ENVIRONMENTAL MANAGEMENT PLAN

OPERATION OF THE EXISTING OSHAKATI ENGEN SERVICE STATION, OSHAKATI, OSHANA REGION

2024

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ABBREVIATIONS

AIDS	Acquired Immuno-Deficiency Syndrome
ER	Owner'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

ENGEN Namibia (Pty) Ltd is a leading marketer of liquid fuels and lubricants in the country. The company has invested in a number of retail fuel facilities across the length and breadth of the country. These facilities ensure self-sufficiency to ENGEN in terms of the supply of its products to its entire customer base, thus augmenting its supply chain. One such site is Oshakati Engen Service Station.

The site is located on Main Road Oshakati, in the town of Oshakati. In addition to pollution control manholes, a three-chamber oil/water separator pit, and vent pipes connected to the fuel storage tanks, the installations at the facility include underground tanks with the following details (Engen, 2017):

PRODUCT	NUMBER OF TANKS	CAPACITY	TOTAL CAPACITY ON SITE
ULP 95	1	$46m^3$	$46m^3$
Diesel 50PPM	1	$23m^3$	$23m^3$
Diesel 500PPM	1	$46m^3$	$46m^3$

The site is found at coordinates Lat: -17.77160; Lon: 15.69211, (See **Figure 1** below for the locality map).

The general amenities offered at the site consists mainly of the fuel facilities for the general public; off-loading of fuel from fuel tankers; a mini grocer, administration and control centre offices; and ablution and change house facilities for consumers and staff.

The site is located along the C46 Main Road from Ongwediva making it easily accessible. Adjacent to the site on the eastern side is Spar Oshakati which brings a lot of activity to the service station (Engen, 2017).

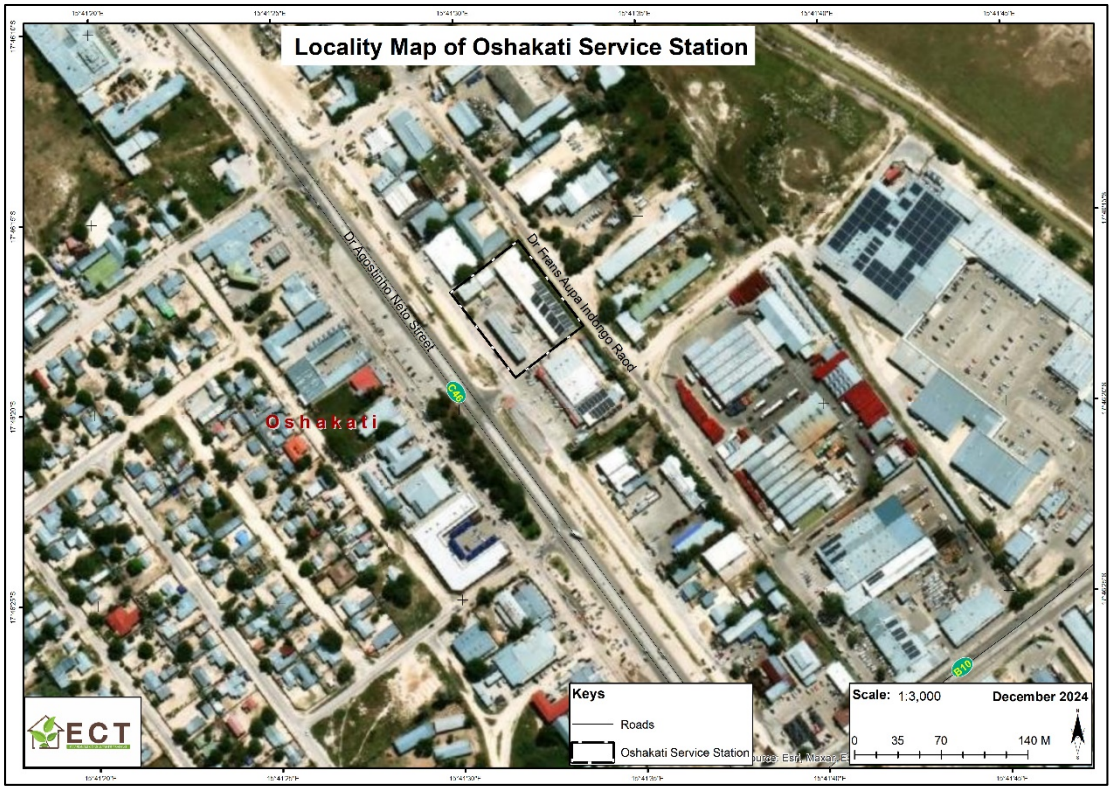

Figure 1: Locality Map of Oshakati Engen Service Station

2 ENVIRONMENTAL MANAGEMENT GUIDLINES

A number of potential environmental impacts may occur during the operations at the site and possibly during the decommissioning phase of the installations. There are already existing environmental controls on site, hence some of the recommendations are already being implemented on site and emphasis should be given to continuous and preventative maintenance of the systems on site. The following guidelines must be used:

2.1 HYDROCARBONS MANAGEMENT

If any spillage occurs, contaminated soil shall be collected in a holding tray or drum and disposed at a licensed hazardous waste site. Any spillage of more than 200 litres must be reported to the Ministry of Mines and Energy as per the Petroleum Products Act. Engen Namibia (Pty) Ltd shall take all reasonable measures to prevent surface or groundwater pollution from the release of oils and fuels. In addition, sufficient space should be left in fuel tanks to allow fuel expansion and to prevent leakage of fuel from the underground tanks.

2.2 ACCESS AND WORK SITES

Fuel tanker trucks shall access the site via permitted routes within the premises. Uncontrolled driving should not be permitted. Routes should be clearly marked with signs, together with designated turning points.

2.3 SITE MANAGEMENT

Staff at the site and contractors should be educated and informed of their environmental obligations. Deterrent penalties for damages should be stipulated, and perpetrators should be held responsible for all transgressions. Areas outside this designated working zone shall be considered “no go” areas. Engen health and safety policies should be implemented at all time.

2.4 STAFF MANAGEMENT

The manager must ensure that all employees have suitable personal protective equipment and are properly trained in firefighting and first aid. Engen Namibia and the site owner will take overall responsibility of training the responsible personnel on environmental management and overall implementation of the EMP on site.

2.5 WASTE MANAGEMENT

All waste generated at the site should be disposed of at designated licensed disposal site. Provision of sufficient bins or containers on-site to store any solid or liquid waste produced should be made. Liquid wastes from the oil/water separators should be cleared by the relevant authority before discharged into the municipal sewage line. All fuel waste should be contained in approved containers and be cleared by the relevant authority before disposed by licensed contractor. The bins and containers should be weatherproof and scavenger-proof.

2.6 FIRE AND SAFETY MANAGEMENT

Hydrocarbons are volatile under certain conditions and their vapours in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise. No fire or any source of fire ignition is to be allowed on site during any of the two phases (operational and decommissioning). Engen and the site owner shall take all reasonable measures and active steps to avoid increasing the risk of fire through activities on site and prevent the accidental occurrence or spread of fire; and shall ensure that there is sufficient fire-fighting equipment on site at all times. This equipment shall include fire extinguishers and horse reels.

3 ENVIRONMENTAL MANAGEMENT PLAN

In terms of the Environmental Management Act 7 of 2007 (Government Notice No. 29), certain activities may not be undertaken without an Environmental Clearance Certificate (ECC). This activity is included in the above-mentioned list, with particular reference to the following activities of the gazetted Namibian Government Notice No. 30 Environmental Impact Assessment Regulations: **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 9.4 The storage and handling of dangerous goods, including petrol, diesel, liquid petroleum, gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one location.

Activity 9.5 Construction of filing stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid, petroleum, gas or paraffin.

It is against this background that Engen Namibia (Pty) Ltd applied for and obtained an ECC for this facility. The ECC is valid for a period of three (3) years and has expired. Engen has thus appointed Environam Consultants Trading (ECT) to apply for the renewal of the ECC on its behalf.

Key to the issuance of an Environmental Clearance Certificate is the submission of an Environmental Management Plan (EMP) which provides for a description of how an activity might impact on the natural environment in which it occurs and clearly sets out commitments from the proponent on how identified impacts will be avoided, minimised and managed so that they are environmentally acceptable.

An EMP is one of the most important outputs of the Environmental Assessment process as it synthesises all of the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. As part of the application for a renewal of the ECC, Environam Consultants Trading has developed an EMP that will outline the appropriate actions.

