APP -001893
IRRIGATION ACTIVITIES OF HENNING CRUSHER ON FARM GUINAS-SEE 455, OSHIKOTO REGION

UPDATED ENVIRONMENTAL MANAGEMENT PLAN

Prepared by:

GEO Pollution Technologies Namibia

Prepared for:

Henning Crusher (Pty) Ltd

August 2023

Project:	**IRRIGATION ACTIVITIES OF HENNING CRUSHER ON FARM GUINAS-SEE 455, OSHIKOTO REGION: UPDATED ENVIRONMENTAL MANAGEMENT PLAN**	
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Report Approval	**Quzette Bosman** Environmental Practitioner	

I Tia Henning acting on behalf of Henning Crusher (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 Tsumeb on the 10th day of August 2023

Henning Crusher (Pty) Ltd

80/035
Company Registration

SUMMARY

Henning Crusher (Pty) Ltd irrigates 90 ha, mainly producing maize, lucerne and sorghum for animal feed on Farm Guinas-See, 455, (a portion of the consolidated Farm Guinas-See 1403) in the Oshikoto Region. Water is abstracted from Lake Guinas and irrigated by means of three centre pivot systems.

The updated EMP provides preventative and mitigation measures for all environmental, safety, health and socio-economic impacts associated with the operations of the facility. The document will be used to apply for renewal of the existing environmental clearance certificate (ECC-00815) for the irrigation activities of Henning Crusher.

Farm Guinas-See is mainly surrounded by farmland. Due to the nature and location of the operations, limited impacts are expected on the surrounding environment. It is however recommended that environmental performance be monitored regularly to ensure regulatory compliance and that corrective measures be taken if necessary. The agricultural activities on the farm play a role in contributing to the agricultural and food sector by growing feed and food for local markets. By appointing local employees and by implementing monitoring and training programs, the positive socio-economic impacts can be maximised while mitigating any negative impacts.

The updated EMP should be used as an on-site reference document during all phases (planning, operations and decommissioning) of the quarry and should be used in conjunction with a health, safety, environment and quality policy. Operators and responsible personnel must be taught the contents of these documents. Local or national regulations and guidelines must be adhered to and monitored regularly as outlined in the updated EMP. All monitoring and records kept should be included in a report to ensure compliance with the ECC conditions. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken.

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1 BACKGROUND AND INTRODUCTION

Geo Pollution Technologies (Pty) Ltd was appointed by Henning Crusher (Pty) Ltd (the Proponent), to update their environmental management plan for the agricultural activities on Farm Guinas-See No. 455 (a portion of the consolidated Farm Guinas See 1403) in the Oshikoto Region (Figure 1-1). Henning Crusher (Pty) Ltd irrigates 90 ha on the farm. The main produce are maize, lucerne and sorghum. Irrigation is from Lake Guinas, by means of three centre pivot irrigation systems. The main operational activities include:

- land preparation;
- planting;
- water abstraction and irrigation;
- fertilizer application and pest control;
- harvesting; and
- processing / storage.

