

APP-002447
PROTEA CHEMICALS' CHEMICAL HANDLING AND STORAGE
FACILITY IN WINDHOEK
ENVIRONMENTAL MANAGEMENT PLAN




Prepared by:



Prepared for:




November 2023

Project:	PROTEA CHEMICALS' CHEMICAL HANDLING AND STORAGE FACILITY IN WINDHOEK: ENVIRONMENTAL MANAGEMENT PLAN	
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I, Karika van Niekerk, acting as representative of Protea Chemicals Namibia (Pty) Ltd, hereby confirm that the project description contained in this report is a true reflection of the information which the Proponent provided to Geo Pollution Technologies. All material information in the possession of the Proponent that reasonably has or may have the potential of influencing any decision or the objectivity of this assessment is fairly represented in this report and the report is hereby approved.

Signed at Walvis Bay on the 14 day of November 2023.



 Protea Chemicals Namibia (Pty) Ltd

_____ CY/2005/0665
 Business Registration/ID No.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
CCTV	Closed Circuit Television
dBA	A-weighted Decibel
DEA	Department of Environmental Affairs
ECC	Environmental Clearance Certificate
EMA	Environmental Management Act
EMP	Environmental Management Plan
EMS	Environmental Management System
HIV	Human Immunodeficiency Virus
HSE	Health, Safety and Environment
IBC	Intermediate Bulk Containers
MEFT	Ministry of Environment, Forestry and Tourism
MSDS	Material Safety Data Sheet
PPE	Personal Protective Equipment
UNFCCC	United Nations Framework Convention on Climate Change
VIP	Ventilated Improved Pit Latrine
WHO	World Health Organisation

1 BACKGROUND AND INTRODUCTION

Geo Pollution Technologies (Pty) Ltd was appointed by Protea Chemicals Namibia (the Proponent) to prepare an environmental management plan (EMP) for the continued operations of their existing chemical handling and storage warehouse on erf 6979, Windhoek, in the Khomas Region (Figure 1-1). The facility has been in operation for many years and the Proponent supplies chemicals to, among others, the mining, agricultural and food industries. Chemicals are received by means of trucks, offloaded into the warehouse and dispatched when customers collect products. Together with daily operations, some maintenance and upgrades are performed on a regular basis to ensure that the facility remains compliant to industry standards, specifically to store chemicals according to their material safety data sheet (MSDS).

In order to comply with Namibian legislation, and to adhere to all codes and standards applied in their operations, the Proponent wishes to develop an EMP for their operations in Windhoek. The EMP provides management options to ensure environmental impacts of the facility are minimised. The environment being defined in the Environmental Management Act as “land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values”.

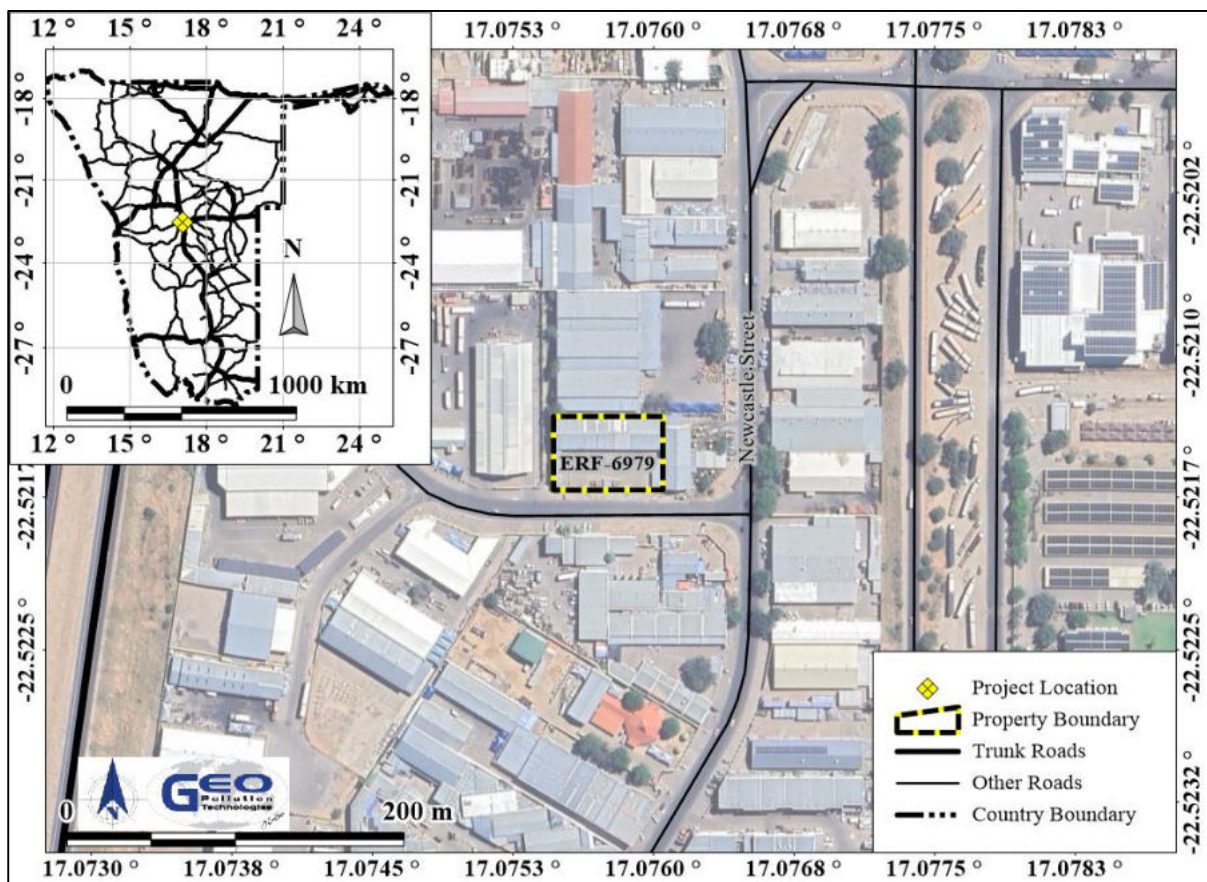


Figure 1-1 Project location

The EMP is thus a tool used to take pro-active action by addressing potential problems before they occur. This limits potential future corrective measures that may need to be implemented and allows for application of mitigation measures for unavoidable impacts. This document should be used as an on-site reference document during all phases (planning, construction (care and maintenance), operations and decommissioning) of the warehouse. All monitoring and records kept should be included in a report to ensure compliance with the EMP. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. A Health, Safety, Environment and Quality policy could be used in conjunction with the EMP. Operators and responsible personnel must

be taught the contents of these documents. Municipal or national regulations and guidelines must be adhered to and monitored regularly as outlined in the EMP.

