APP006386

ENVIRONMENTAL MANAGEMENT PLAN

2025

Continued Operation of the Existing Organic Fertiliser Plant on Portion 59 (A Portion of Portion 8) of the Consolidated Farm Okahandja Townlands No. 277, Okahandja, Otjozondjupa Region

Environmental Management Plan

CONTINUED OPERATION OF THE EXISTING ORGANIC FERTILISER PLANT ON PORTION 59 (A PORTION OF PORTION 8) OF THE CONSOLIDATED FARM OKAHANDJA TOWNLANDS NO. 277, OKAHANDJA, OTJOZONDJUPA REGION

PROJECT DETAILS

PROPONENT:

Hafa Peak Investments CC

P.O Box 25491

Windhoek

Tel: +264 81 226 5000

Fax: +264 886 157 96

Email: dean.lee@hafapeak.com

REPORT DATE:

09 September 2025

AUTHOR:

Colin P Namene

P.O. Box 24056

Windhoek

Tel: 061 – 258 394

Fax: 061 – 258 470

Email: colin@environam.com

Signature

TABLE OF CONTENTS

1 INTRODUCTION 4
2 ROLES AND RESPONSIBILITIES 5
2.1 DEVELOPER'S REPRESENTATIVE 5
2.2 ENVIRONMENTAL CONTROL OFFICER 6
2.3 CONTRACTOR 7
3 ASSUMPTIONS AND LIMITATIONS 7
4 APPLICABLE LEGISLATION 7
5 MANAGEMENT ACTIONS 9
5.1 OPERATION AND MAINTENANCE PHASE 11
5.2 DECOMMISSIONING PHASE 13

LIST OF TABLES

Table 1: DR's responsibilities 6
Table 2: Legal provisions relevant to this development 7
Table 3: Operation and maintenance management actions 11

ABBREVIATIONS

AIDS	Acquired Immuno-Deficiency Syndrome
DR	Developer'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
NHC	National Heritage Council

Reg.	Regulation
S	Section
TB	Tuberculosis

1 INTRODUCTION

Namibia is heavily reliant on imports of fertiliser for agricultural purposes. This leads to increased prices of fertilisers for local farmers, given the high costs of imported blended fertilisers. The lead time of fertiliser transportation and delivery to end consumers is another challenge.

HAFA PEAK INVESTMENTS CC has identified an opportunity to establish a fertiliser factory that will enable the reduction in price and lead time for this critical product, it also opens up the market for supplying the rest of the SADC regional countries such as Angola, Zambia, Zimbabwe, DRC, Botswana etc. with a more affordable product in a shorter time.

Hafa Peak Investments CC's (HP) main objective is to produce organic fertiliser for use at communal, small scale, commercial and green scheme farms. The fertiliser can also be used by landscaping companies and municipalities. The Company's key focus is on providing quality organic input supplies and support for Namibia booming organic fertiliser market. HAFA PEAK INVESTMENTS will use local chicken manure supplied by Namibia Poultry Industries (NPI) and wood chips as the main feedstock to manufacture organic fertiliser, thus turning the environmentally harmful waste materials to harmless organic fertiliser. HP provides affordable harmless, high-quality fertiliser to the end user and distributes the fertiliser through retailers and wholesalers like in Namibia and Angola, with prospects for further markets.

HAFA PEAK uses newest technology known as Tetanti Agribiotech (TTT) to manufacture the fertiliser. This technology is the world's only destructive and innovative concept that revolutionises the traditional microbial composting process with the use of enzymes to stabilize and mature organic wastes. The technology is based on targeted enzyme products, and with the combined use of machinery, organic wastes can be turned into organic fertilisers within 3 hours.

TTT technology is efficient and cost effective, it greatly improves the maturation process of organic matter over 100 folds and can reduce pollution and increase product safety. The production process solves the odour, waste water, large area demand and time-consuming problems that are normally associated with traditional composting.

Toxic matters in organic wastes are also detoxified and/or deodorised through the degradation, synthesis, transformation and/or polymerisation reactions by the enzymes. At the same time, pathogens, insect eggs and grass seeds are mostly exterminated at 80°C (at least 30 minutes). TTT Technology produces stable and high-quality organic fertiliser within three hours.