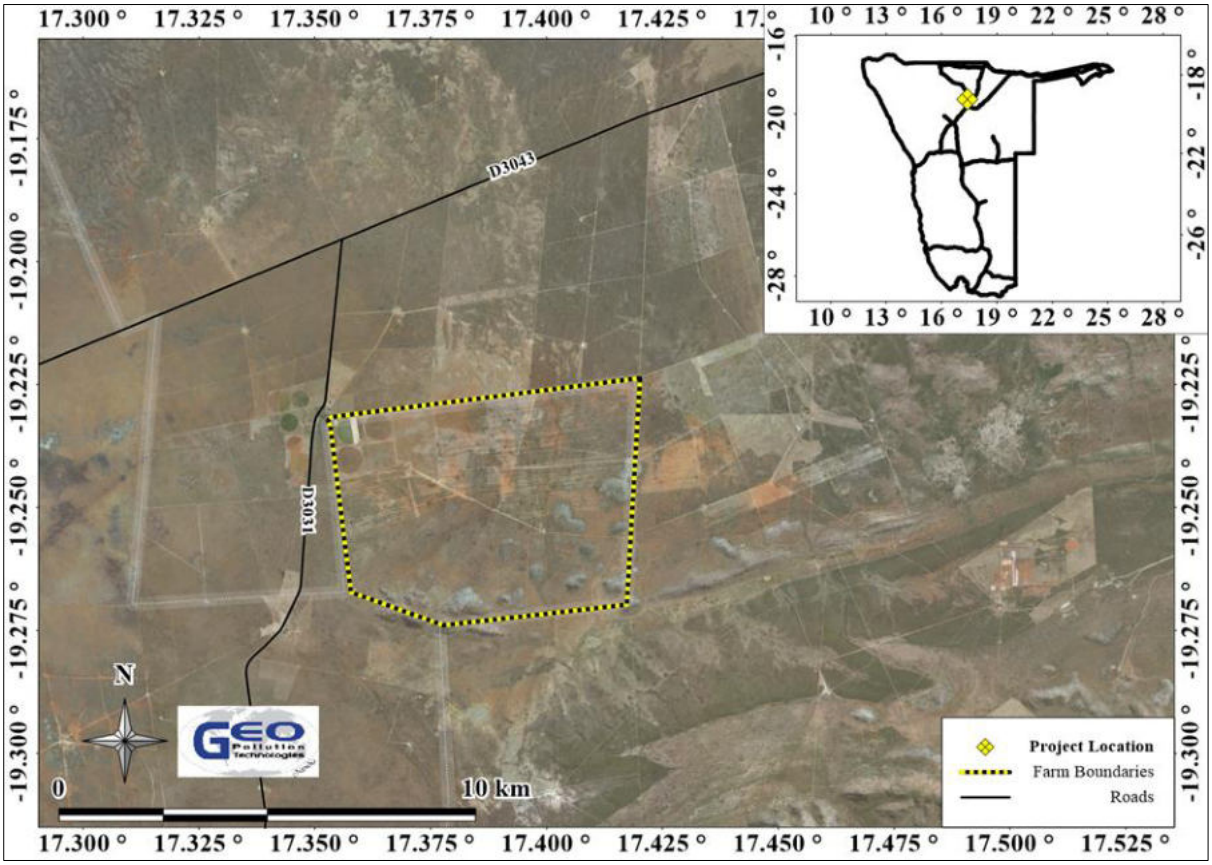

Figure 1-1 Project Location

A brief risk assessment was undertaken in 2020 (Botha et al. 2020) to determine the potential impact of the operations, maintenance / construction, and possible decommissioning phases of the project on the environment. The environment being defined in the Environmental Assessment Policy and 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".

The updated environmental management plan was prepared in support of an environmental clearance certificate in compliance with Namibia's Environmental Management Act (Act No 7 of 2007) (EMA).

Project Justification – Intensive commercial agriculture has long been practiced on Farm Guinas-See and agriculture is a very important sector in Namibia. According to the National Development Plan 5 (NDP5), although agriculture contributes only 3.8% to GDP, it supports 70% of the Namibian population and employs a third of the working force. One of the key strategies of the NDP5 is to increase agricultural production of cereals and horticulture. The sorghum (cereals) produced on the farm, informally known as cow candy, is however currently only used as animal feed on the farm. Farm Guinas-See contributes to local food security and revenue generation by supplying local markets with crops (maize) while employment and housing are provided to local Namibians.

Benefits of the agricultural activities on Farm Guinas-See:

- Feed and food production for local markets and contribution to food security in Namibia,
- Employment and skills development,
- Generation of income contributing to the national treasury,
- Support for economic resilience in the area through diversified business activities and opportunities.

2 SCOPE

The scope for the preparation of the updated EMP is:

1. To update the potential environmental impacts emanating from the operational and possible decommissioning activities of the agriculture activities,
2. To update existing and identify new management actions which could mitigate the potential adverse impacts to acceptable levels,
3. Comply with the requirements of EMA,
4. Provide sufficient information to the relevant competent authority and the Ministry of Environment, Forestry and Tourism (MEFT) to make an informed decision regarding the renewal of the ECC for the operations and possible decommissioning of the facility.