The EMP will be used to apply for an environmental clearance certificate (ECC) in compliance with Namibia's Environmental Management Act (Act No 7 of 2007) (EMA).

Project Justification – The need and demand for chemicals changes and grows as industry in Namibia is developed and diversified. Chemicals are mainly imported into Namibia via the Port of Walvis Bay or by road from South Africa. There is thus a need for a warehouse where such chemicals can temporarily be stored and where clients can collect most, if not all, of their required chemicals simultaneously. Protea Chemicals offers this opportunity to customers through operating the warehouse in Windhoek. The main benefit of the warehouse is thus reliable and secure supply of chemicals to various industries in Namibia. This provides some secondary benefits in the form of support for economic and industrial development, generation of income and employment.

2 SCOPE

The scope of this EMP, in compliance with the requirements of EMA, is to:

- ◆ Provide a brief overview of operations of the facility.
- ◆ Summarise the legal and regulatory framework within which the project operates.
- ◆ Provide a brief overview of the environment, i.e. the physical, biological, social and economic conditions, potentially impacted by the project.
- ◆ Identify potential impacts of the project on the environment.
- ◆ Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels.
- ◆ Provide sufficient information to the relevant competent authorities and the Ministry of Environment, Forestry and Tourism (MEFT) to make informed decisions regarding the development.

3 METHODOLOGY

The following methods were used to prepare the EMP:

1. Baseline information about the site and its surroundings was obtained from existing secondary information and a site visit.
2. Potential environmental impacts emanating from the operations, construction / maintenance and decommissioning of the facility were considered and possible enhancement measures were listed for positive impacts while mitigation /preventative measures were provided for negative impacts as part of the EMP.

4 PROJECT DESCRIPTION

The Protea Chemicals facility is located in the Northern Industrial Area in Windhoek. The erf is thus also zoned for industrial use.

4.1 INFRASTRUCTURE

The erf is 2,400 m² in size. It hosts a warehouse of 1,004 m² in which all chemicals, except hydrogen peroxide is stored. The warehouse has a concrete floor and has two large entrance/exit doors. A small roofed and fenced area outside of the warehouse is used for the storage of hydrogen peroxide only. Administrative offices, a mess room (canteen), guardhouse and ablution facilities comprise the rest of the buildings on site. See Figure 4-1 for the site layout.

Firefighting equipment is placed throughout the site and within easy reach. An emergency shower, eyewash station and water bath are also present for any accidental contact with chemicals.



Figure 4-1 Site infrastructure



Photo 4-1 Hydrogen peroxide storage



Photo 4-2 Chemical storage



Photo 4-3 Firefighting equipment and signage



Photo 4-4 Safety signage and firefighting equipment



Photo 4-5 Emergency shower



Photo 4-6 Emergency eyewash station



Photo 4-7 Emergency water bath with water storage



Photo 4-8 Guard house

4.2 OPERATIONS

Various chemicals of both hazardous and non-hazardous nature are stored on site. The type and volume of chemicals stored at any time varies depending on customer demand. Most chemicals are ordered for specific clients, but some chemicals are stocked as items available for purchase by any customer.

Chemicals are received in bags, cans, drums and intermediate bulk containers (IBC). The IBC's are the largest single volume items with a 1,000 litre capacity. All products are received on pallets which are offloaded from trucks with a forklift and moved into the warehouse. For dispatch, bulk quantities remain on pallets and are again moved and loaded onto trucks with the forklift. Where single, small volume items are sold, these are removed from the pallets and handled by hand.

Four permanent employees are present on site. Three in the office and one in the warehouse. A security guard is also contracted from a third party security company.

Spill clean-up infrastructure is available on site and contaminated or expired products are store in a designated area until it can be safely disposed of at for example a hazardous waste disposal facility or returned to suppliers.

5 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an environmental assessment, as per the Namibian legislation. The legislation and standards provided in Table 5-1 to Table 5-3 govern the environmental assessment process in Namibia and/or are relevant to the facility.

Table 5-1 Namibian law applicable to the project

Law	Key Aspects
The Namibian Constitution	<ul style="list-style-type: none"> ◆ Promote the welfare of people ◆ Incorporates a high level of environmental protection ◆ Incorporates international agreements as part of Namibian law
Environmental Management Act Act No. 7 of 2007, Government Notice No. 232 of 2007	<ul style="list-style-type: none"> ◆ Defines the environment ◆ Promote sustainable management of the environment and the use of natural resources ◆ Provide a process of assessment and control of activities with possible significant effects on the environment

Law	Key Aspects
Environmental Management Act Government Notice No. 28-30 of 2012	<ul style="list-style-type: none"> ◆ Commencement of the Environmental Management Act ◆ List activities that requires an ECC ◆ Provide Environmental Impact Assessment Regulations
Water Resources Management Act Act No. 11 of 2013	<ul style="list-style-type: none"> ◆ Provide for management, protection, development, use and conservation of water resources ◆ Prevention of water pollution and assignment of liability
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	<ul style="list-style-type: none"> ◆ Define the powers, duties and functions of local authority councils ◆ Regulates discharges into sewers
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	<ul style="list-style-type: none"> ◆ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters ◆ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation
Labour Act Act No 11 of 2007, Government Notice No. 236 of 2007	<ul style="list-style-type: none"> ◆ Provides for Labour Law and the protection and safety of employees ◆ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997)
Atmospheric Pollution Prevention Ordinance Ordinance No. 11 of 1976	<ul style="list-style-type: none"> ◆ Governs the control of noxious or offensive gases ◆ Prohibits scheduled process without a registration certificate in a controlled area ◆ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process
Hazardous Substances Ordinance Ordinance No. 14 of 1974	<ul style="list-style-type: none"> ◆ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export ◆ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings
Pollution Control and Waste Management Bill (draft document)	<ul style="list-style-type: none"> ◆ Not in force yet ◆ Provides for prevention and control of pollution and waste ◆ Provides for procedures to be followed for licence applications

