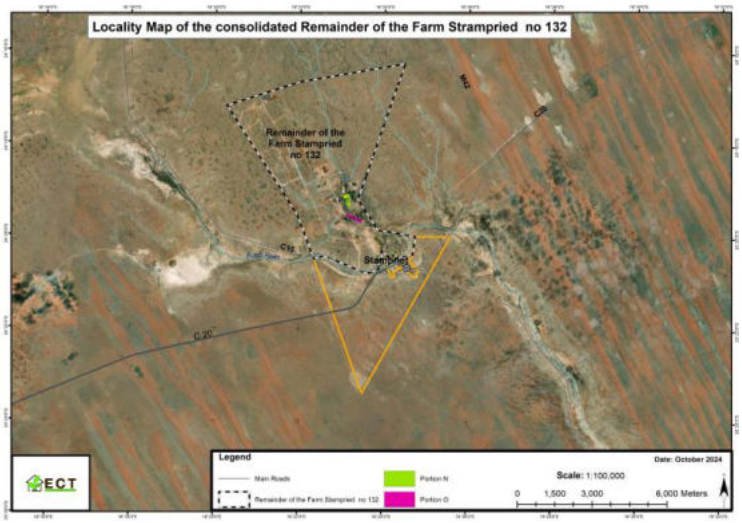

UPDATED ENVIRONMENTAL MANAGEMENT PLAN

2024

Township Establishment on Remainder of Farm Stampried 132, Hardap Region

Springwater Investments (Pty) Ltd

ECT
ENVIRONAM CONSULTANTS TRADING

Updated Environmental Management Plan

FOR THE TOWNSHIP ESTABLISHMENT ON REMAINDER OF FARM STAMPRIED 132, HARDAP REGION

PROJECT DETAILS

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REPORT DATE:

30 October 2024

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Signature (EAP)

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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
HM	Stampriet Municipality
I&APs	Interested and Affected Parties
NHC	National Heritage Council
Reg.	Regulation
S	Section
TB	Tuberculosis

1 INTRODUCTION

Stampriet is a village located in the Hardap Region of Namibia. It is situated approximately 64 km north-east of Mariental. In order to diversify the local economic development, away from the fluctuating tourism numbers throughout the year, additional developments in the village are required. As with many developments a need for a sufficient supply of housing and related activities also arises. Springwater Investment (Pty) Ltd, hereinafter referred to as the proponent, realised this opportunity and approached the Stampriet Village Council to allocate them a portion of land to carry out the **Township Establishment.**

In compliance with the legal requirements contained in the Environmental Management Act, 2007 (Act 7 of 2007) Springwater Investment (Pty) Ltd obtained an Environmental Clearance Certificate ECC for this activity in 2017 (see **Appendix B**). The duration of an ECC is three years upon which a renewal of the certificate becomes necessary. The ECC was renewed in 2022, with this renewal expiring in 2024. It is against this background that Springwater Investment (Pty) Ltd has appointed Environam Consultants Trading (ECT) to undertake the process of applying for the renewal on their behalf.

Key to the issuance of an Environmental Clearance Certificate for the renewal 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 or managed so that they are environmentally acceptable.

An EMP is one of the most important outputs of the EA 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 phases of these developments:

- Planning and Design – the period, prior to construction, during which preliminary legislative and administrative arrangements, necessary for the preparation of the land, are made and engineering designs are carried out. The preparation of construction tender documents forms part of this phase;
- Construction – the period during which the proponent, having dealt with the necessary legislative and administrative arrangements, appoints a contractor for the construction of services infrastructure, buildings as well as any other construction process(s) within the development areas;
- Operation and Maintenance – the period during which the development will be fully functional, operational and maintained.

The decommissioning of these developments is not envisaged; however, in the event that this should be considered some recommendations have been outlined in **Table 6-5**.

2 PROJECT LOCATION

The site is located on Farm Stampriet 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 Stampriet No. 132. The site is found on the following coordinates: Lat: -24.320496°; Lon: 18.382956°.