3 METHODOLOGY

The following methods were used to update the EMP investigate the potential impacts on the social and natural environment due to the construction and operations of the facility:

1. Baseline information about the site and its surroundings was updated using secondary information.
2. Potential environmental impacts emanating from the operations and decommissioning of the facility were updated, as were possible enhancement measures for positive impacts and mitigation / preventative measures for negative impacts.
3. The updated EMP was prepared to be submitted to the MEFT.

4 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 4-1 to Table 4-3 govern the environmental assessment process in Namibia and/or are relevant to the development.

Table 4-1. Namibian law applicable to the project

Law	Key Aspects
The Namibian Constitution	♦ 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	♦ 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
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	♦ Commencement of the Environmental Management Act ♦ List activities that requires an environmental clearance certificate ♦ Provide Environmental Impact Assessment Regulations
Nature Conservation Ordinance 4 of 1975 Including all amendments: Government Notice: 117 of 1976; 115 of 1978 77 of 1985; 75 of 1987; 90 of 1988; 131 of 1996 Nature Conservation Amendment Ordinance 4 of 1977; 16 of 1980; 27 of 1986 Nature Conservation Amendment Act: 6 of 1988; 17 of 1988; 31 of 1990; Act 5 of 1996.	♦ To consolidate and amend the laws relating to the conservation of nature; the establishment of game parks and nature reserves; the control of problem animals; and to provide for matters incidental thereto ♦ Provides list of specially protected game, protected game (including birds) and huntable game (including birds) ♦ Provides a list protected species in annex 243
Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act Act No. 36 of 1947; Government Notice No. 1239 of 1947	♦ Governs the registration, importation, sale and use of fertilizers, farm feeds, agricultural remedies and stock remedies ♦ Various amendments and regulations
Seed and Seed Varieties Act 23 of 2018 Act No. 23 of 2018, Government Notice No. 368 of 2018	♦ Provides for restrictions on the importation of seed ♦ Not in force yet.
Petroleum Products and Energy Act Act No. 13 of 1990, Government Notice No. 45 of 1990	♦ Regulates petroleum industry ♦ Makes provision for impact assessment ♦ Petroleum Products Regulations (Government Notice No. 155 of 2000) ♦ Prescribes South African National Standards (SANS) or equivalents for construction, operation and decommissioning of petroleum facilities (refer to Government Notice No. 21 of 2002)

Law	Key Aspects
The Water Act Act No. 54 of 1956	♦ Remains in force until the new Water Resources Management Act comes into force ♦ Defines the interests of the state in protecting water resources ♦ Controls water abstraction and the disposal of effluent ♦ Numerous amendments
Water Resources Management Act Act No. 11 of 2013	♦ Provide for management, protection, development, use and conservation of water resources ♦ Prevention of water pollution and assignment of liability ♦ Not in force yet
Forest Act (Act 12 of 2001, Government Notice No. 248 of 2001)	♦ Makes provision for the protection of the environment and the control and management of forest fires ♦ Provides the licencing and permit conditions for the removal of woody and other vegetation as well as the disturbance and removal of soil from forested areas
Forest Regulations: Forest Act, 2001 Government Notice No. 170 of 2015	♦ Declares protected trees or plants ♦ Issuing of permits to remove protected tree and plant species.
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	♦ 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	♦ 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	♦ 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	♦ 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)	♦ Not in force yet ♦ Provides for prevention and control of pollution and waste ♦ Provides for procedures to be followed for licence applications
Soil Conservation Act Act No. 76 of 1969	♦ Law relating to the combating and prevention of soil erosion, the conservation, improvement and manner of use of the soil and vegetation and the protection of the water sources in Namibia

Law	Key Aspects
Biosafety Act	♦ Regulate activities involving the research, development, production, marketing, transport, application and other uses of genetically modified organisms and specified products derived from genetically modified organisms ♦ Prohibits planting of genetically modified organisms without registration

Table 4-2. Relevant multilateral environmental agreements for Namibia and the project

Agreement	Key Aspects
Stockholm Declaration on the Human Environment, Stockholm 1972.	♦ 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.
United Nations Framework Convention on Climate Change (UNFCCC)	♦ 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	♦ Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity.
International Treaty on Plant Genetic Resources for Food and Agriculture, 2001	♦ Promote conservation, exploration, collection, characterization, evaluation and documentation of plant genetic resources for food and agriculture ♦ Promote the sustainable use of plant genetic resources for food and agriculture.

