC) which was approved in December 2021 and will expire in December 2024. It is against this background that FRESHFRUIT FARMING (PTY) LTD has appointed Environam Consultants Trading (ECT) to undertake the process of applying for the renewal of the Environmental Clearance Certificate.

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 the renewal of the ECC, Environam Consultants Trading has revised and updated the existing EMP that will outline the appropriate actions to be undertaken in mitigation of potential negative environmental impacts. 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 are 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 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 expeditious 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 FRESHFRUIT FARMING (PTY) LTD Poultry Production, 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 the 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
- Disinfected clothes to be worn in broiler houses at all times.

3. PRODUCTION PROCESS

The FRESHFRUIT FARMING (PTY) LTD poultry production project has a fully operational broiler system including a hatchery and broiler house.

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 and produced by the 60 small-scale farmers are processed through this abattoir.

Off Takers

FRESHFRUIT FARMING (PTY) LTD has secured contracts with red dot, Namibian Student Accommodation and NAMICA. FRESHFRUIT FARMING (PTY) LTD is currently at an advanced stage of discussion to also supply KFC. FRESHFRUIT FARMING (PTY) LTD believes, with the current shortage and ever-growing need for chicken, that FRESH FRUIT FARMING (PTY) LTD will not be able to satisfy the demand of chicken in Namibia with just one chicken farm.

4. STRUCTURE AND LAYOUT

The FRESH FRUIT FARMING (PTY) LTD poultry production project is an intensive farming unit that consists of the following:

Hatchery

The hatchery is necessitated by the need to be self-sufficient 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 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

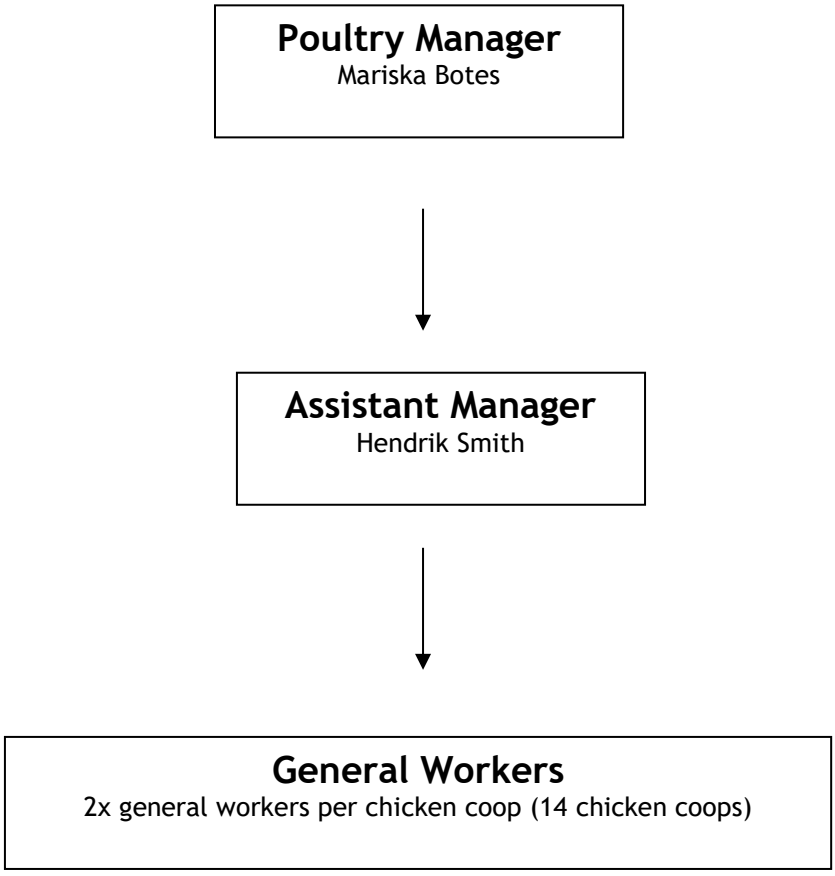
under roof and house 3000 hens and 375 roosters, this combination produces a minimum of 2500 fertilised eggs a day.

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:



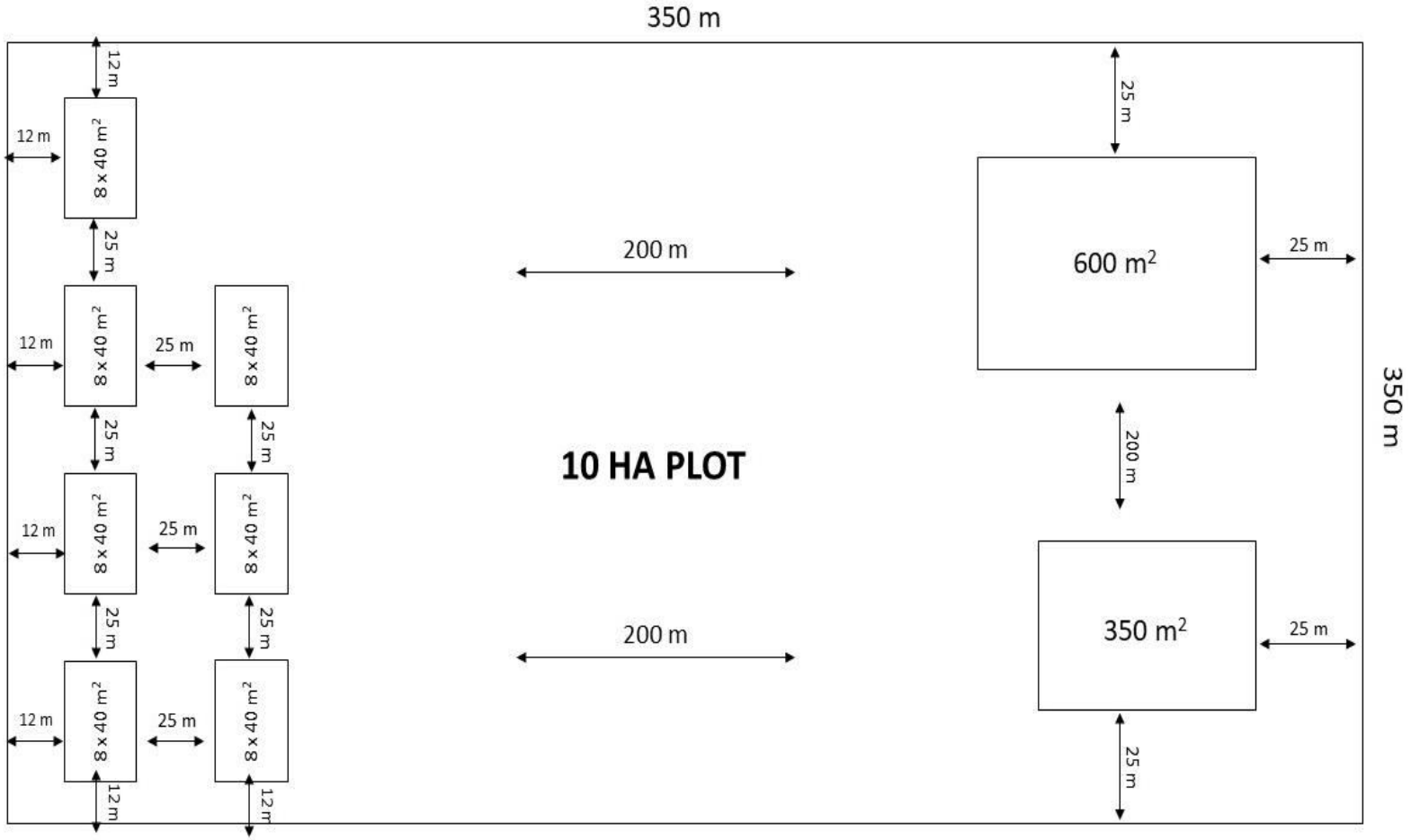


Figure 1: General layout of the hatchery, incubator and broiler houses

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 Stampried No. 132, adjacently north of the existing Township of Stampriet Village. Farm Stampried 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 Stampried No. 132. Refer to **Figure 2** below for the locality map of Stampriet and **Figure 3** for the locality map of Portions 811,814 and 815 of Farm Stampried 132.