An EMP will generally detail the mitigation and monitoring actions to be implemented during the following phases of a development:

- Planning and Design – the period, prior to construction, during which preliminary legislative and administrative arrangements, 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 owner, having dealt with the necessary legislative and administrative arrangements, appoints a contractor for the development of services infrastructure as well as any other construction process(s) within the development area;
- Operation and Maintenance – the period during which the services infrastructure and other structures will be fully functional and maintained.

The installations at the site already exist and are in use, therefore the EMP will only cover the operation and maintenance phase, and include the decommissioning phase.

4 ROLES AND RESPONSIBILITIES

Engen Namibia (Pty) Ltd (the proponent) is ultimately responsible for the implementation of the EMP. The proponent may delegate this responsibility as the project progresses through its life cycle. In this case the delegated responsibility for the effective implementation of this EMP will rest on the following key individuals:

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

4.1 OWNER'S REPRESENTATIVE

The owner may assign the responsibility of managing all aspects of this development to a designated member of staff, referred to in this EMP as the Employer' Representative (ER). The owner may decide to assign this role to one person for the full duration of this development, or may assign a different ER to each of the development phases. The ER's responsibilities are as follows:

Table 2-1: Responsibilities of ER

Responsibility	Project Phase
Making sure that the necessary approvals and permissions laid out in **Table 3-1** 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

4.2 ENVIRONMENTAL CONTROL OFFICER

The ER may assign the responsibility of overseeing the implementation of the whole EMP on the ground during the operation and maintenance phase to a designated member of staff, referred to in this EMP as the Environmental Control Officer (ECO). The PR /Proponent may also decide to assign this role to an independent environmental consultant. The ECO will have the following responsibilities during this development:

- Management and facilitation of communication between the Owner, ER, 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 infrastructure maintenance areas with respect to the implementation of this EMP (monitor and audit the implementation of the EMP);
- Submitting bi-annual reports to the office of the Environmental Commissioner;
- Assisting the Contractor in finding solutions with respect to matters pertaining to the implementation of this EMP;
- Advising the ER on the removal of person(s) and/or equipment not complying with the provisions of this EMP;
- Making recommendations to the ER 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.

- Applying for the renewal of the ECC upon expiry.

4.3 CONTRACTOR

Contractors appointed by the owner are automatically responsible for implementing all provisions contained within the relevant chapters of this EMP. Contractors will be responsible for the implementation of this EMP applicable to any work outsourced to subcontractors. **Table 4-1** applies to contractors appointed during the operation and maintenance phase. In order to ensure effective environmental management, the aforementioned chapters should be included in the applicable contracts for outsourced operation and maintenance work.

4.4 ASSUMPTIONS AND LIMITATIONS

This EMP has been drafted with the acknowledgment of the following assumptions and limitations:

- This EMP has been drafted based on the information presented by the proponent. ECT will not be held responsible for the potential consequences that may result from any alterations to the existing infrastructure.

5 APPLICABLE LEGISLATION

Legal provisions that have relevance to various aspects of this development are listed in **Table 3-1** below. The legal instrument, applicable corresponding provisions and project relevance details are provided.

Table 3-1: Legal provisions relevant to the proposed development

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO THE 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 THE 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, 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 9.4** The storage and handling of a dangerous goods, including petrol, diesel, liquid petroleum, gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one location. **Activity 9.5** Construction of filing stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid, petroleum, gas or paraffin.
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 owner 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 11 of 2013	Part 13 deals with the prohibition of pollution of water resources.	The pollution of water resources should be avoided during the operation of the development.
The Ministry of Environment, Forestry and Tourism (MET) Policy on HIV & AIDS	MEFT has recently developed a policy on HIV and AIDS. In addition, it has also initiated a programme aimed at	The owner and its contractor have to adhere to the guidelines provided to manage the aspects of HIV/AIDS.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO THE PROJECT
	mainstreaming HIV and gender issues into environmental impact assessments.	
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 Village, Town or Municipal Council.	The development has to comply to 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.
National Heritage Act No. 27 of 2004	The Act is aimed at protecting, conserving and registering places and objects of heritage significance.	All protected heritage resources (e.g. human remains etc.) discovered, need to be reported immediately to the National Heritage Council (NHC) and require a permit from the NHC before they may be relocated
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.
Petroleum Products and Energy Act, 1990 Petroleum Products Regulations (2000)	These legislations provide for the application of retail licences	The facility should have a retail licence from the Ministry of Mines and Energy.
Water Quality Guidelines for Drinking Water and Waste Water Treatment	Details specific quantities in terms of water quality determinants, which waste water, should be treated to before being discharged into the environment (see Appendix B).	These guidelines are to be applied when dealing with water and waste water treatment.