Table 5-2 City of Windhoek regulations, plans and policies

Regulation, Policy of Plan	Key Aspects
Groundwater Protection Regulations	<ul style="list-style-type: none"> ◆ Provides for the protection of groundwater, landscape and vegetation sensitivity ◆ Requires an EIA and EMP for projects that may potentially impact on groundwater ◆ Identifies three groundwater control zones: medium, high and very high
Windhoek Environmental Structure Plan and Environmental Policy	<ul style="list-style-type: none"> ◆ Integrates spatial planning decision-making, environmental planning and environmental impact management
Town Planning Scheme	<ul style="list-style-type: none"> ◆ Enables the comprehensive management of all property and related public sector functions across the city ◆ Provides for the protection of groundwater and the environment ◆ Prohibits any sewer, septic tank, pit latrine, VIP or french drain within 500 m of any private or production borehole

Regulation, Policy of Plan	Key Aspects
	<ul style="list-style-type: none"> without council's consent ◆ Sets the Southern Development Limit for Windhoek.
Council of Windhoek: Noise Control Regulations General Notice No. 77 of 2006	<ul style="list-style-type: none"> ◆ Resolution 215/09/2006 dealing with noise ◆ Impose various noise limits for residential commercial and industrial areas for day and night time ◆ Restricts noise reaching industrial areas at 70 dBA during the day and 70 dBA at night
Drainage and Sewage Regulations	<ul style="list-style-type: none"> ◆ Regulates discharges into sewer systems ◆ Provides standards to which effluents entering a sewer system must adhere ◆ Regulates storm water run-off.

Table 5-3 Relevant multilateral environmental agreements for Namibia and the development

Agreement	Key Aspects
Stockholm Declaration on the Human Environment, Stockholm 1972.	<ul style="list-style-type: none"> ◆ Recognizes the need for a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment
1985 Vienna Convention for the Protection of the Ozone Layer	<ul style="list-style-type: none"> ◆ Aims to protect human health and the environment against adverse effects from modification of the Ozone Layer are considered ◆ Adopted to regulate levels of greenhouse gas concentration in the atmosphere
United Nations Framework Convention on Climate Change (UNFCCC)	<ul style="list-style-type: none"> ◆ The Convention recognises that developing countries should be accorded appropriate assistance to enable them to fulfil the terms of the Convention
Convention on Biological Diversity, Rio de Janeiro, 1992	<ul style="list-style-type: none"> ◆ Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity

The chemical handling and storage facility is listed as an activity requiring an ECC as per the following points from Section 9 of Government Notice No. 29 of 2012:

Hazardous Substance Treatment, Handling and Storage

- ◆ 9.1 “The manufacturing storage handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974.”
- ◆ 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.”

6 ENVIRONMENTAL CHARACTERISTICS

This section lists pertinent environmental characteristics of the study area and provides a statement on the potential environmental impacts on each.

6.1 LOCALITY AND SURROUNDING LAND USE

The facility is situated on erf 6979, on Newcastle Street, Windhoek, (22.5215 °S; 17.0757 °E) (Figure 1-1). Access to the site is gained from Newcastle Street. The erf is zoned for industrial use all adjacent properties are mainly used for industrial purposes.

6.2 CLIMATE

The project location is part of a semi-arid highland savannah region. Heavy rainfall in this region is mostly common between January and March, peaking mostly in February, whilst May to September have little or no rainfall. See Table 6-1 for a summary of climate data. The aridity of

the region causes water resources to be a scarce commodity that has to be conserved and protected from pollution. Groundwater is an important source of water in Namibia.

Table 6-1 Summary of climate data for the area (Atlas of Namibia Project, 2002)

Average annual rainfall (mm/a)	300 – 350
Variation in annual rainfall (%)	30 – 40
Average annual evaporation (mm/a)	3,000 – 3,200
Water deficit (mm/a)	1,701 – 1,900
Average annual temperatures (°C)	19 – 20

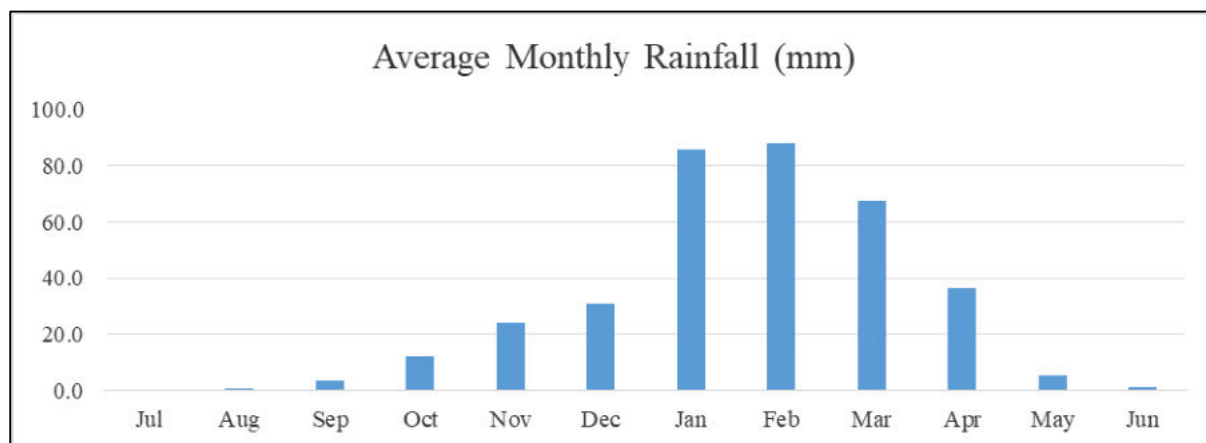


Figure 6-1 Monthly average rainfall (Atlas of Namibia Project, 2002)

6.3 TOPOGRAPHY AND DRAINAGE

The regional topography of the area can be described as a wide graben valley sloping north inside the surrounding hilly terrain. The valley floor is relatively flat compared to the surrounding terrain (Khomas Hochland to the west and Eros Mountains to the east) where moderate to steep slopes are the norm. A very distinct mountain range (Auas Mountains) cuts across the valley south of the city and divides the valley into two parts, with the southern part draining to the south.

The site itself is relatively flat, and drains in a north easterly direction towards the Klein Windhoek River which forms part of the catchment of the Swakop River, an ephemeral river, draining in a western direction.