Figure 2: Locality map of Stampriet

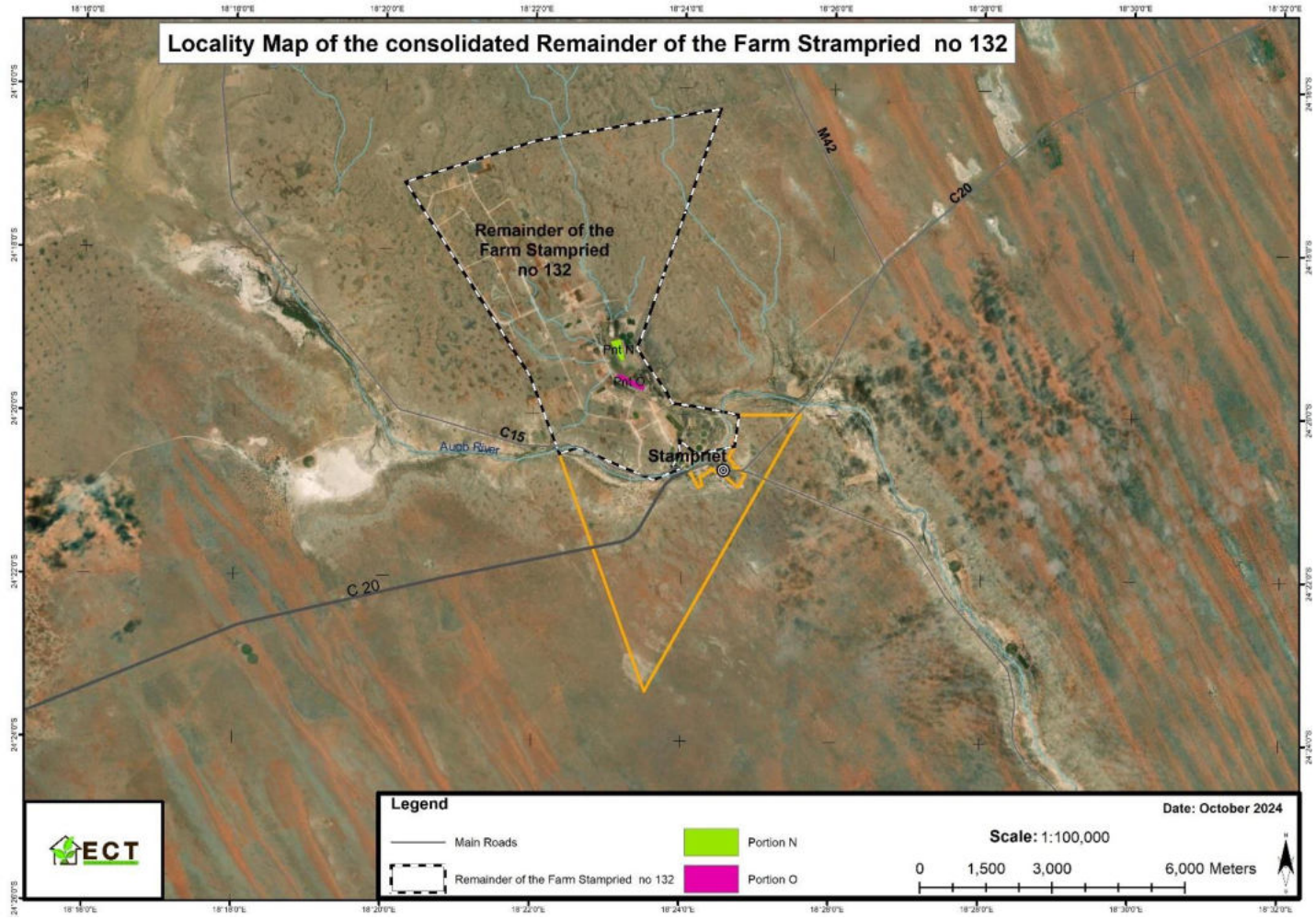


Figure 3: Location of Fresh Fruit Farming (Pty) Ltd Abattoir

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	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." Article 95(l) deals with the "maintenance of ecosystems, essential ecological processes and biological diversity" and sustainable use of the country's natural resources.	Sustainable development should be at the forefront of this development.
Environmental Management Act No. 7 of 2007 (EMA)	Section 2 outlines the objective of the Act and the means to achieve that. Section 3 details the principle of Environmental Management	The development should be informed by the EMA.
EIA Regulations GN 28, 29, and 30 of EMA (2012)	GN 29 Identifies and lists certain activities that cannot be undertaken without an environmental clearance certificate. GN 30 provides the regulations governing the environmental assessment (EA) process.	**Activity 8.1** The abstraction of ground or surface water for industrial or commercial purposes. **Activity 8.2** The abstraction of groundwater at a volume exceeding the threshold authorised in terms of a law relating to water resources. **Activity 8.6** Construction of industrial and domestic wastewater treatment plants and related pipeline systems. **Activity 8.7** Irrigation schemes for agriculture excluding domestic irrigation. **Activity 9.2** 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

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.
The Ministry of Environment and Tourism (MET) Policy on HIV & AIDS	MET 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.
Local Authorities Act No. 23 of 1992	The Local Authorities Act prescribes the manner in which a town or municipality should be managed by the Town or Municipal Council. Sections 34-47 make provision for the aspects of water and sewerage.	The development has to be comply with the provisions of the Local Authorities Act
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.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
Public and Environmental Health Act of 2015	The Act serves to protect the public from nuisance and states that person may not cause a health nuisance or may not permit to exist on a land or premises owned or occupied by him or her, or of which he or she is in charge, a health nuisance or other condition liable to be injurious or dangerous to health.	The proponent should ensure that health nuisances are avoided.
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.
Water Resources Management Act 11 of 2013.	• A permit application in terms of Sections 72(1) of the Water Act is required for the disposal of industrial or domestic waste water and effluent. Section 44 (1): a licence for abstraction and use of water, to be obtained from the Minister.	Obligation not to pollute surface water bodies. The following licences are required in terms of the Water Resources Management Act: • Licence to abstract and use water; • Groundwater disposal licence; • Borehole licence.

7. ROLES AND RESPONSIBILITIES

FreshFruit Farming (Pty) Ltd (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 **Table 1** 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

• Management and facilitation of communication between the Proponent, PR, the contractors, and Interested and Affected Parties (I&APS) with regard to this EMP;
• Monitor and audit the implementation of the EMP;
• Submitting bi-annual reports to the Environmental Commissioner.
• Assisting Contractors in finding solutions with respect to matters pertaining to the implementation of this EMP;
• Advising the PR on the removal of person(s) and/or equipment not complying with the provisions of this EMP;
• Making recommendations to the PR with respect to the issuing of fines for contraventions of the EMP.