Figure 1: Locality map of Stampriet

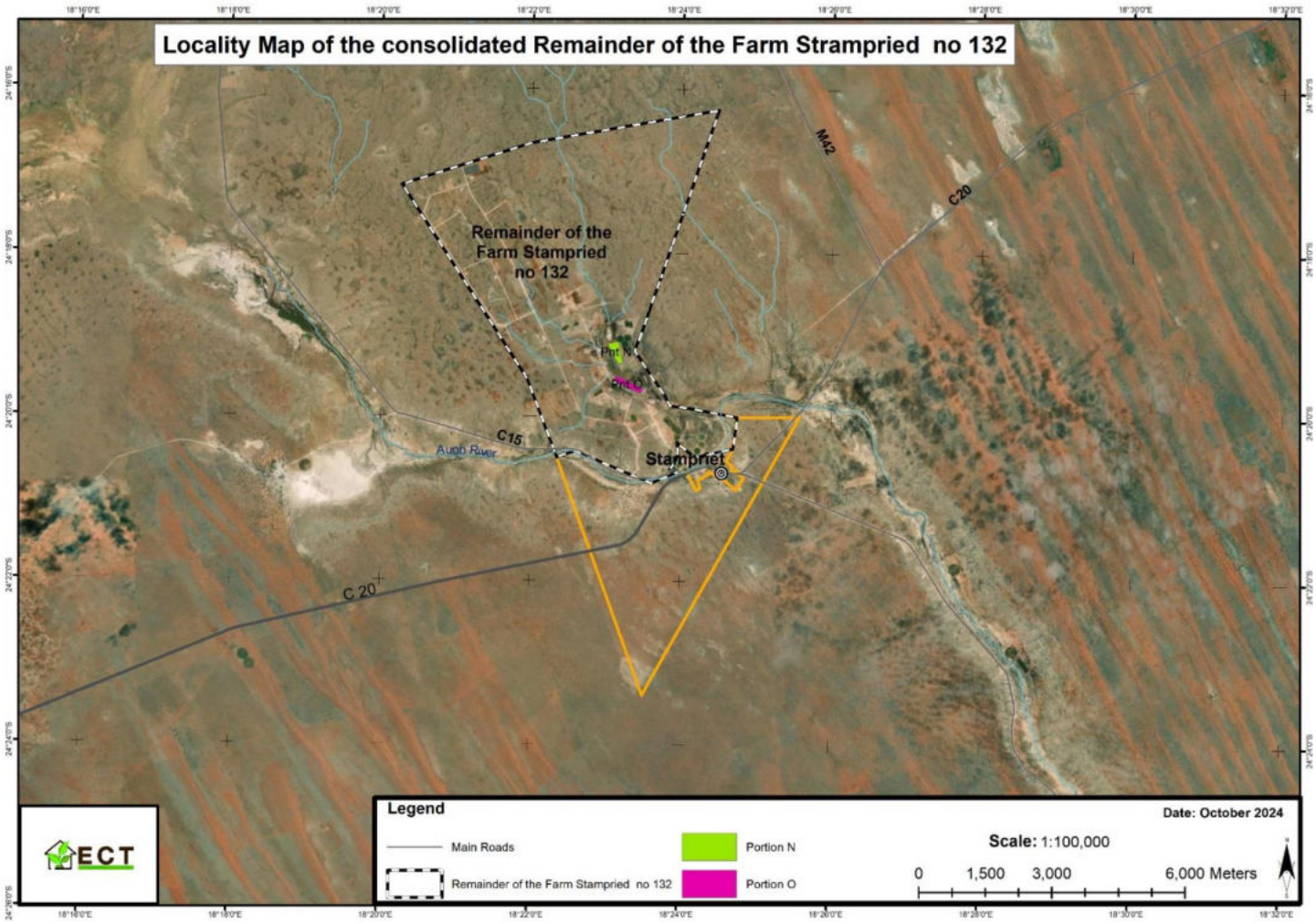

Figure 2: Locality map of the proposed development

3 PROJECT DESCRIPTION

As previously outlined above, the proposed project involves the township establishment on Remainder of Farm Stampriet No. 132. The township establishment is a result of the subdivision of the consolidated Portion of Farm Stampriet No. 132 (to be consolidated from the Remainder of Farm Stampriet No. 132 and Portion N of Farm Stampriet No. 132). The subdivisions consist of 93 erven/portions made up of the following land uses: 17 agricultural plots, 2 portions for the establishment of an agricultural training college and a vocational training centre, a portion for a lifestyle estate, 10 portions for business use, 21 portions for general residential erven, an industrial erf, a municipal erf and an undetermined erf to be used for future development including public open spaces, streets and servitudes, and erven for bulk services.