6.4 GEOLOGY AND HYDROGEOLOGY

Metasedimentary rocks of the Namibian Age constitute the regional geology of the study area, consisting of rocks from the Damara Sequence. The Damara Sequence is locally subdivided into the Swakop Group rocks. The Kuiseb Formation make up the Swakop Group and include amphibolite, schist, micaceous quartzite and quartzite. The project location is situated on an alluvium deposit (sand) and is underlain by the Kuiseb Formation rocks (schist). See Figure 6-2 for the hydrogeological map of the area.

The metamorphic formations of the study area strike in a west-south-westerly direction and dip 15-35° to the north-northwest. The structural geology of the Windhoek area is complex as a result of numerous episodes of folding, faulting, thrusting and rifting. A number of north- to northwesterly striking faults and joints found in Windhoek form the major underground water conduits and therefore determine the conditions of the aquifer. A shallow alluvium basin overlay these formations within the Windhoek Graben Valley. Host rock fracturing along fault planes results in better development of secondary porosity in quartzite compared to schistose terrain, which is prone to plastic deformation rather than brittle fracturing. The quartzite therefore exhibits significantly higher secondary porosity and permeability, compared to the micaceous schist.

Table 6-2 presents groundwater statistics for 11 boreholes in a 5 km radius around the project. The groundwater information was obtained from Department of Water Affairs (DWA) borehole database. This database is generally outdated and more boreholes might be present. The average depth of 6 of the 11 boreholes is 63 m below surface and the yield of 6 of the 11 boreholes ranges between 2 and 45 m³/h. The average groundwater level of 5 of the 11 known boreholes is 12 m below surface, ranging between 8 and 24 m below surface.

The project area is located within the Okahandja Groundwater Basin. Groundwater flow at the site can be expected in a northerly direction. Local flow patterns may vary due to groundwater abstraction. The project area also falls within the Windhoek-Gobabis Subterranean Water Control Area (Extension) as per Government Notice 47 of 26 March 1976. This means that Government controls groundwater usage and development in this area.

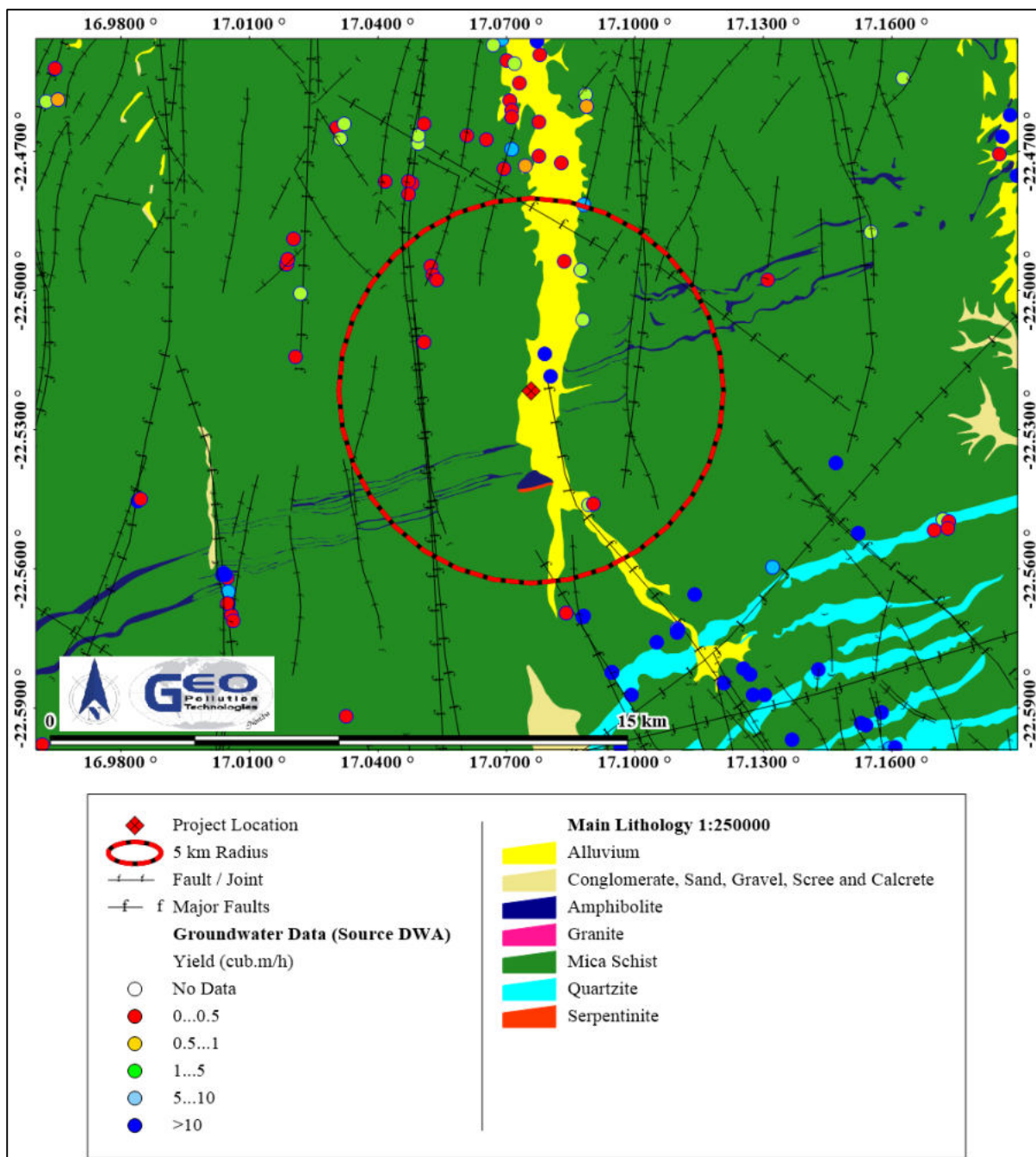


Figure 6-2 Hydrogeology map

Table 6-2 Groundwater statistics

	Depth (m)	Yield (m ³ /h)	Waterlevel (m)	Waterstrike (m)	TDS (ppm)	SO ₄ (ppm)	NO ₃ (ppm)	F (ppm)
Datapoints	6	6	5	11	8	8	5	8
Minimum	38	2	8	0	164	5	0.1	0.2
Average	63	16	12	11	924	158.6	7.9	1.5
Maximum	96	45	24	64	2567	510	24.0	4.4
Group A	0-50	>10	0-10	0-10	0-1000	0-200	0-10	0-1.5
	2	2	3	8	5	6	4	5
Group B	50-100	5-10	10-50	10-50	1000-1500	200-600	10-20	1.5-2.0
	4	1	2	2	2	2	0	1
Group C	100-200	0.5-5	50-100	50-100	1500-2000	600-1200	20-40	2.0-3.0
	0	3	0	1	0	0	1	0
Group D	>200	0-0.5	>100	>100	>2000	>1200	>40	>3
	0	0	0	0	1	0	0	2