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 Abattoir on Portion 808 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**
Lack of environmental knowledge among employees	• All employees are required to attend onsite Environmental Awareness/Training prior to commencing work on site. • 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. • The poultry manager is to maintain accurate records of any training undertaken. • The ECO shall monitor the poultry managers" compliance with the requirement to provide sufficient environmental awareness training to all site staff. • Training is to cover all aspects of the EMP and procedures to be followed
Monitoring	• An Environmental Control Officer should monitor the implementation of the EMP. • The Environmental Control Officer should inspect the site on a regular basis (preferably monthly or bi-monthly). • Biannual reports are to be submitted to the Ministry of Environment, Forestry and Tourism. • The above functions may be outsourced to an Independent Environmental Practitioner.
Dust generation	• Dust suppression equipment need to be onsite to water down dusty road. • Speed bumps or traffic speed signs need to be erected to reduce speeding onsite that could result in the generation of dust. • Regular maintenance of vehicles to address wear of tires and breaks. Optimal engine combustion will allow for “cleaner" exhaust emissions.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• If the soil is compacted, open areas should be ripped, fertilised and re-vegetated as soon as possible using suitable grass species
Infrastructure services	• It is recommended that alternative and renewable sources of energy be explored and introduced into the proposed development to reduce dependency on the grid. • Solar geysers and panels, and biogas should be introduced to provide for general lighting and heating of water and buildings, such as broiler houses. • Other 'green' technologies to reduce the proposed development's dependency on fossil fuel should be explored where possible. • Designs and building materials should be as such to reduce dependency on artificial heating and cooling in order to limit the overall energy necessities. • Water saving mechanisms should be incorporated within the proposed development's design and plans in order to further reduce water demands. • Re-use of treated waste water should be considered wherever possible to reduce the consumption of potable water. • Introduce energy management systems, in the development, as well as energy saving awareness to encourage energy wastage. • Keep drains clean. • Adhere to water quality guidelines in terms of The Water Resources Management Act 11 of 2013.
Generation of noise.	• 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. • Regular maintenance of vehicles, back-up generators and equipment. • All equipment and machinery should be fitted with adequate silencers.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• 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. • If work is to be undertaken outside of normal work hours permission must be obtained from the ECO and the poultry manager. • No noisy work is to be conducted over the weekends or on public holidays.
Surface and Ground Water	• A no-go buffer area of at least 50 m should be allocated to any water bodies in the area. • No dumping of waste products of any kind in or in close proximity to any surface water bodies. • 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. • 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. • Wastewater should not be discharged directly into the environment. • All toilets must be flush-type and be linked to their own French Drain/Septic Tank. • Users to be educated not to flush foreign objects down the toilet. • The service infrastructure should be designed and constructed by suitably qualified engineering professionals. • Develop and implement a preventative maintenance plan for the service infrastructure. • Drip trays must be placed underneath heavy vehicles and machinery when not in use to contain all oil that might be leaking from these equipment. • Should it be necessary to wash equipment this should be done at an area properly suited and prepared to receive and contain polluted water.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Disposal of waste from the various activities should be disposed of properly at the designated landfill. • Prevent fuel spills: look at work practices, staff training, equipment and storage. • Consider the use of environmentally friendly degreasers for washing and cleaning. • In the instance of an accidental fuel spill, the effluent should be contained as far as possible.
Waste management.	• Develop a waste management plan. • 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. • The waste management plan should consider the type of waste, description, source, storage, disposal method, disposal facility and responsible person. **The implementation of the waste management plan should ensure:** • Installation of sufficient waste bins, skips or bulk containers, where necessary. • All containers (bins, skips or bulk containers) shall be kept in a clean and hygienic manner. • Containers (bins, skips or bulk containers) utilised for the disposal of general and hazardous waste must be demarcated accordingly. • Waste material may only be temporarily stored at areas demarcated for such storage. • General waste shall be stored in a manner that prevents the harbouring of pests. • General and hazardous waste should always be stored and disposed of separately. • 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.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Skips or bulk containers should be removed to a nearby landfill site on a weekly basis or more often, if required. • Safe disposal certificates should be requested from general and hazardous landfill sites with every waste disposal. • These safe disposal certificates should be kept on file to illustrate compliance with the cradle to grave principle. • The ECO shall monitor the compliance with the cradle to grave principle. • No incineration of any kind of waste will be permitted onsite.
Poor waste (chicken mortality) management.	Note: The management of chicken mortalities should be included in the waste management plan. **Temporary storage of mortalities** • 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. **Disposal of mortalities** • Mortalities must be disposed of as soon as possible. **Disposal of mass mortalities In the event of a disease outbreak** • Notify the state vet. • The state vet must visit the site. • The state vet will place the property, or the specific chicken site or house that is infected, under quarantine. • Depending on the disease and severity, the chickens can be slaughtered on site or transported to an abattoir with a permit.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Alternatively, mortalities can be covered with lime and buried.
Run off of contaminated water	• The abattoir is cleaned after each cycle. • High-pressure hoses should be used in the washing of the abattoir and equipment, to minimise the amount of water used. • Wash and sanitise abattoir and equipment with biodegradable soaps and disinfectants. • Use biodegradable soaps and disinfectants in the footbath and showers. • Use biodegradable soaps and disinfectants for washing of vehicles. • Do not dispose the wash water from cleaning the abattoir into the environment.
Stormwater management	• 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. • Clean storm water should be diverted and kept in the environment surrounding the site. • Storm water measures should be inspected on a regular basis in order to ensure that the structures are functional and not causing soil erosion. • Where necessary place culverts underneath road foundations.
Hazardous substances	• Identify all chemical substances used onsite including fuel, greases, vaccines, detergents etc. • Obtain the material safety data sheet of each of these chemical substances. • 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. • Material Safety Data Sheets for all hazardous chemical substances must be readily available on site. • 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). • Keep a stock inventory register of all chemicals in the store.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Powders must be stored above liquids. • Proper storage of chemicals in a lockable, well ventilated building. • Ensure adequate access control for the storage area. • Storage areas for hazardous chemicals are to comply with standard fire safety regulations. • Safety signage including “No Smoking”, “No Naked Lights” and “Danger”, and product identification signs, are to be clearly displayed in areas housing chemicals. • 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. • Chemicals are to be properly labelled and handled in a safety conscious manner. • All personnel handling hazardous chemicals and hazardous materials are to be issued with the appropriate Personal Protective Equipment (PPE). • Ensure that diesel or fuel tanks are in a bunded area with capacity of holding 110% of the total storage volume. • The removal of only the daily-required amount of chemicals to be used from the shed. • 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. • Use of drip trays during filling of machinery or equipment. Drip trays should be emptied into secondary containers on a regular basis. • 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. • Immediately clean all spillage of fuels, lubricants and other petroleum based products.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• The contaminated material must be disposed of in accordance with the waste management procedure. • No hazardous chemical must be discarded in the sewage or storm water system. • Train staff on the use of chemicals in accordance with the risks as described in the material safety data sheets. • Soil contaminated with hazardous chemical substances shall be treated as hazardous waste and removed from site.
Hydrocarbon pollution of soil, surface - and groundwater.	• Inspection and maintenance of equipment, generators and vehicles owned by the proponent shall take place on a regular basis. • 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. • Equipment, generators and vehicles are to be repaired immediately upon developing leaks. • Generators must be stored on a concrete floor in a bunded area. • Drip trays shall be supplied for all repair work undertaken on machinery on site. • Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to contain incidental spills and pollutants. • 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. • 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.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Soil contaminated with hazardous substances, fuel or oil shall be treated as hazardous waste and removed from site. • 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. • All liquid fuels (petrol and diesel) are to be stored in tanks or containers with lids.
Unsanitary conditions on site.	• Sufficient ablution facilities shall be provided – minimum of 1 toilet per 15 workers. • 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. • Ablution facilities shall be inspected and maintained to prevent or minimise blockage and leakages. • Ablution facilities are to be serviced weekly or more frequently if required. • Toilets should have properly closing doors and should have toilet paper at all times. • Awareness of the importance of proper hygiene should be created among employees. • Excreting anywhere other than in the toilets shall not be allowed. • A septic tank system should be considered instead of French drains.
Outbreak of poultry diseases.	• All chickens should originate from a closed bio-security compartment. • All chicks should originate from disease free sources. • Chicks from another farm should not be mixed with chickens in the flock. • Access control to and from the premises and access to the premises should only be by prior arrangement. • Installation of footbaths with disinfectant at all the entrances to each of the chicken slaughtering facilities. • Installation of showers for all staff working on site. • Use a sound vaccination program.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Never permit contaminated equipment from other poultry farms in the buildings. • Clean and sanitise abattoir and equipment after each cycle with biodegradable soaps and disinfectants. • Monitoring and auditing of processes by a contracted veterinarian or State Vet.
Inefficient and redundant use of electricity.	• Ensure that all employees have been informed on the importance of natural resources (proper environmental training and awareness). • Inspect operations regularly to determine areas of improvement with regards to resource consumption. • Monitoring of resource consumption. • Identify areas where resource consumption can be minimised. • Set targets to try and minimise resource consumption. • Identify technologies and practices that may reduce resource consumption. • Implementation of technologies and practices that can reduce resource consumption. • Save electricity by turning off lights and computers when leaving the office. • 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).
Inefficient and redundant use of water.	• Ensure that all employees have been informed on the importance of natural resources (proper environmental training and awareness). • Regular site inspection by supervisors. • Inspect operations regularly to determine areas of improvement with regards to resource consumption. • Regular maintenance and inspection of equipment such as hose pipes, to prevent leaks.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Monitoring of resource consumption. • Identify areas where resource consumption can be minimised. • Set targets to try and minimise resource consumption. • Identify technologies and practices that may reduce resource consumption. • Implementation of technologies and practices that can reduce resource consumption. • Use high pressure hoses to clean the abattoir and equipment. • Regular inspection and maintenance of all boreholes, water tanks, toilets, water pipes and taps. • Leaking water tanks, taps, toilets and pipes must be repaired immediately. • Running water taps and pipes may not be left unattended. • Each time you flush the toilets approximately 20 litres of water is used, therefore use the toilets wisely. • All pipe, hose and tap connections are to be fitted with correct and appropriate plumbing fittings. • Ensure that Water Abstraction permits are in place and kept current.
Air quality. Odour from animal slaughtered, handling of meat and domestic waste.	• Ensure meat and meat products are kept at correct cold storage temperatures. • Manage wastewater efficiently through regular maintenance of wastewater systems.
Sewage	• Discharge of wastewater into the environment is prohibited. • The septic tank system shall be kept in a good state of repair at all times. • Seepage of the septic tank into the underground should be avoided at all costs. • Obtain relevant permits for the installation of septic tank system. • In the instance that they become full, effluent should be disposed of at a proper sewage works e.g. Stampriet Village Council Wastewater Works.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Official arrangements to that effect should be in place (in writing).
Visual and Sense of Place	• The structures on the site have to be aesthetically pleasing and designed to blend in with the natural surrounds. • 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. • 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.
Archaeology and Heritage	• The proponent or PR should promptly report any archaeological or heritage finds to the relevant authorities such as the National Heritage Council.
Health, Safety and Security	• Ensure that all personnel are properly trained depending on the nature of their work. • Provide for a first aid kit and a properly trained person to apply first aid when necessary. • A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases. • Provide free condoms in the workplace. • Facilitate access to Antiretroviral medication. • Adhere to the existing protocols in terms of Covid-19. • Restrict unauthorised access to the site and implement access control measures • Clearly demarcate dangerous areas and no go areas on site. • Staff and visitors to the site must be fully aware of all health and safety measures and emergency procedures. • The proponent must comply with all applicable occupational health and safety requirements.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
Social	• Ensure locals enjoy priority in terms of job opportunities for skills that are available locally, to the extent possible. • Ensure local procurement where commodities are available locally.
Traffic	• Limit and control the number of access points to the site. • Ensure that road junctions have good sightlines. • Adhere to the speed limit. • Implement traffic control measures where necessary. • Minimise the movement of heavy vehicles during peak time.