Since the approval of the previous ECC, the following progress has been made on the various properties as summarised below:

Agricultural plots - Bulk services have been completed, deed registration is finalized, and private sales are ongoing.

Agricultural training college and vocational training center - Accreditation is currently in process.

Retirement village - Finalisation of submission of plans has been concluded. Expected date for marketing is the middle of September 2021. Construction is expected to commence in early November 2021.

Rural residential development - Bulk services have been completed, deed registration is finalized, and private sales are ongoing.

Lifestyle estate - Submission to the Local Authority and MURD is underway. The expected marketing date is 2025, with construction slated to commence in mid to late 2025.

Business - Bulk services have been completed, deed registration is finalized, and private sales are ongoing.

General residential - Bulk services have been completed, deed registration is finalized, and private sales are ongoing.

Industrial - Bulk services have been completed, deed registration is finalized, and private sales are ongoing.
Municipal - Already in operation and functioning as a HOA.
Distillery - The roof and walls are completed. The floor has been finished. The structure is expected to be fully completed within a week. Equipment installation will commence immediately after the completion of the structure.

Development on the land is an ongoing process that will be completed over time.

4 DECISION FACTORS

The following factors served as informants and were considered when preparing the layout designs for the proposed development:

- Existing land use;
- Anthropogenic influence of the area;
- Cumulative impact on the natural resources.

5 ROLES AND RESPONSIBILITIES

Springwater Investment (Pty) Ltd cc (the Developer) is ultimately responsible for the implementation of the EMP, from the planning and design phase to the decommissioning phase (if these developments are in future decommissioned) of this development. 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).

5.1 DEVELOPER'S REPRESENTATIVE

The Developer should assign the responsibility of managing all aspects of these developments 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 these developments, 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 as follows:

Responsibility	Project Phase
Making sure that the necessary approvals and permissions laid out in **Table 6-1** are obtained/adhered to	Throughout the lifecycle of these developments
Making sure that the relevant provisions detailed in **Table 6-2** are addressed during planning and design phase.	Planning and design phase
Suspending/evicting individuals and/or equipment not complying with the EMP	• Construction • Operation and maintenance
Issuing fines for contravening EMP provisions	• Construction • Operation and maintenance

5.2 ENVIRONMENTAL CONTROL OFFICER

The DR should assign the responsibility of overseeing the implementation of the whole EMP on the ground during the construction and 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. The ECO will have the following responsibilities during the construction and operation and maintenance phases of these developments:

- 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 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.

5.3 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. **Table 6-3** applies to contractors appointed during the construction phase and Table 6-4 to those 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 construction, operation and maintenance work.

The tables in the following chapter (**Chapter 6**) detail the management measures associated with the roles and responsibilities that have been laid out in this chapter.

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

- Planning and design phase management actions (**Table 6-2**);
- Construction phase management actions (**Table 6-3**);
- Operation and maintenance phase management actions (Table 6-4); and
- Decommissioning phase management actions (**Table 6-5**).

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

6.1 ASSUMPTIONS AND LIMITATIONS

This EMP has been drafted based on the scoping-level Environmental Assessment (EA) conducted for the Township Establishment on Remainder of Farm Stampriet 132, Hardap Region as presented 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 construction labourers will be sourced mostly from the Stampriet townland areas and surrounds, and that migrant labourers (if applicable) will be housed within established accommodation facilities in the townlands.

6.2 APPLICABLE LEGISLATION

Legal provisions that have relevance to various aspects of these developments are listed in **Table 6-1** below. The legal instrument, applicable corresponding provisions and contact details are provided.

Table 6-1: 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 5.1** The rezoning of land from- © agricultural use to industrial use. **Activity 5.2** The establishment of land resettlement schemes. **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