6 MANAGEMENT ACTIONS

The tables in this chapter detail the management measures associated with the roles and responsibilities that have been laid out in **Chapter 4**. The aim of the management actions in this chapter 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 associated this development:

- Operation and maintenance phase management actions (**Table 4-1**); and
- Decommissioning phase management actions (**Table 4-2**).

The owner should assess these commitments in detail and should acknowledge their commitment to the specific management actions detailed in the tables below.

6.1 OPERATION AND MAINTENANCE PHASE

The management actions included in **Table 4-1** below apply during the operation and maintenance phase of this development.

Table 4-1: Operation and maintenance management actions

Impact	Management Actions
Education and Training	• All employees including all contractors appointed for maintenance work on the respective infrastructure and their employees must be made aware of necessary health, safety and environmental considerations applicable to their respective work. • Records of environmental training and incidents should be maintained. • Post instructional/ informational signs regarding storm water pollution around the facility for customers and employees. • Place signs on faucet (hose bibbs) reminding employees and customers to conserve water and not to use water to clean up spills. • Label drains within the facility boundary by paint/ stencil (or equivalent), to indicate whether they flow to an on-site treatment device, directly to the sanitary sewer, or to a storm drain.
Monitoring and Auditing	• An Environmental Practitioner should monitor the implementation of the EMP, and recommend any changes to this document. • The Environmental Practitioner should inspect the site on a regular basis (preferably monthly or bi-monthly). • Biannual reports are to be submitted to the Ministry of Environment, Forestry and Tourism. These reports are to be submitted with the application for the renewal of the ECC.
General Facility	• Spot clean leaks and drips routinely. • Maintain a spill response plan and keep it current. • The above to take into consideration air, surface and groundwater, and soil quality, as well as the transportation of products to and from the facility. • Inspect and clean storm drain inlets and catch basins within the facility boundary at least once each year.

Impact	Management Actions
	• Ensure adherence to the Covid-19 protocols, as they are applicable from time to time. • Ensure availability of fully stocked first aid kits. • Ensure a designated and trained official is available to administer first aid. • Personnel are to be provided with relevant protective equipment.
Fuel Dispensing Area	• Ensure paving of the land within the confines of the property, priority to be given to concrete slabs as opposed to interlocks especially at the fuel dispensing areas. • Maintain fuel dispensing areas using dry clean-up methods such as sweeping for removal of litter and debris, or use of rags and absorbents for leaks and spills, and never wash down unless the wash water is collected and disposed of properly. • Fit underground storage tanks with spill containment and overfill prevention systems. • Fit fuel dispensing nozzles with "hold-open latches" (automatic shutoffs). • Post signs at the fuel dispenser or fuel island warning vehicle owners/operators against "topping off" of vehicle fuel tanks. • Ensure metering of incoming and outgoing fuel and maintain records. • Ensure metering equipment are calibrated as per industry standards. • Maintain all equipment, such as tanks, pumps, meters, hoses etc. in a clean state (regular inspections to be carried out).
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 are 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, in particular fuel, should be bunded and capable to hold 120% of the total volume of a given substance stored on site. • Ensure fuel tanks do not leak (regular inspections to be carried out).
Housekeeping	**Equipment Cleaning**

Impact	Management Actions
	• **Indoor Cleaning:** Clean equipment in a designated area, such as a mop sink, pot sink, or floor area with a drain connected to the sanitary sewer. • **Outdoor Cleaning:** Clean equipment in a designated covered, bermed area with a drain connected to the sanitary sewer. • Do not clean equipment cleaned outdoors in any area where water may flow to a street, gutter, storm drain, or stream. • Use floor mats that are small enough to be cleaned inside in a mop sink or near a floor drain. • Take floor mats that are too big to be cleaned indoors, to a self-service car wash to clean? **Grease Handling and Disposal** • Prevent oil, grease, or waste grease from being poured down a storm drain, or into a skip container. • Ensure waste grease from grease interceptors and traps are being properly disposed of by a responsible/ recognised disposal company. **Spill Clean-up and Surface Cleaning** **Spill Prevention** • Maintain a Spill Response Plan and keep it current. • Minimise the distance between waste collection points and storage areas. • Contain and cover all solid and liquid wastes. • Ensure absorbent materials and other spill response equipment are maintained in accordance with local regulations and procedures for containment and clean-up of different spills, and that they are easily accessible from anywhere in the facility. • Spot clean leaks and drips routinely. • Make sure floor drains are connected to or discharge to the sanitary sewer system, and not to the storm drain system. **Spill Clean-up** • Stop spills at the source. • Prevent wash water from spill clean-up from flowing to a gutter or a storm drain. • Use granular absorbents (e.g. cat litter) to absorb spills.