14. DECOMMISSIONING PHASE

The viability of the establishment of the abattoir 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

Fresh Fruit Farming Poultry Production Buiness Plan. 2021.

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

Appendix A – Water Quality Guidelines

ANNEXURE

Water Quality Standards for Effluent

Effluent to be discharged or disposed of in areas with potential for drinking water source contamination; international rivers and dams and in water management and other areas				
			Special Standard	**General Standard**
DETERMINANTS	**UNIT**	**FORMAT**	**95 percentile requirements**	
PHYSICAL REQUIREMENTS				
Temperature	° C		Not more than 10^0C higher than the recipient water body	
Turbidity	NTU		< 5	< 12
pH			6,5-9,5	6,5-9,5
Colour	mg/litre Pt		< 10	< 15
Smell			No offensive smell	
Electric conductivity 25 °C	mS/m		< 75 mS/m above the intake potable water quality	
Total Dissolved Solids	mg/litre		< 500 mg/litre above the intake potable water quality	
Total Suspended Solids	mg/litre		< 25	< 100
Dissolved oxygen	% saturation		>75	>75
Radioactivity	units		below ambient water quality of the recipient water body	
ORGANIC REQUIREMENTS				
Biological Oxygen Demand	mg/litre	BOD	< 10	< 30
Chemical Oxygen Demand	mg/litre	COD	< 45	< 100
Detergents (soap)	mg/litre		< 0.2	< 3
Fat, oil & grease, individual	mg/litre	FOG	nil	< 2.5
Phenolic compounds	µg/litre	as phenol	< 0.01	< 0.10
Aldehyde	µg/litre		< 50	< 100
Adsorbable Organic Halogen	µg/litre	AOX	< 50	< 100
INORGANIC MACRO DETERMINANTS				
Ammonia (NH_4 – N)	mg/litre	N	< 1	< 10
Nitrate (NO_3 - N)	mg/litre	N	< 15	< 20
Nitrite (NO_2 - N)	mg/litre	N	< 2	< 3
Total Kjeldahl Nitrogen (TKN)	mg/litre	N	< 18	< 33
Chloride	mg/litre	Cl	< 40 mg/litre above the intake potable water quality	< 70 mg/litre above the intake potable water quality
Sodium	mg/litre	N	< 50 mg/litre above the intake potable water quality	<90 mg/litre above the intake potable water quality
Sulphate	mg/litre	SO_4	< 20 mg/litre above the intake potable water quality	< 40 mg/litre above the intake potable water quality
Sulphide	µg/litre	S	< 0.05	< 0.5
Fluoride	mg/litre	F	1,0	2,0
Cyanide (Free)	µg/litre	CN	< 30	< 100
Cyanide (recoverable)	µg/litre	CN	< 70	< 200
Soluble Ortho phosphate	mg/litre	P	< 0.2	3,0
Zinc*	mg/litre	Zn	1	5