The project site is located north of Okahandja Town Proper, south of the C31 Road to Hochfeld. It is approximately 9 km from the Okahandja Shopping Centre. The proponent

undertook an Environmental Impact Assessment (EIA) in order to obtain an Environmental Clearance Certificate (ECC) for the activities from the Office of the Environmental Commissioner in the Ministry of Environment, Forestry and Tourism (MEFT). The ECC was issued in 2022. This ECC is now up for renewal (2025) and the proponent has appointed Environam Consultants Trading (ECT) to apply for the renewal.

An EMP is one of the most important outputs of the EIA process as it synthesises all of the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. This EMP details the mitigation and monitoring actions to be implemented during the following phase of this development:

- Operation and Maintenance – the period during which the development will be fully functional, operational and maintained.

2 ROLES AND RESPONSIBILITIES

HAFA PEAK INVESTMENTS CC, (the Developer) is ultimately responsible for the implementation of the EMP, from the planning and design phase to the decommissioning phase of this development, if the development is in future decommissioned. The developer will delegate this responsibility as the project progresses through its life cycle. The delegated responsibility for the effective implementation of this EMP will rest on the following key individuals:

- Developer's Representative;
- Environmental Control Officer; and
- Contractor (Construction and Operations and Maintenance).

2.1 DEVELOPER'S REPRESENTATIVE

The Developer should assign the responsibility of managing all aspects of this development for all development phases (including all contracts for work outsourced) to a designated member of staff, referred to in this EMP as the Developer's Representative (DR). The Developer may decide to assign this role to one person for the full duration of the development, or may assign a different DR to each of the development phases – i.e., one for the planning and design phase, one for the construction phase and one for the operation and maintenance phase. The DR's responsibilities are depicted in **Error! Reference source not found.** as follows:

Table 1: DR's responsibilities

Responsibility	Project Phase
Making sure that the necessary approvals and permissions laid out in **Error! Reference source not found.** are obtained/adhered to.	Throughout the lifecycle of this development
Suspending/evicting individuals and/or equipment not complying with the EMP	• Operation and maintenance
Issuing fines for contravening EMP provisions	• Operation and maintenance

2.2 ENVIRONMENTAL CONTROL OFFICER

The DR 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 DR/Developer may decide to assign this role to one person for both phases, or may assign a different ECO for each phase. During the operation phase the Developer may outsource the monitoring and evaluation of the EMP to an independent Environmental Consultancy. The ECO will have the following responsibilities during the operation and maintenance phases of this development:

- Management and facilitation of communication between the Developer, DR, the contractors, and Interested and Affected Parties (I&APs) with regard to this EMP;
- Conducting site inspections (recommended minimum frequency is bi-monthly) of all construction and/or infrastructure maintenance areas with respect to the implementation of this EMP (monitor and audit the implementation of the EMP);
- Assisting the Contractor in finding solutions with respect to matters pertaining to the implementation of this EMP;
- Advising the DR on the removal of person(s) and/or equipment not complying with the provisions of this EMP;
- Making recommendations to the DR with respect to the issuing of fines for contraventions of the EMP; and
- Undertaking an annual review of the EMP and recommending additions and/or changes to this document.

2.3 CONTRACTOR

Contractors appointed by the Developer 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. **Error! Reference source not found.** applies to those contractors appointed during the o peration 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 table in **Chapter 5** detail the management measures associated with the roles and responsibilities that have been laid out in this chapter.

3 ASSUMPTIONS AND LIMITATIONS

This EMP has been drafted based on the scoping-level Environmental Assessment (EA) conducted for the proposed organic fertiliser plant as represented by the developer. ECT will not be held responsible for the potential consequences that may result from any alterations to the initial layout.

It is assumed that labourers will be sourced mostly from the Okahandja Constituency area and that migrant labourers (if applicable) will be housed within the Okahandja Constituency area.

4 APPLICABLE LEGISLATION

Legal provisions that have relevance to various aspects of this development are listed in **Error! Reference source not found.** below. The legal instrument and applicable c orresponding provisions are provided.