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
		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 9.1** The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974. **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 governing the generation or release of emissions, pollution, effluent or waste. **Activity 10.1 (a)** The construction of Oil, water, gas and petrochemical and other bulk supply pipelines. **Activity 10.1 (b)** The construction of public roads. **Activity 10.2 (a)** The route determination of roads and design of associated physical infrastructure where – it is a public road.
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.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
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.
Petroleum Products and Energy Act of Namibia (Act No. 13 of 1990	This act makes provision for impact assessments for new proposed fuel facilities and petroleum products known to have detrimental effect on the environment.	Specific regulations that should be referred to are: Regulation 3, 16, 20, 21, 24, 29, 32, 40(2) and 50.
Pollution Control and Waste Management Bill	This bill is currently in preparation and is included as a guideline only.	Of particular relevance to the development are parts 2, 7 and 8.
Forestry Act (No 2 of 2001)	The Act stipulates that there be a general protection of the receiving and surrounding environment.	The Act specifies that no living tree, bush, shrub, or indigenous plants within 100m from any river, stream or watercourse, may be removed without the necessary license.
Soil Conservation Act (No 76 of 1969)	This Act deals with the combating and prevention of soil erosion. It states that the soil should be conserved, protected and improved.	Proper mitigation measures should be followed during the implementation phases of the project.
Namibia Vision 2030	Vision 2030 states that the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets.	Care should be taken that the development does not lead to the degradation of the natural beauty of the area.
Water 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.
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. Experience with construction projects has shown that a significant risk is created when construction workers interact with local communities.
Urban and Regional Planning Act, 2018	The Act regulates subdivisions of portions of land falling within a proclaimed Local Authority area.	Such applications are to be submitted to the Urban and Regional Board
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 comply with the provisions of the Local Authorities Act

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
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 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 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.

6.3 PLANNING AND DESIGN PHASE

The DR should ensure that the management actions detailed below are adhered to during the period before the construction of the infrastructure starts.

Table 6-2: Planning and design management actions

PLANNING AND DESIGN PHASE IMPACTS	
Impact	Mitigation Measures
Visual and Sense of Place	• 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, especially from the area, should be incorporated. • Visual pollutants can further be prevented through mitigations such as keeping existing vegetation, introducing tall indigenous trees; keeping structures unpainted, minimising large advertising billboards and high-rise buildings. • Any prominent features such as communication masts, solar panels, water tank etc. must be strategically located to minimise visual intrusion. • Avoid erecting bright features such as neon lights. • Infrastructure should be well-maintained and kept in a state of repair.
Surface and ground water	• Appoint professional engineers to develop a detailed storm water management design as part of the infrastructure service provision of the developments. • No dumping of waste products of any kind in or in close proximity to any water bodies. • Contaminated runoff from the various operational activities should be prevented from entering any water bodies. • 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. • Disposal of waste from the development should be properly managed. • The service infrastructure should be designed and constructed by suitably qualified engineering professionals.

PLANNING AND DESIGN PHASE IMPACTS	
Impact	Mitigation Measures
	• Develop and implement a preventative maintenance plan for the service infrastructure. • Introduce water management systems, such as recycling, in the development, as well as water saving awareness to encourage water wastage.
Fauna and flora	• Adapt the proposed developments to the local environment – e.g. small adjustments to the site layout could avoid potential features such as water bodies, existing vegetation, etc. • Plant local indigenous species of flora as part of the landscaping as these species would require less maintenance than exotic species. • Prevent the introduction of potentially invasive alien ornamental plant species such as; Lantana, Opuntia, Prosopis, Tecoma, etc.; as part of the landscaping as these species could infestate the area further over time. • Control and manage the movement of off-road vehicles such as quad bikes, 4X4 vehicles.
Existing Service Infrastructure	• 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. • 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 Water Resources Management Act 11 of 2013.
Waste management	• A sufficient number of waste bins should be placed on the properties for the soft refuse.

PLANNING AND DESIGN PHASE IMPACTS	
Impact	Mitigation Measures
	• A sufficient number of skip containers for the heavy waste and rubble should be provided for at appropriate sites. • The waste containers should be able to be closed to prevent birds and other animals from scavenging. • Solid waste will be collected and disposed of at an appropriate local land fill in Stampriet, this should be done in consultation with the local authority. • Hazardous waste to be disposed of a designated landfill site, the nearest of which is Windhoek (Kupferberg landfill site). • Introduce and enforce adherence to the Waste Management Hierarchy i.e. Waste prevention, reuse, recycling, recovery including energy recovery and as a last option, safe disposal.
Traffic	• The proponent in consultation with the Roads Authority will initiate an on-site investigation to determine the suitability of the proposed access road. • Ensure that road junctions have good sightlines. • Limit the type of vehicle e.g. heavy trucks. • Adhere to the speed limit. • Implement traffic control measures where necessary.