Effluent to be discharged or disposed of in areas with potential for drinking water source contamination; international rivers and dams and in water management and other areas				
			Special Standard	General Standard
DETERMINANTS	**UNIT**	**FORMAT**	**95 percentile requirements**	
INORGANIC MICRO DETERMINANTS				
Aluminium	µg/litre	Al	< 25	< 200
Antimony	µg/litre	Sb	< 5	< 50
Arsenic	µg/litre	As	< 50	< 150
Barium	µg/litre	Ba	< 50	< 200
Boron	µg/litre	B	< 500	< 1000
Cadmium*	µg/litre	Cd	< 5	< 50
Chromium, (hexavalent)	µg/litre	Cr	< 10	< 50
Chromium, Total*	µg/litre	Cr	< 50	< 1000
Copper*	µg/litre	Cu	< 500	< 2000
Iron	µg/litre	Fe	< 200	< 1000
Lead*	µg/litre	Pb	< 10	< 100
Manganese	µg/litre	Mn	< 100	< 400
Mercury*	µg/litre	Hg	< 1	< 2
Nickel	µg/litre	Ni	< 100	< 300
Selenium	µg/litre	Se	< 10	< 50
Strontium*	µg/litre	Sr	< 100	< 100
Thallium	µg/litre	Ti	< 5	< 10
Tin*	µg/litre	Sn	< 100	< 400
Titanium	µg/litre	Ti	< 100	< 300
Uranium*	µg/litre	U	< 15	< 500
*Total for Heavy Metals (Sum of Cd,Cr,Cu,Hg,Pb	µg/litre	Cd,Cr,Cu, H g & Pb	< 200	< 500
UNSPECIFIED COMPOUNDS FROM ANTHROPOGENIC ACTIVITIES				
Agricultural chemical compounds	µg/litre		Any in-/organic compound recognized as an agro-chemical is to be avoided or reduced as far as possible. Maximum acceptable contaminant levels will be site specific, dependent on chemical usage and based the water quality of the recipient water body	
Industrial and mining chemical compounds, including unlisted metals and persistent organic pollutants	µg/litre		Any in-/ organic compound recognized as an industrial chemical including unlisted metals is to be avoided or reduced as far as possible. Maximum acceptable contaminant levels will be site specific dependent on chemical usage and based the water quality of the recipient water body	
Endocrine Disruptive Compounds (EDC)	µg/litre		Any chemical compound that is suspected of having endocrine disruptive effects is to be avoided as far as is possible. Maximum acceptable contaminant levels will be site specific dependent on chemical usage and based the water quality of the recipient water body.	
Hydrocarbons (Benzene, Ethyl Benzene, Toluene and Xylene	µg/litre		Below detection level	Below detection level
Organo-metallic compounds: methyl mercury, tributyl tin (TBT), etc.	µg/litre		Below detection level	Below detection level
DISINFECTION				
Residual chlorine	mg/litre		< 0.1 Dependent on recipient water body	< 0.3 Dependent on recipient water body

Effluent to be discharged or disposed of in areas with potential for drinking water source contamination; international rivers and dams and in water management and other areas				
			Special Standard	**General Standard**
DETERMINANTS	**UNIT**	**FORMAT**		
BIOLOGICAL REQUIREMENTS (Algae and parasites)				
Further treatment of the effluent dependent on: 1. the water quality of the recipient water body if any 2. the distance from any point of potable water abstraction 3. an acceptable maximum contaminant level downstream of the point of discharge 4. the exposure to human and animal consumption downstream of the point of discharge 5. any reuse option that may be implemented.				
MICROBIOLOGY				
Further treatment of the effluent are dependent on: 1. the water quality of the recipient water body if any 2. the distance from any point of potable water abstraction 3. an acceptable maximum contaminant level downstream of the point of discharge 4. the exposure to human and animal consumption downstream of the point of discharge 5 any water reuse option that may be implemented.				

ANNEXURE

Table 1. Water Quality Guidelines and Standards for Potable Water

Specifications for water quality intended for human consumption from the source and piped water supply					
Status				**Ranges and upper limits**	
Interpretation				**(Ideal guideline)**	**(Acceptable Standard)**
DETERMINANTS	**Unit**	**Format**	**Concern**	**95 Percentile Requirement**	
PHYSICAL AND ORGANOLEPTIC REQUIREMENTS					
Temperature	° C		E	Ambient temperature	
Colour	PTU	or mg/litre	E	10	<15
Taste			O,E	No objectionable taste	
Odour			O,E	No objectionable odour	
Turbidity (treated surface water)	NTU	or TU	H,I	< 0,3	< 0,5
Turbidity (groundwater)	NTU	or TU	H,I	< 0,5	<2
pH @ 20 °C	pH		I	6.0 to 8,5	6 to 9
Electric Conductivity @ 25 °C	mS/m***	E.C.	H,I	< 80	< 300
Total Dissolved Solids	mg/litre		H,I	< 500	< 2 000
INORGANIC MACRO DETERMINANTS					
Ammonia	mg/litre	N	H	< 0.2	< 0.5
Calcium	mg/litre	Ca	I	< 80	< 150
Chloride	mg/litre	Cl	H,I	< 100	< 300
Fluoride	mg/litre	F	H	< 0.7	< 2,0
Magnesium	mg/litre	Mg	H	< 30	< 70
Nitrate	mg/litre	N	H	< 6	< 11
Nitrite	mg/litre	NO_2	H	< 0.2	< 0.5
Potassium	mg/litre	K	H	< 25	< 100
Sodium	mg/litre	Na	H.I	< 100	< 300
Sulphate	mg/litre	SO_4	H,O	100	< 300
Asbestos (fibres longer than 10 μm)	Fibres/litre		H	<500 000	< 1000 000
INORGANIC MICRO DETERMINANTS					
Aluminium	μg/litre	Al	H	< 25	< 100
Antimony	μg/litre	Sb	H	< 5	< 50
Arsenic	μg/litre	As	H	<10	< 50
Barium	μg/litre	Ba	H	0,5	< 2
Beryllium	μg/litre	Be	H	< 2	< 5
Bismuth	μg/litre	Bi	H	< 250	< 500
Boron	μg/litre	B	H	< 300	< 500
Bromide	μg/litre	Br	H	< 500	< 1 000
Cadmium	μg/litre	Cd	H	< 5	< 10
Cerium	μg/litre	Ce	H	<1 000	<2 000
Cesium	μg/litre	Cs	H	< 1 000	< 2 000
Chromium Total	μg/litre	Cr	H	< 50	< 100
Cobalt	μg/litre	Co	H	< 250	< 500
Copper	μg/litre	Cu	H	< 500	< 2 000