Impact	Management Actions
Cooling and Refrigeration Equipment Maintenance	• Ensure all discharges from cooling and refrigeration equipment are going to the sanitary sewer and not to the street or storm drains.
Access	• Provide for painted guidelines in terms of access and exit points. • Consider the construction of raised islands to prevent motorist from entering and accessing through the wrong lane. • Provide for pedestrian crossing. • It is highly recommended that the premises, especially the area housing the tanks and pumps be paved, with impermeable slabs as opposed to interlocks.
Water	• No dumping of waste products of any kind in or in close proximity to any surface water bodies. • Contaminated runoff from the various operational activities such as greases, fuels, oils etc. should be prevented from entering any surface or ground water bodies. • Ensure that surface water accumulating on-site are channeled and captured through a proper storm water management system to be treated in an appropriate manner before disposal into the environment. • Treat oily water through an oil/water separator before it is drained to the sewer or collected by a licensed contractor. • Prevent fuel spills: look at work practices, staff training, equipment and storage. • Consider the use of environmentally friendly degreasers for washing and cleaning. • Regularly monitor underground tanks and supply lines to detect leaks. • Ensure groundwater monitoring wells are in place and are regularly monitored and sampled. • Consider the installation of an automatic leak detection system. • The leak detectors must be tested and monitored regularly. • In the instance of an accidental spill, the effluent should be contained as far as possible in a separator pit.
Fire prevention and control	• Smoking should not be allowed on the premises. • Ensure availability of sufficient fire hydrants. • Ensure sufficient supply of water for fire hydrants.

Impact	Management Actions
	• Ensure availability of sufficient fire extinguishers. • Control high fire risk activities that have to be carried out such as welding on the premises. • Train employees in the use of fire-fighting equipment. • Store flammable inventory in a secure area with proper firefighting equipment and signage.
Energy efficiency and water management	The owner should consult the relevant national and/or international development guidelines which addresses the following: • The incorporation of water saving initiatives and technology within the development in order to reduce water demand. • Ensure sufficient metering systems are in place to monitor the energy and water use. • Train employees on the importance of water and energy savings.
Noise	• Do not allow activities that generate excessive noise levels. • Continuous monitoring of noise levels should be conducted to make sure the noise levels do not exceed acceptable limits. • No activity having a potential noise impact should be allowed after 18:00 if possible. • Maintain equipment used during the operation and keep them in a good state such that they do not emit excessive noise.
Emissions	• Manage activities that generate emissions. • Use vapour recovery equipment and techniques to avoid air pollution and minimise fuel loss. • Position vent pipes at points that are far from buildings and adjacent properties. • Train fuel area staff in vapour recovery procedures. • Conduct regular air quality monitoring.
Waste management	• Explore recycling solutions for waste. • Spot clean leaks and drips routinely. • Minimise storm water pollution from outside waste receptacles by doing at least one of the following: a) Use of only watertight waste receptacle(s) and keep the lid(s) closed;

Impact	Management Actions
	b) Grading and paving the waste receptacle area to prevent run-on of storm water; c) Installing a roof over the waste receptacle area; d) Installing a low containment berm around the waste receptacle area; e) Using and maintaining drip pans under waste receptacles. • Provide for adequate number of refuse bins at all pumps as well as around the site. • Use recognized waste management service providers to handle solid waste. • Solid waste to be disposed of at the designated landfill of the Local Authority. • All hazardous waste to be collected and disposed of as per industry standards. • Provide suitable on-site ablution facilities to cater for all personnel and customers using the facilities. • Keep spill cleanup materials handy near the tank and loading areas.
Visual Impact	• Use colours that blend in with the natural environment for the painting of buildings.