11 boreholes in a 5.0 km radius from 22.52150°S 17.07570°E

Statistical grouping of parameters is for ease of interpretation, except for the grouping used for sulphate, nitrate and fluoride, which follow the Namibian guidelines for the evaluation of drinking-water quality for human consumption, with regard to chemical, physical and bacteriological quality. In this case the groupings has the following meaning:

Group A: Water with an excellent quality

Group C: Water with low health risk

Group B: Water with acceptable quality

Group D: Water with a high health risk, or water unsuitable for human consumption

6.5 PUBLIC WATER SUPPLY

Water consumption in Windhoek is well managed by means of water demand management. Nevertheless available water is one of the city's most scarce resources and represents a constraint for sustainable development in future. Consumption will increase with the soaring influx of people to the city.

Listed in order of resource development, Windhoek receives its water from boreholes in and around town, reclaimed water (New Goreangab Water Reclamation Plant), and a NamWater Scheme that transfers water from the Von Bach Dam, the Swakoppoort Dam, the Omatako Dam and the Grootfontein Karst Area. The city has also started with artificial recharge of the Windhoek aquifer and is planning to extend this scheme through the installation of new recharge boreholes as well as the development of deeper abstraction boreholes, 400 to 500 m deep. This clearly illustrates the value of the aquifer. The boreholes are the second most important water resource of the city and the sustained use of the aquifer needs to be assured. The project is located within the Swakoppoort Dam catchment which is important in terms of public water supply for the central areas of Namibia.

6.6 FAUNA AND FLORA

The site lies in the Savanna Biome with a thornbush shrubland vegetation type. Trees such as *Acacia hereroensis*, *Combretum apiculatum*, *Acacia reficiens*, *Acacia hebeclada*, *Ziziphus mucronata*, *Rhus* species and a variety of other trees are characteristic of this vegetation type.

The Proponent's property is an existing site which has been cleared of all vegetation during the initial establishment of the site.

6.7 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

The project area falls within the Khomas Region and lies in Windhoek, the capital of Namibia. Windhoek is the largest town in Namibia with more than 300,000 people. It is the economic and business centre of the country. The Hosea Kutako International Airport situated east of Windhoek, links Windhoek with the rest of the world, while the B1, B2 and B6 highways links Windhoek to the rest of Namibia and southern Africa.

7 ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides management options to ensure impacts of the facility are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The environmental management measures are provided in the tables and descriptions below. These management measures should be adhered to during the various phases of the operations of the facility. All personnel taking part in the operations of the facility should be made aware of the contents in this section, so as to plan the operations accordingly and in an environmentally sound manner.

The objectives of the EMP are:

- ◆ to include all components of operations, maintenance and possible decommissioning of the facility,
- ◆ to prescribe the best practicable control methods to lessen the environmental impacts associated with the facility,
- ◆ to monitor and audit the performance of operational personnel in applying such controls; and
- ◆ to ensure that appropriate environmental training is provided to responsible operational personnel.

7.1 IMPLEMENTATION OF THE EMP

The section below outline the management of the environmental elements that may be affected by the different activities. Impacts addressed and mitigation measures proposed are seen as minimum requirements which have to be elaborated on. Delegation of mitigation measures and reporting activities should be determined by the Proponent and included in the EMP. The EMP is a living document that must be prepared in detail, and regularly updated, by the Proponent as the project progress and evolve.

The EMP and ECC must be communicated to the site managers. A copy of the ECC and EMP should be kept on site. All monitoring results must be reported on as indicated. Reporting is important for any future renewals of the ECC and must be submitted to the MEFT. Renewal of ECC will require six monthly reports based on the monitoring prescribed in this EMP.

Various potential and definite impacts will emanate from the operations and decommissioning phases. The majority of these impacts can be mitigated or prevented. The prevention and mitigation measures are listed below.

7.1.1 Planning

During the phases of planning for construction (upgrades, maintenance etc.), continued operations and possible future decommissioning of the facility, it is the responsibility of Proponent to ensure they are, and remain, compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to, and during all phases, to ensure potential impacts and risks are minimised. The following actions are recommended for the planning phase and should continue during various other phases of the project:

- ◆ Ensure that all necessary permits from the various ministries, local authorities and any other bodies that governs the operations of the facility are in place and remains valid.
- ◆ Ensure all appointed contractors and employees enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractors, sub-contractors, employees and all personnel present or who will be present on site.
- ◆ Make provisions to have a health, safety and environmental (HSE) coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.
- ◆ Have the following emergency plans, equipment and personnel on site, where reasonable, to deal with all potential emergencies:

- EMP, risk management, mitigation, emergency response plan and HSE manuals
 - Adequate protection and indemnity insurance cover for incidents;
 - Comply with the provisions of all relevant safety standards;
 - Procedures, equipment and materials required for emergencies.
- ◆ If one has not already been established, establish and maintain a fund for future restoration of the project site should project activities cease and the site is decommissioned and environmental restoration or pollution remediation is required.
 - ◆ Establish and/or maintain a bi-annual reporting system to report on aspects of operations, maintenance and decommissioning as outlined in the EMP.
 - ◆ Submit bi-annual reports to the MEFT to allow for ECC renewal after three years. This is a requirement by MEFT.
 - ◆ Appoint a specialist environmental consultant to update the EMP and apply for renewal of the ECC prior to expiry.

7.1.2 Revenue Generation and Employment

Although limited, continued operations and maintenance of the facility relies on direct employment. Skilled and unskilled labourers are employed or contracted for various tasks of operations and maintenance. Unskilled labour may be sourced locally while it is expected that skilled contractors within Namibia will be used for specialised work. The presence of the facility also contributes to employment creation in the skilled and unskilled labour sector as it provides essential goods allowing other industries to operate. Additional investments opportunities exist as a result of the presence of Protea Chemicals in Windhoek and the reliable supply of chemicals to industries in Namibia.

Desired Outcome: Contribution to national treasury and provision of employment to local Namibians.