Specifications for water quality intended for human consumption from the source and piped water supply					
Status				**Ranges and upper limits**	
Interpretation				**(Ideal guideline)**	**(Acceptable Standard)**
DETERMINANTS	**Unit**	**Format**	**Concern**	**95 Percentile Requirement**	
INORGANIC MICRO DETERMINANTS					
Cyanide (free)	**µg/litre**	**CN^-**	**H**	**< 20**	**< 50**
Cyanide (recoverable)	**µg/litre**	**CN^-**	**H**	**< 70**	**< 200**
Iron	**µg/litre**	**Fe**	**H,E**	**< 200**	**< 300**
Lead	**µg/litre**	**Pb**	**H**	**<10**	**< 50**
Manganese	**µg/litre**	**Mn**	**H**	**< 50**	**< 100**
Mercury	**µg/litre**	**Hg**	**H**	**< 1**	**<2**
Nickel	**µg/litre**	**Ni**	**H**	**< 50**	**< 150**
Selenium	**µg/litre**	**Se**	**H**	**< 10**	**< 50**
Thallium	**µg/litre**	**Ti**	**H**	**< 5**	**< 10**
Tin	**µg/litre**	**Sn**	**H**	**<100**	**<200**
Titanium	**µg/litre**	**Ti**	**H**	**< 100**	**< 300**
Uranium	**µg/litre**	**U**	**H**	**< 3**	**< 15**
Vanadium	**µg/litre**	**V**	**H**	**< 100**	**< 500**
Zinc	**µg/litre**	**Zn**	**H**	**< 1 000**	**< 5 000**
Organo-metallic compounds	**µg/litre**	**-**	**H**	**below detection limit**	**below detection limit**
ORGANIC DETERMINANTS					
Dissolved Organic Carbon	**mg/litre**	**DOC-C**	**H**	**< 5**	**<10**
Phenol compounds	**µg/litre**	**phenol**	**H**	**< 5**	**< 10**
DISINFECTION AND DISINFECTION BY-PRODUCTS					
Bromodichloromethane (Part of THM)	**µg/litre**		**H**	**< 20**	**< 50**
Bromoform (Part of THM)	**µg/litre**		**H**	**< 40**	**< 40**
Chloroform (Part of THM)	**µg/litre**		**H**	**< 20**	**< 100**
Dibromomonochloro-methane (Part of THM)	**µg/litre**		**H**	**< 20**	**< 100**
Trihalomethanes (Total)	**µg/litre**	**THM**	**H**	**< 100**	**< 150**
Bromate	**µg/litre**		**H**	**< 5**	**< 10**
Chloramines	**mg/litre**	**Cl_2**	**H**	**< 2**	**< 4**
Chlorine dioxide	**µg/litre**		**H**	**< 400**	**< 800**
Chlorite	**µg/litre**		**H**	**< 400**	**< 4000**
Chlorate	**µg/litre**		**H**	**< 200**	**< 700**
Haloacetic acids	**µg/litre**		**H**	**not detected**	**< 60**
Chlorine, free, after 30 min; GENERAL	**mg/litre**	**Cl_2**	**H,I**	**0,1 – 0,5**	**0,1 - 3,0**
Chlorine, free, after 30 min; SPECIFIC	**mg/litre**	**Cl_2**	**Turbidity: < 0,3 NTU**	**0,1**	**0,1 - 3,0**
Chlorine, free, after 30 min; SPECIFIC	**mg/litre**	**Cl_2**	**Turbidity: > 0,3 NTU**	**0,5**	**0,1 - 3,0**
Chlorine, free, after 60 min; SPECIFIC	**mg/litre**	**Cl_2**	**Turbidity: >1,0 NTU**	**1,0**	**0,1 - 3,0**

Specifications for water quality intended for human consumption from the source and piped water supply					
Status				**Ranges and upper limits**	
Interpretation				**(Ideal guideline)**	**(Acceptable Standard)**
DETERMINANTS	**Unit**	**Format**	**Concern**	**95 Percentile Requirement**	
BIOLOGICAL REQUIREMENTS					
Algae					
Chlorophyll α	**µg/litre**		**E,O**	**< 1**	**< 2**
Blue-green algae	**cells**	**/ml**	**H,O**	**< 200**	**<2 000**
Mycrocystin	**µg/litre**		**H**	**< 0.1**	**< 1**
Geosmin	**ηg/litre**		**E, H**	**< 15**	**< 30**
2-Methyl Iso Borneal (2 MIB)	**ηg/litre**		**E, H**	**< 15**	**< 30**
OTHER DETERMINANTS					
Agricultural chemical compounds			**H**	**Any organic compound recognized as an agro-chemical should be in accordance with the WHO and EPA requirements.**	
Industrial chemical compounds			**H**	**Any organic compound recognized as an industrial chemical should be in accordance with the WHO and EPA requirements.**	
Endocrine disruptive chemicals			**H**	**Any chemical compound that is suspected of having endocrine disruptive effects shall be in accordance with the WHO and EPA requirements.**	
RADIOACTIVITY				**95 Percentile Requirement**	
Gross alpha activity	**Bq/litre**		**H**	**< 0.2**	**< 0.5**
Gross beta activity	**Bq/litre**		**H**	**< 0.4**	**< 1.0**
If Gross alpha and beta is above specification calculate Dose based on individual radionuclide concentrations	**mSv/a**		**H**	**≤ 0.04**	**≤ 0.1**
ANALYSIS QUALITY CHECK* **					
Ion balance: Total anions			**-**	**< 3 -Tolerance = 0.2 m equivalent 3-10 – Tolerance 2% on +- balance 10-800 – Tolerance 5% on +- balance**	
TDS Balance: determined / calculated	**ratio**		**-**	**~ 1**	**~ 1**
Ratio TDS / EC (EC as µS/cm)	**ratio**		**-**	**~ 0,66**	**0,55 – 0,7**