6.2 DECOMMISSIONING PHASE

There is an inherent environmental risk with fuel storage and handling, therefore the removal of redundant infrastructure should be done expeditiously. While residual leftovers in the storage and handling of fuel may represent a small portion of the total capacity, those seemingly insignificant small amounts of product can pose a serious health and safety risk to personnel and the surrounding environment. Hence decommissioning activities require close management. **Table 4.2** delineates requirements and processes to be followed without serious impact to the surrounding environment, this also include procedures for identifying pollution during the decommissioning process. Due to non-availability of local guidelines, we have looked at international best practice (adapted from Directorate of Environment and Heritage Policy Development, Australia 2017).

Table 4-2: Decommissioning phase management actions

Impact	Management Actions

A decommissioning environmental management plan (DEMP) should be prepared prior to commencement of decommissioning works.	The DEMP should address the following, where relevant:
	• Time frame for remediation works
	• Site access restriction and signage requirements
	• Soil contamination assessment requirements, including sampling and analytical requirements to:
	  ○ Identify the type and distribution of soil contamination
	  ○ Quantify levels of soil contamination
	  ○ Classify soils in accordance with relevant guidelines for disposal of contaminated soil
	• Site remediation requirements
	• Waste management, containment, transportation and disposal
	• Erosion and sediment control
	• Noise management
	• Dust suppression and control
	• Equipment decommissioning, isolation, storage and transportation requirements (including provisions for solid and liquid waste containment during works)
	• Management of environmental releases / accidents
	• General housekeeping requirements during decommissioning works
	• Record keeping and documentation.
	
	The DEMP will require input from appropriately qualified and experienced environmental professionals. Where possible, national or regional environmental personnel will take on this role, but if this is not appropriate then a qualified environmental consultant should be engaged to prepare the DEMP and undertake any sampling and analytical plans and contamination assessments.

Decommissioning of Above-ground Storage Tanks (ASTs) and (Underground Storage Tanks) USTs	All tank removals must be undertaken by a suitably qualified and experienced contractor who should be aware of and have control measures for the specific hazards associated with removal, transport and disposal of petroleum storage systems (e.g. ASTs and USTs), including: • Unexpected release of product during decommissioning and removal

Impact	Management Actions
should be undertaken in accordance with acceptable standards.	• Flammable vapours • Product toxicity • Excavations • Confined spaces Prior to decommissioning, all product remaining in the tank (including piping and hoses) should be removed and appropriately disposed of. All vapours should be removed from tanks and a Lower Explosive Limit (LEL) of less than 5% should be confirmed using a calibrated detector. Labelling, transport and disposal of decommissioned tanks should be undertaken in accordance with national or otherwise acceptable international requirements. Appropriate supports and strapping should be used to stop movement of the tank during transport. Where USTs are to be decommissioned in-situ, they should be completely filled with an inert material after removal of associated infrastructure and purging of product and vapours. After tanks are decommissioned, soil and groundwater validation testing should occur prior to reinstatement of the ground surface. Should soil or groundwater contamination be identified the Environmental Commissioner should be contacted for more information. Records of abandonment, in-situ decommissioning or removal must be kept. All staff undertaking tank removals should be aware of specific requirements for decommissioning of Under-ground Petroleum Storage Systems (UPSS).
Any environmental assessments undertaken must include a comprehensive review of current and historical site activities to determine the extent of environmental impacts.	The review should: • Identify activities which may have resulted in environmental impacts • Identify areas of potential contamination • Identify contaminants of potential concern • Outline recommendations for further investigation, if required. Where further investigation works confirm levels of environmental contamination above relevant and applicable environmental criteria / guidelines, the Environmental Commissioner should be informed and remedial works conducted to ensure areas identified as contaminated are effectively managed and remediated to the extent practicable.

6.3 CONCLUSION

The service station applies largely to good environmental management practices in terms of pollution control. The installations on site comply to the relevant international and national standards in the oil and gas industry namely SABS/SANS standards. It is therefore recommended that the application for the renewal of the Environmental Clearance Certificate for this site be approved, on condition that they adhere to the issues delineated in the EMP.

REFERENCE

Directorate of Environment and Heritage Policy Development, Australia 2017.

Engen, 2017. OPERATION AND DECOMMISSIONING OF EXISTING OSHAKATI ENGEN SERVICE STATION, OSHAKATI-OSHANA REGION: NAMIBIA. Nam Geo-Enviro Solutions. November 2017.

Namibian Government Notice No. 30 Environmental Impact Assessment Regulations, 2012.

Appendix A - Environmental Clearance Certificate

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.