Table 2: 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.	The development should be informed by the EMA.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
	Section 3 details the principle of Environmental Management	
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 9.2** Any process or activity which requires a permit, license 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 governing the generation or release of emissions, pollution, effluent or waste.
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 EA process should incorporate the aspects outlined in the guidelines.
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 Resources Management Act (No. 11 of 2013)	Relevant principles of the Act include, inter alia: • Equitable access for all people to safe drinking water is an essential basic human right to support a healthy productive life.	The pollution of water resources should be avoided during operation of the development.
The Ministry of Environment, Forestry and Tourism (MEFT) Policy on HIV & AIDS	MEFT has 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/s have to adhere to the guidelines provided to manage the aspects of HIV/AIDS.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
Urban and Regional Planning Act (Act of 2018).	Urban and Regional Planning Act (Act of 2018) regulates subdivisions of portions of land falling within a proclaimed Local Authority area.	Section 16 of Chapter 3 deals with the Ministers' declaration of authorised planning authorities and establishment of joint committees.
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.
Public Health Act no 36 of 1919	Section 119 prohibits persons from causing nuisance.	The developer and contractors 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.
Okahandja Town Planning Scheme.	The town planning scheme has as its general purpose the co-ordinated and harmonious development of the local authority area, or the area or areas situate therein.	Portion 59 is zoned as "Special" in terms of the Okahandja Town Planning Scheme.

5 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 them.

The following tables provide the management actions recommended to manage the potential impacts rated in the scoping-level EA conducted for this development. These management actions have been organised temporally according to project phase:

- Operation and maintenance phase management actions (**Error! Reference source not found.**);

The responsible persons at the Developer's team have assessed these commitments in detail and have committed to the specific management actions where indicated in the table below.

5.1 OPERATION AND MAINTENANCE PHASE

The management actions included in **Error! Reference source not found.** below apply during the operation and maintenance phase of this development.

Table 3: Operation and maintenance management actions

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
Environmental monitoring and Evaluation	• An Environmental Practitioner should monitor the implementation of the EMP, and recommend any changes to this document when necessary. • The Environmental Practitioner should inspect the site on a regular basis (preferably monthly or bi-monthly). • Biannual reports are to be submitted to the Environmental Commissioner.
Noise	• Limit the types of activities that generate excessive noise. • All areas where noise levels are above 85 dB should be managed and controlled in accordance with the relevant guidelines. • Continuous monitoring of noise levels should be conducted to make sure the noise levels do not exceed acceptable limits. • Maintain equipment used during the operation and keep them in a good state such that they do not emit excessive noise. • No activity having a potential noise impact should be allowed after 18:00 if possible. • Conduct noise monitoring network around the boundary of the project and at the nearest farms to ensure that that noise is within acceptable limits. • Personnel should wear correct hearing PPE when working in noisy environment.
Waste management	• The area will be kept free of waste, except in designated waste storage areas. • Any wastes distributed by winds will be regularly cleaned up. • A sufficient number of waste bins should be placed around the site for the soft refuse. • A sufficient number of skip containers for the heavy waste and rubble should be provided for around the site. • Solid waste will be collected and disposed of at an appropriate local land fill. • Place priority on waste reduction, waste reuse and waste recycling, in that order. • All raw materials must be managed in accordance with the requirements for that specific raw material.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Wastewater generated from the fertilizer factory should be recycled, re-used, or collected for treatment to acceptable standards (as per MAWLF guidelines) and then released to the environment. • Any contaminated soil generated must be contained and disposed of accordingly.
Air Quality	• Implement dust suppression on unpaved roads by wetting with water, some chemical binders can be applied to the roads, e.g Spray with lignosulphonate or Dust-A-side. • Maintain roads. • Limit vehicles and adhere to off road speed limit. • Ensure personnel wears correct PPE to prevent exposure to particulate matters. • Building interiors and surfaces should be cleaned regularly. Strict adherence to housekeeping practices will help reduce dust levels. • Ensure proper and timely maintenance of feeders and handling equipment. • HP should undertake a gas monitoring exercise once a year to monitor the gases emitted during the operational process in order to ensure effectiveness of the technology and compliance.
Social	• Provide sufficient security personnel. • Operation personnel should not reside on site. • 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.
Visual	• It is recommended that more ‘green’ technologies be implemented within the architectural designs and building materials of the development 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. • Ensure that the infrastructure is designed and supervised by suitably qualified engineering professionals. • It is recommended that electricity demand for the operations be met with the same technology utilised in generation.

5.2 DECOMMISSIONING PHASE

The decommissioning of this development is not foreseen in the near future. However, a dedicated decommissioning plan has to be developed within 12 months after operations commence.

Appendix B – 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.