"Concern" refers to impact if the limit is transgressed: H = health concern; O = organoleptic effect;
I = effect on infrastructure, structural; E = aesthetic effect

* Based on a viral cell culture-dependent method and not on cell culture-independent methods (e.g. PCR)

** Indicative of faecal pollution having occurred, even when the residual disinfectant levels are safe.

*** Comply with SANAS Guidelines

Table 2: Microbiological and Biological Requirements

MICROBIOLOGICAL REQUIREMENTS APPLICABLE TO ALL POTABLE WATER					
Microbiology	**cfu**			**95 percentile**	**1 of samples maximum**
Heterotrophic bacteria HPC or TCC	**counts**	**/ml**		**100 at 37^0 C**	**1 000 at 37^0 C**
Total Coliform	**counts**	**/100 ml**	**H**	**0**	**5**
E.Coli	**counts**	**/100 ml**	**H**	**0**	**1**
Entrerococci	**counts**	**/100 ml**	**H**	**0**	**1**
Somatic Coliphage	**counts**	**/100 ml**	**H**	**0**	**1**
Clostridium perfrigens inclusive spores	**counts**	**/100 ml**	**H**	**0**	**1**
Enteric viruses	**viral count***	**/10 L**	**H**	**0**	**1**
Parasites (Protozoa) applicable to all potable water				**95 percentile**	**99 percentile**
Giardia lamblia	**cysts**	**/100 litre**	**H**	**0**	**1**
Cryptosporidium	**oocysts**	**/100 litre**	**H**	**0**	**1**
Giardia lamblia and Giardia lamblia (Grab sample)	**cysts or oocysts**	**/10 L**	**H**	**0**	**0**

Table 3: Special Requirements for the Protection of Infrastructure

Specifications for water quality intended for human consumption from the source and piped water supply for the protection of infrastructure against corrosion					
Status				**Ranges and upper limits**	
Interpretation				**(Ideal guideline)**	**(Acceptable Standard)**
DETERMINANTS	**Unit**	**Format**	**Concern**	**95 Percentile requirement**	
CORROSIVE AND SCALING PROPERTIES					
Calcium Carbonate Precipitation Potential	**mg/litre**	**CCPP**	**I**	**4 - 5**	**3 - 6**
Alkalinity/Sulphate/ Chloride Ratio	**Equi-valents**	**Corrosivet y Ratio**	**I**	**With SO_4 and Cl above 50 mg/litre Ratio=(Alk/50)/(SO_4/48+Cl/35.5) > 5.0 Water is Stable Ratio= (SO_4/48+Cl/35.5)/(Alk/50) > 0.2 Water is Corrosive**	
Total Hardness (Ca & Mg)	**mg/litre**	**$CaCO_3$**	**I**	**<200**	**< 400**

Table 4: Frequency of Microbiological Monitoring for Bulk Water Supply

Size of population served	Turbidity 95%**	Frequency of sampling
> 250 000	< 0,5 NTU	**Thrice weekly *** **
100 001 – 250 000	< 1,0 NTU	**Twice weekly**
50 001 – 100 000	< 1,0 NTU	**Once weekly**
10 001 – 50 000	< 1,0 NTU	**Three times every month**
< 10 000 reticulated	< 1,0 NTU	**Once every 1 month***
< 10 000 non-reticulated	**1 – 2 NTU**	**Once every 1 month***

* Upon complaints by the consumers or of medical practitioners and after incidents such as pipe breaks, the frequency should be increased until the situation has returned to original counts and been declared safe;

** Average or 95 percentile turbidity of the water supplied

*** The frequency should be stepped up by one extra sampling per week for every 100 000 residents (including the estimated number of visitors residing within the area at any time) in the area served, over and above 250 000.

General Information

1. The area being monitored shall be defined by the Minister in consultation with the Minister responsible for health and, where applicable, relevant officials from the Regional and Local Authorities;
2. At the time of sampling the operator shall also take a “free chlorine” reading of the same water under examination but prior to sampling for microbiological sampling, whilst using a portable device designed for that purpose and accepted by the Minister; this ‘reading’ is to be recorded and reported together with the results from the microbiological analyses;
3. As for field ‘screening’ of water supplies for microbiological contamination there exist portable devices designed for that purpose and accepted by the Minister; these ‘readings’ are to be recorded and reported together with the results from the microbiological analyses;
4. The results of the microbiological monitoring together with the free chlorine readings is to be reported as per mutual agreement to the ultimate supplier (bulk water supplier, Local Authority, or any other supplier) for remedial action where required, and to the Minister for record and monitoring purposes and follow up actions;
5. The costs of routine monitoring shall be borne by the authority commissioning the monitoring;

Methodology for Sampling and Analyses

The methodologies followed for sampling and during transit and storage of samples prior to analysis shall be as prescribed.

1. Preferably samples are to be taken in borosilicate glass bottles with a glass or polypropylene screw-cap lid;
2. Where this is not feasible or practical polyethylene bottles with internal seal and with screw-lid can be used;
3. Samples shall, as far as practical, be analysed within 24 hours of sampling;
4. Where there are special requirements for the period between sampling and analysis to be less than 24 hours, such requirement should be attended to as far as is practical;
5. Samples are to be kept and stored, even during transit, at as low a temperature as is practically manageable, whilst preventing the risk of the sample freezing;
6. The sample shall be kept away from light and shielded from sunlight, to reduce chances of micro-/biological growth to a minimum;
7. The use of preservation chemicals should be considered, planned and executed with extreme care;
8. Where sample preservation is appropriate or required an extra smaller volume sample should be taken so as to not upset any other analyses that are affected by the preservation chemical(s);
9. Certain determinants may be monitored ‘in the field’ at the time of sampling; such field-data are to be measured in a receptacle or container different from the sample container; data so obtained shall be recorded as “field measurement” and cannot replace laboratory analysis for the parameters concerned;
10. The methodologies followed for physical, chemical and microbiological analysis shall be in agreement with the specifications listed in the latest edition of the SANS 241, Drinking Water Standards, published by the SABS.
11. The cost of routine, regulatory inspections and monitoring, for the purpose of fulfilling the provisions of this regulation shall borne by the service provider.