6.4 CONSTRUCTION PHASE

The management actions listed in **Table 3-4** apply during the construction phase. This table may be used as a guide when developing EMPs for other construction activities within this development area.

Table 6-3: Construction phase management actions

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
Site Preparation	• Developer must set out the entire plan before any workers, equipment or building materials are brought to site. This includes marking the corners of all buildings, walkways, driveways, parking areas, water installations, power generators etc. • The marked-out areas must be inspected and approved by a competent engineer before construction starts.

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
	• The contractor must make use of metal droppers, hazard tapes etc. to avoid confusion about which areas may be disturbed for development and which will be off-limits. • Construction should be carried out in a safe and effective manner and obstruction or danger to pedestrians and vehicles as a result of unsafe or ineffective siting of facilities, construction activities or material should be minimised.
Fauna and flora	• Prevent contractors from collecting wood, veld food, etc. during the construction phase. • Workers must be provided with wood/charcoal from external approved sources/suppliers. • Cooking on site must be done on gas or open fires at a designated spot with no possibility of causing veld fires. • Do not clear cut the entire development site, but rather keep the few individual trees and shrubs not directly affecting the development as part of the landscaping. • Topsoil from construction areas should be stockpiled and used for rehabilitation purposes. • Transplant removed vegetation where possible, or plant new trees in lieu of those that have been removed.
Pressure on existing infrastructure	• Ensure all potable water points are metered and regularly read. • Use water sparingly and avoid wastage and leaks. Educate the workforce on water saving measures. • French drains may only collect waste water from domestic use and should be removed at the end of construction safely without further environmental damage by competent contractors. • Ensure that the workforce is provided with temporary toilets during the construction phase. • Ensure that the above facilities are always in good working order and are inspected and maintained to avoid any leakage/seepage.
Surface and Ground Water Impacts	• It is recommended that construction takes place outside of the rainy season in order to limit flooding on site and to limit the risk of ground and surface water pollution. • No dumping of waste products of any kind in or in close proximity to surface water bodies, especially the ocean. • Heavy construction vehicles should be kept out of any surface water bodies and the movement of construction vehicles should be limited where possible to the existing roads and tracks. • Ensure that oil/ fuel spillages from construction vehicles and machinery are minimised and that where these occur, that they are appropriately dealt with.

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Drip trays must be placed underneath construction vehicles when not in use to contain all oil that might be leaking from these vehicles. • Contaminated runoff from the construction sites should be prevented from entering the surface and ground water bodies. • All materials on the construction site should be properly stored. • Disposal of waste from the site should be properly managed and taken to the Stampriet landfill site. • Construction workers should be given ablution facilities at the construction sites that are located at least 30 m away from any surface water and these should be regularly serviced. • Washing of personnel or any equipment should not be allowed on site. Should it be necessary to wash construction equipment these should be done at an area properly suited and prepared to receive and contain polluted waters. • A waste water abstraction permit should be obtained from the Ministry of Agriculture, Water and Land Reform.
Building Materials	• Ensure that building materials used in the development are not sourced trough environmentally harmful and unsustainable practices. • Building sand and or/rocks and other materials should be sourced from approved sites or suppliers. Materials may not be collected from environmentally sensitive areas identified in the Environmental Impact Assessment. • No removal of protected plant species without a harvesting permit from the Department of Forestry.
Health, Safety and Security	• Employ a health and safety officer to manage, coordinate and monitor risks and hazards as well as report and record all health and safety incidents on site. • Construction personnel should not overnight at the site, but only the security personnel. • Ensure that all construction personnel are properly trained depending on the nature of their work. • Provide for a first aid kid 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 and to local community throughout the construction phase. • Facilitate access to Antiretroviral medication for construction personnel. • Ensure adherence to the Covid-19 protocols as they are introduced from time to time.