Actions

Enhancement:

- ◆ The Proponent must employ local Namibians where possible.
- ◆ If the skills exist locally, employees must first be sourced from the town, then the region and then nationally. Deviations from this practice must be justified.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Bi-annual summary report based on employee records.

7.1.3 Skills, Technology and Development

During operations of the facility, training is provided to a portion of the workforce to be able to perform their duties according to the required standards. Skills are transferred to an unskilled workforce for general tasks. Development of people and technology are key to economic development of the town, region and nationally.

Desired Outcome: To see an increase in skills of local Namibians.

Actions

Enhancement:

- ◆ If the skills exist locally, contractors and employees must first be sourced from the town, region, and then nationally. Deviations from this practice must be justified.
- ◆ Skills development and improvement programs to be made available as identified during performance assessments.
- ◆ Employees to be informed about parameters and requirements for references upon employment.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Record should be kept of training provided.
- ◆ Ensure that all training is certified or managerial reference provided (proof provided to the employees) inclusive of training attendance, completion and implementation.
- ◆ Bi-annual summary reports on all training conducted.

7.1.4 Demographic Profile and Community Health

The facility relies on labour for operations. The scale of the project is limited and it is not foreseen that it has or will in future create a change in the demographic profile of the local community. Exposure to factors such as communicable disease like HIV/AIDS as well as alcoholism / drug abuse are often associated with the trucking industry. Spills and leaks may present risks to members of the public especially if groundwater is polluted.

Desired Outcome: To prevent the in-migration and growth in informal settlements and to prevent the spread of diseases such as HIV/AIDS. To prevent health impacts on the surrounding business community due to chemical spills or accidents.

Actions:

Prevention:

- ◆ Employ only local people from the area, deviations from this practice should be justified appropriately.
- ◆ Adhere to all municipal by-laws relating to environmental health which includes, but is not limited to sanitation requirements on site.
- ◆ Store all chemicals according to MSDS instructions and segregating incompatible chemicals.
- ◆ Well trained staff responsible for all handling of chemicals.

Mitigation:

- ◆ Educational programmes for employees on HIV/AIDS and general upliftment of employees' social status.
- ◆ Appointment of reputable contractors.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Facility inspection sheet for all areas which may present environmental health risks, kept on file.
- ◆ Bi-annual summary report based on educational programmes and training conducted.
- ◆ Bi-annual report and review of employee demographics.

7.1.5 Traffic

The distribution of chemicals rely on the trucking industry which in turn contribute to increased traffic congestion, wear and tear of roads, and accidents. Construction activities (upgrades) may result in temporary traffic impacts as result of large vehicles accessing the site for delivery and collection of equipment and machinery.

Desired Outcome: Minimum impact on traffic and no transport or traffic related incidents.

Actions

Prevention:

- ◆ Erect clear signage regarding access and exit points at the facility.
- ◆ Trucks delivering or collection goods should not be allowed to obstruct any traffic.

Mitigation:

- ◆ If any traffic impacts are expected, traffic management should be performed.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- ◆ A report should be compiled bi-annually of all incidents reported, complaints received, and action taken.

7.1.6 Health, Safety and Security

Some chemicals handled and stored on site are hazardous with inherent health risks to personnel on site when inhalation, accidental ingestion, eye or skin contact occurs. Some chemicals may in itself not be particularly dangerous, but may become dangerous when in contact or mixed with incompatible materials. This may happen when for example incompatible materials are stored with each other, during containment failure (e.g. ruptured bags), or when different spilled products are cleaned and stored in the same container.

Injuries can occur due to incorrect lifting of heavy equipment and materials, falling from heights, stacked chemicals tipping over, and accidents involving forklifts and vehicles.

Desired Outcome: To prevent injury, health impacts, unauthorised entry and theft.

Actions

Prevention:

- ◆ All health and safety standards specified in the Labour Act should be complied with.
- ◆ Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool, which includes: operational, safe work and medical procedures, permits to work, emergency response plans, housekeeping rules, MSDS's and signage requirements (personal protective equipment (PPE), flammable etc.).
- ◆ Develop emergency response plans for all possible health, safety and security impacts and appoint responsible personnel in key positions to activate and oversee such plans when required.
- ◆ Clearly label dangerous and restricted areas as well as dangerous equipment and products.
- ◆ Provide all employees with required and adequate PPE which include coveralls, respirators and protective eyewear.
- ◆ Ensure that all personnel who will work in the warehouse receive adequate training on:
 - operation of equipment (mainly the forklift).
 - reading and understanding of MSDS instructions (take note that MSDS documents are not always 100% adequate and that some extra information for hazardous chemicals may be required).
 - handling of hazardous substances.
 - containment of hazardous substance spills.
 - correct application of neutralising agents, absorbents, etc. which may be used for spilled products (knowledge of incompatibilities is key).
 - identification of incompatible chemicals and the need to separate them during storage (segregation).
 - identification of potential hazardous conditions or events.
 - first aid and actions to be taken for specific highly dangerous chemicals should contact, inhalation or ingestion occur.
 - firefighting and compatible firefighting media for specific chemicals (see section 7.1.7).
- ◆ A MSDS file in which a particular MSDS can quickly be found, must be available in the warehouse.
- ◆ For specific highly dangerous chemicals (e.g. highly reactive with other chemicals and substances, highly flammable, highly corrosive or poisonous), abridged emergency procedures can be prepared that summarise they key do's and don'ts for each of these chemicals.
- ◆ The contact details of all emergency services must be readily available.
- ◆ The emergency shower, eyewash station and water bath must be inspected daily to ensure it is in working order and ready for use in an emergency.
- ◆ Ideally, a worker should not be allowed to enter the warehouse alone when chemicals will be handled. Should an emergency situation result where a worker is injured to such an extent that he/she can't call for help (e.g. inhalation of noxious/corrosive fumes), aid and medical treatment may come too late to prevent serious injury or even fatalities. Safety measures must be implemented and these can include being accompanied by the security

guard on site or using a panic button that can be worn by the warehouse employee which sounds an alarm in the offices.

- ◆ Security procedures and proper security measures must be in place to protect workers and clients.
- ◆ Equipment on site must be locked away or placed in a way that does not encourage criminal activities (e.g. theft).

Mitigation:

- ◆ For all emergency situations, the appropriate emergency response plan must be implemented as soon as possible in order to minimize the magnitude of impacts or prevent such impacts from developing into more severe impacts.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Any incidents must be recorded with action taken to prevent future occurrences.
- ◆ A report should be compiled bi-annually of all incidents reported. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.