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Restrict unauthorised access to the site and implement access control measures. • Consider the welfare and safety of neighboring property owners (farms etc.) • Clearly demarcate the construction site boundaries along with signage of no unauthorised access. • Clearly demarcate dangerous areas and no-go areas on site. • Staff and visitors to the site must be fully aware of all health safety measures and emergency procedures. • The contractor must comply with all applicable occupational health and safety requirements. The workforce should be provided with all necessary Personal Protective Equipment where appropriate.
Traffic	• Ensure drivers are licensed and trained in the operation of the vehicles they operate. • Limit and control the number of access points to the site. • Ensure that road junctions have good sightlines. • Construction vehicles' need to be in a road worthy condition and maintained throughout the construction phase. • Transport the materials in the least number of trips as possible. • Adhere to the speed limit. • Implement traffic control measures where necessary. • Minimise the movement of heavy vehicles during peak time.
Noise	• No amplified music should be allowed on site. • Inform immediate neighbours of construction activities to commence and provide for continuous communication between the neighbours and contractor. • Limit construction times to acceptable daylight hours. • Install technology such as silencers on construction machinery. • Do not allow the use of horns as a general communication tool, but use it only where necessary as a safety measure. • Provide protective equipment such as ear muffs and ear plugs to workers.
Air quality	• All loose material should be kept on site for the shortest possible time. • It is recommended that dust suppressants such as Dustex be applied to all the construction clearing activities to minimise dust.

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Construction vehicles to only use designated roads. • During high wind conditions the contractor must make the decision to cease works until the wind has calmed down. • Cover any stockpiles with plastic to minimise windblown dust. • Provide workers with dust masks. • Ensure construction vehicles are well maintained to prevent excessive emission of smoke.
Waste	• It is recommended that waste from the temporary toilets be disposed of at the Stampriet Wastewater Treatment Works. • 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. • A properly constructed temporary waste cage, that does not allow waste to be blown uncontrollably, may be erected on site. • The waste containers should be able to be closed to prevent birds and other animals from scavenging. • Solid waste will be collected and disposed of at an appropriate local land fill in Stampriet, in consultation with the local authority.
Hazardous Substances	• All chemicals and other hazardous substances must be stored and maintained in accordance with the Hazardous Substances Ordinance (No. 14 of 1974), with all relevant licences and permits to be obtained where applicable. • Given the potential harm to human health during handling and use of any of hazardous substances it is essential that all staff be trained with regards to the proper handling of these substances as well as First Aid in the case of spillage or intoxication. • Storage areas for all substances should be bunded and capable to hold 120% of the total volume of a given substance stored on site.

CONSTRUCTION PHASE IMPACTS	
Impact	**Mitigation Measures**
Historical, Archaeological and Cultural Heritage	• No archaeological or cultural and heritage sites have been found on site. In the case of accident find the proponent must immediately contact the National Heritage Council for advise on further steps to be taken.
Social	• Ensure locals enjoy priority in terms of job opportunities, to the extent possible, for skills that are available locally. • Ensure local procurement where commodities are available locally.
Post Construction Rehabilitation	• Inform the Ministry of Environment, Forestry and Tourism before any rehabilitation starts on site, for advise on terms and conditions. • Competent contractors or personnel should refill pits with waste and not sealable stockpiled blocks or smaller fragments of large blocks. • All rehabilitated areas are to be monitored over a 4-year period. • All domestic and or industrial waste must be collected and disposed of at an approved disposal facility. • Remove workshops, fences, generators and any scrap material in the vicinity of the work area. • Remove all concrete slabs and structures on the site and transport to an approved disposal facility.

6.5 OPERATION AND MAINTENANCE PHASE

The management actions included in Table 6-4 below apply during the operation and maintenance phase of this development.

Table 6-4: Operation and maintenance management actions

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
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, more especially the beach front. • Contaminated runoff from the various operational activities should be prevented from entering any surface water bodies. • 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. • Disposal of waste from the development should be properly managed. • 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.
Noise	• Limit the types of activities that generate excessive noise. • No activity having a potential noise impact should be allowed after 18:00 if possible.
Air quality	• Manage activities that generate emissions or dust. • Minimise the movement of vehicles in the area.
Quality of life	The development of properties will greatly contribute to the well-being and quality of life of the Stampriet residents.
Infrastructure development	• Ensure that the infrastructure is designed and supervised by suitably qualified engineering professionals. To consider the sensitive environment when designing and constructing the services.

OPERATIONAL PHASE IMPACTS	
Impact	**Mitigation Measures**
	• Electricity is to be obtained from the competent supplier such as NamPower or an Independent Power Producer generating renewable energy to ensure efficiency of generation and use as well as security of supply. • Consider the use of gas for cooking due to its efficiency and low pollution factor.

6.6 DECOMMISSIONING PHASE

The decommissioning of this development is not foreseen. In the event that this development is decommissioned the following management actions should apply.