7.1.7 Fire and Explosion

Some chemicals stored are flammable in nature and can even become explosive when exposed to incompatible materials (e.g. oxidisers when mixed with a fuel source like hydrocarbons). Uncontrolled fires and explosions can cause extensive damage to surrounding properties and can lead to casualties.

Desired Outcome: To prevent property damage, possible injury and impacts caused by uncontrolled fires.

Actions:

Prevention:

- ◆ A holistic fire protection and prevention plan must be developed for the site and it should specifically take into account flammable products stored on site. This plan must include an emergency response plan, firefighting plan and a spill recovery plan and should have dedicated assigned personnel to oversee their development and implementation.
- ◆ The installation of smoke detectors in the warehouse should be investigated.
- ◆ Firefighting equipment must be maintained and regularly serviced.
- ◆ Regular personnel training (firefighting, fire prevention and responsible housekeeping practices).
- ◆ Ensure all chemicals are stored strictly according to MSDS instructions. This include segregation of incompatible products.
- ◆ Ensure sufficiently trained warehouse employees who knows which fire extinguishing media (e.g. water, powder, foam) are incompatible with which chemicals (e.g. water on concentrated acid can result in a seriously violent reaction).
- ◆ Maintain regular site, mechanical and electrical inspections and perform regular maintenance.
- ◆ Clean all spills/leaks without delay and dispose of any contaminated material according to their MSDS requirements and at suitable locations to prevent the accumulation of flammable or explosive products on site.

Mitigation:

- ◆ For any fire related emergency situation, the appropriate emergency response plan must be implemented as soon as possible in order to minimize the magnitude of impacts or prevent such impacts from developing into more severe impacts.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat themselves.
- ◆ A report should be compiled bi-annually of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given.

7.1.8 Air Quality

Some spilled or uncontained chemicals can reduce air quality by releasing fumes which may be noxious, corrosive or poisonous. Different chemicals mixing and reacting with each other can produce fumes not expected from the products on their own.

Desired Outcome: To prevent health impacts related to reduced air quality within the warehouse.

Actions

Mitigation:

- ◆ Employees should be informed about the dangers of chemical vapours.
- ◆ The warehouse should be well ventilated and the doors open when employees or any other person enters.
- ◆ If spills occur, clean-up should be initiated immediately and according to MSDS instructions.
- ◆ Respirators should be provided to employees entering the warehouse.
- ◆ Also refer to section 7.1.6.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Any complaints received regarding excessive fumes or odours should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

7.1.9 Noise

Noise will exist due to heavy vehicles accessing the site for loading of chemicals and the use of the forklift. Although the nature of the operations is such that noise levels will not likely result in hearing loss, it may be a nuisance to neighbours. The site is however in an industrial area where noise can reasonably be expected.

Desired Outcome: To prevent any nuisance and hearing loss due to noise generated.

Actions

Prevention:

- ◆ Follow the City of Windhoek guidelines for limits to noise pollution (Council Resolution 215/09/2006) to prevent hearing impairment and a nuisance at nearby receptors.
- ◆ Follow the Labour Act Health and Safety Regulations for employees in the workplace.

Mitigation:

- ◆ Hearing protectors as standard PPE for workers should situations with elevated noise levels occur (e.g. construction and maintenance activities).

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ City of Windhoek Council Resolution 215/09/2006
- ◆ Maintain a complaints register.
- ◆ Bi-annual report on complaints and actions taken to address complaints and prevent future occurrences.

7.1.10 Waste production

Limited waste is produced during the operational phase. Waste will be produced in the form of domestic waste from administrative offices as well as hazardous waste like spilled, contaminated and expired chemicals or the empty bags and containers such products came in. Containers contaminated with chemicals can pose health risk of discarded at regular disposal sites where it may be collected for re-use by people.

Desired Outcome: To reduce the amount of waste produced and prevent pollution and littering.

Actions

Prevention:

- ◆ Waste reduction measures should be implemented and all waste that can be re-used/recycled must be kept separate.
- ◆ Ensure adequate temporary waste storage facilities are available.
- ◆ Ensure waste cannot be blown away by wind.
- ◆ Ensure no empty containers leave the site and can be used as for example water containers.

Mitigation:

- ◆ Waste should be disposed of regularly and at appropriately classified disposal facilities, this includes hazardous material (empty chemical containers, contaminated rugs, paper water and soil).
- ◆ See the MSDS available from suppliers for disposal of contaminated products and empty containers.
- ◆ Liaise with the town council regarding waste and handling of hazardous waste.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.
- ◆ Any complaints received regarding waste should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

7.1.11 Ecosystem and Biodiversity Impact

The site has previously been developed and is mostly devoid of vegetation. The nature of the operational activities is such that the probability of creating a habitat for flora and fauna to establish is low. Ecosystem or biodiversity impacts are mostly associated with pollution of the environment.

Desired Outcome: To avoid pollution of, and impacts on, the ecological environment.

Actions.

Prevention:

- ◆ Educate all contracted and permanent employees on the value of biodiversity and the importance of pollution prevention.

Mitigation:

- ◆ Report any extraordinary animal sightings to the MEFT.
- ◆ Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- ◆ The establishment of habitats and nesting sites at the facility should be prevented where possible.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Any ecologically significant events or sightings to be included in a bi-annual report.

7.1.12 Groundwater, Surface Water and Soil Contamination

Operations entails the storage and handling of various chemicals. Such material may contaminate surface water, soil and groundwater. Contamination may either result from spills and leaks during operations. Chemicals in the warehouse is stored on concrete surfaces, but due the nature of operations not in bunded areas. Large liquid chemical spills can thus find its way into the yard. Container damage during loading/offloading of trucks can also cause some chemicals to accumulate on the paving. Storm water can result in such chemicals reaching storm water drains and ultimately the environment.

Desired Outcome: To prevent the contamination of water and soil.

Actions

Prevention:

- ◆ Proper training of operators must be conducted on a regular basis (chemical handling, forklift operations, spill detection, spill control).
- ◆ To prevent container damage, a limit should be placed on stacking height during transport and storage.
- ◆ Employees must be trained in emergency response actions when a spill occur.

Mitigation:

- ◆ Spill clean-up and containment means must be readily available on site as per the relevant MSDS and all spills must be cleaned up immediately.
- ◆ Also refer to section 7.1.6.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ A report should be compiled bi-annually of all spills or leakages reported. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken, and comparison of pre-exposure baseline data (previous pollution conditions survey results) with post remediation data (e.g. soil / groundwater hydrocarbon concentrations).

7.1.13 Visual Impact

This is an impact that not only affects the aesthetic appearance, but also the integrity of the facility. The general upkeep and maintenance of the facility will not only reduce any negative visual impacts, but also ensure the longevity of the structures and buildings. Proposed upgrades will have a positive visual impact.

Desired Outcome: To minimise aesthetic impacts associated with the facility and prevent lighting from being a visual disturbance.

Actions

Mitigation:

- ◆ Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ A report should be compiled every bi-annually of all complaints received and actions taken.

7.1.14 Cumulative Impact

Possible cumulative impacts associated with the operational phase include: increased risk of groundwater and soil contamination while increased traffic in the area will have a cumulative impact on traffic flow, increase the risk of accidents and elevate noise.

Desired Outcome: To minimise all cumulative impacts associated with the facility.

Actions

Mitigation:

- ◆ Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- ◆ Reviewing bi-annual and annual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Annual summary report based on all other impacts must be created to give an overall assessment of the impact of the operational phase.

7.2 DECOMMISSIONING AND REHABILITATION

Decommissioning is not foreseen during the validity of the ECC. Decommissioning was however assessed. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including buildings and underground infrastructure if not required for future land use. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within Labour Act Health and Safety Regulations and City of Windhoek Council Resolution 215/09/2006 limits on noise and waste should be contained and disposed of at an appropriately classified and approved waste facility and not dumped in the surrounding areas. Future land use after decommissioning should be assessed prior to decommissioning and rehabilitation initiated if the land will not be used for similar future purposes. The EMP for the facility will have to be reviewed at the time of decommissioning to cater for changes made to the site and to implement guidelines and mitigation measures.

7.3 ENVIRONMENTAL MANAGEMENT SYSTEM

The Proponent could implement an Environmental Management System (EMS) for their operations. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- ◆ A stated environmental policy which sets the desired level of environmental performance;
- ◆ An environmental legal register;
- ◆ An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- ◆ Identification of environmental, safety and health training needs;
- ◆ An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy;
- ◆ Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS; and
- ◆ This EMP.

8 CONCLUSION

The chemical storage and handling facility has a positive impact in the industrial and mining sector in Namibia. In addition to reliable and convenient supply of chemicals, the Proponent contributes to employment, skills transfer and training which in turn develops the small local workforce.

Negative impacts can successfully be mitigated by implementing preventative measures. Fire prevention should be adequate, and health and safety regulations should be adhered to in accordance with the regulations pertaining to relevant laws and internationally accepted standards of operation. Any waste produced must be removed from site and disposed of at an appropriate facility or re-used or recycled where possible. Hazardous waste must be disposed of at an approved hazardous waste disposal site. Noise pollution should at all times meet the prescribed City of Windhoek Council Resolution 215/09/2006 requirements to prevent hearing loss and not to cause a nuisance.

The EMP should be used as an on-site reference document for the operations of the facility. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may need to be undertaken. The Proponent could use an in-house Health, Safety, Security and Environment Management System in conjunction with the EMP. All operational personnel must be taught the contents of these documents.

Should the DEA of the MEFT find that the impacts and related mitigation measures, which have been proposed in this report, are acceptable, an ECC may be granted to the Proponent. The ECC issued, based on this document, will render it a legally binding document which should be adhered to.

9 REFERENCES

Atlas of Namibia Project. 2002. Digital Atlas of Namibia Unpublished Report. Ministry of Environment & Tourism.

Directorate of Environmental Affairs, 2008. Procedures and Guidelines for Environmental Impact Assessment (EIA) and Environmental Management Plans (EMP), Directorate of Environmental Affairs, Ministry of Environment and Tourism, Windhoek.

Namibia Statistics Agency. Namibia 2011 Population and Housing Census Main Report.

Appendix A: Consultant's Curriculum Vitae

ENVIRONMENTAL SCIENTIST**André Faul**

André entered the environmental assessment profession at the beginning of 2013 and since then has worked on more than 190 Environmental Impact Assessments including assessments of the petroleum industry, harbour expansions, irrigation schemes, township establishment and power generation and transmission. André's post graduate studies focussed on zoological and ecological sciences and he holds a M.Sc. in Conservation Ecology and a Ph.D. in Medical Bioscience. His expertise is in ecotoxicological related studies focussing specifically on endocrine disrupting chemicals. His Ph.D. thesis title was The Assessment of Namibian Water Resources for Endocrine Disruptors. Before joining the environmental assessment profession he worked for 12 years in the Environmental Section of the Department of Biological Sciences at the University of Namibia, first as laboratory technician and then as lecturer in biological and ecological sciences.

CURRICULUM VITAE ANDRÉ FAUL

Name of Firm	:	Geo Pollution Technologies (Pty) Ltd.
Name of Staff	:	ANDRÉ FAUL
Profession	:	Environmental Scientist
Years' Experience	:	22
Nationality	:	Namibian
Position	:	Environmental Scientist
Specialisation	:	Environmental Toxicology
Languages	:	Afrikaans – speaking, reading, writing – excellent English – speaking, reading, writing – excellent

EDUCATION AND PROFESSIONAL STATUS:

B.Sc. Zoology	:	University of Stellenbosch, 1999
B.Sc. (Hons.) Zoology	:	University of Stellenbosch, 2000
M.Sc. (Conservation Ecology)	:	University of Stellenbosch, 2005
Ph.D. (Medical Bioscience)	:	University of the Western Cape, 2018

First Aid Class A	OHS-Med, 2022
Basic Fire Fighting	OHS-Med, 2022

PROFESSIONAL SOCIETY AFFILIATION:

Environmental Assessment Professionals of Namibia (Practitioner)

AREAS OF EXPERTISE:

Knowledge and expertise in:

- ◆ Water Sampling, Extractions and Analysis
- ◆ Biomonitoring and Bioassays
- ◆ Biodiversity Assessment
- ◆ Toxicology
- ◆ Restoration Ecology

EMPLOYMENT:

2013-Date	:	Geo Pollution Technologies – Environmental Scientist
2005-2012	:	Lecturer, University of Namibia
2001-2004	:	Laboratory Technician, University of Namibia

PUBLICATIONS:

Publications:	5
Contract Reports	+190
Research Reports & Manuals:	5
Conference Presentations:	1