Table 6-5: Decommissioning phase management actions

Environmental Feature	Management Actions
Equipment	• Conduct an investigation on soil and groundwater contamination. • Prior to removing or destroying infrastructure, carefully remove all residue products for recycling or safe disposal. • Solid material and uncontaminated soil should be used for filling purposes.
Stormwater and Wastewater Management	• Do not dispose water used for flushing pipes and tanks into the sewer system. • Waste water should not contaminate storm water.
Waste Management	• Solid waste generated from the removal of tanks should be treated as hazardous unless proven otherwise. • Contaminated soil and other waste material must be disposed of at an authorised disposal facility. • Waste should not be stockpile for extensive periods on site unless it is adequately protected from polluting the environment through leachate of potentially harmful contaminants.
Spillage	• Spillage should be prevented and should be reported to the relevant authorities if it occurs.
Remediation	• Clean-up or remediation of any contamination must be done.

Environmental Feature	Management Actions
	• The owner or occupant of the land bears the responsibility of any pollution arising from their property.
Health and Safety of Workers	• The safety and security of workers in the decommissioning phase is of high importance. • The contractor shall comply with all standards and legally required health and safety regulations. • The contractor must ensure that workers have access to suitable personal protective equipment. • A first aid kit should be available and adequately resourced. • Ensure that a health and safety officer is employed and on site during the decommissioning phase to manage, coordinate and monitor risk and safety issues.

Appendix A – Property Development Environmental Management Plan

This Development Environmental Management Plan will form part of every Deed of Sale or lease agreement to be entered into between Springwater Investment (Pty) Ltd cc and purchasers or lessees of the individual erven on the development site.

Environmental feature	Mitigation measure
Health and safety	• No human waste may be expelled on open soil. Every construction site should have at least one portable toilet. • Only one or two security guards may reside/sleep on-site during construction. No other construction personnel may sleep/reside on-site. • No open fires may be made anywhere on-site during the construction period. Heating and cooking facilities (where necessary/applicable) should be provided by the Contractor.
Waste management	• The waste container of portable toilets should be emptied on a regular basis to avoid overflows. Waste from portable toilets should be removed to the Stampriet Village Council wastewater treatment facility. • All waste should be placed in the appropriate waste containers on a daily basis. • All waste on-site should be removed on a weekly basis. • Concrete should not be mixed on open soil. Concrete should be mixed on an impermeable (i.e. lined) surface.

Appendix B – Environmental Clearance Certificate (2021)

ECC – 01447

Serial: 2NHNSF1447

REPUBLIC OF NAMIBIA

MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM

OFFICE OF THE ENVIRONMENTAL COMMISSIONER

ENVIRONMENTAL CLEARANCE CERTIFICATE

ISSUED

In accordance with Section 37(2) of the Environmental Management Act (Act No. 7 of 2007)

TO

Springwater Investments (Pty) Ltd
P. O. Box 90103, Windhoek

TO UNDERTAKE THE FOLLOWING LISTED ACTIVITY

Proposed Township Establishment on Remainder of Farm Stampriet 132, Hardap Region.

MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM
Private Bag 13306
WINDHOEK NAMIBIA
25 JUN 2021
ENVIRONMENTAL COMMISSIONER

ENVIRONMENTAL COMMISSIONER

Issued on the date: 2021-06-22

Expires on this date: 2024-06-22

(See conditions printed over leaf)

Reduce
Reuse
Recycle

NAMIBIA IS NOT A TRASH BIN DO THE RIGHT THING

This certificate is printed without erasures or alterations

ECC –

CONDITIONS OF APPROVAL

1. This environmental clearance is valid for a period of 3 (three) years, from the date of issue unless withdrawn by this office
2. This certificate does not in any way hold the Ministry of Environment and Tourism accountable for misleading information, nor any adverse effects that may arise from these activities. Instead, full accountability rests with the proponent and its consultants
3. This Ministry reserves the right to attach further legislative and regulatory conditions during the operational phase of the project
4. All applicable and required permits are obtained and mitigation measures stipulated in the EMP are applied particularly with respect to management of ecological impacts.
5. Strict compliance with national heritage guidelines and regulations is expected throughout the life-span of the proposed activity, therefore any new archaeological finds must be reported to the National Heritage Council for appropriate handling of such.

Appendix c – 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.