Table 4-3. Standards or codes of practise

Standard or Code	Key Aspects
South African National Standards (SANS)	♦ The Petroleum Products and Energy Act prescribes SANS standards for the construction, operations and demolition of petroleum facilities ♦ SANS 10089-3:2010 is specifically aimed at storage and distribution of petroleum products at fuel retail facilities and consumer installations ♦ SANS 10131: 2004 aimed at above-ground storage tanks for petroleum products ♦ Provide requirements for spill control infrastructure.
National Climate Change Strategy & Action Plan, 2013 – 2020 Republic of Namibia, Ministry of Environment and Tourism	♦ The strategy aims to develop, identify and disseminate climate resilient crop farming practices ♦ Aims to ensure water resources are sustained and to ensure monitoring and data collecting technologies of surface and underground water are developed and implemented at basin/watershed level ♦ Promote conservation and sustainable utilisation of water resources.

Listed activities which require an ECC application (Govern Regulation No 29 of 2012) related to this project include the following:

Section 7 of Government Notice No. 29 of 2012: Agriculture and Aquaculture Activities

♦ 7.4 The import, processing and transit of genetically modified organisms. The Proponent may consider to plant genetically modified maize.

- 7.5 Pest control: The Proponent will use conventional pest control products as approved by the Namibian government for some of the produce. All pest control measures are typical to the agricultural sector in Namibia.

Section 8 of Government Notice No. 29 of 2012: Water Resource Developments

- 8.1 The abstraction of ground or surface water for industrial or commercial purposes. Water is abstracted from Lake Guinas for irrigation purposes.
- 8.7 Irrigation schemes for agriculture excluding domestic irrigation. Operations are not part of any irrigation scheme. The irrigation of crops through centre pivot irrigation systems are however for commercial purposes.

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. The Proponent stores fuel for the use of agricultural implements and therefore has a consumer fuel installation.
- 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. The Proponent stores fuel and has a consumer fuel installation.

5 ENVIRONMENTAL CHARACTERISTICS

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

5.1 LOCALITY AND SURROUNDING LAND USE

Farm Guinas-See FMB/00445 (19.236583°S; 17.360884°E) is located approximately 35 km directly west of Tsumeb and 45 km north of Otavi. The farm is accessed via the D3031 Road and is situated close to the regional divide between the Otjozondjupa and Oshikoto Regions. The consolidation of the farm with the neighbouring property Seringboom 460 ensured that the consolidated property, known as Farm Guinas See 1403 falls within the Oshikoto Region. All adjacent properties are farms and land use mainly comprise agriculture. Adjacent properties are listed in Table 5-1.

Table 5-1. Adjacent properties

Number on Map	Direction from Guinas-See	Farm	Landuse
1	North	Guinas Weide FMB/00456	Agriculture
2	Northeast	Gras Vlakte FMB/00457	Agriculture
3	East	Seringboom FMB/00460	Agriculture
4	Southeast	Wandelberg FMB/00462	Agriculture
5	South	Vogelberg FMB/00463	Agriculture
6	Southwest	Guinaspoh / Ebenaeser FMB/00464	Agriculture
7	West	Guinas FMB/00454/00001	Agriculture
8	West	Guinas FMB01126	Agriculture
9	Northwest	Guinas FMB/00454/00002	Agriculture

5.2 CLIMATE

The farm is situated in a semi-arid climatic region. Days are mostly warm with very hot days during the summer months, while nights are generally cool. Rainfall occurs from October to April. The highest rainfall is normally received during the months of January, February and March, whilst July and August are generally dry. Average annual rainfall received in area is high compared to most of Namibia and it ranges between 450 and 500 mm/a, with a rainfall variability

of 30%. The average annual evaporation rate exceeds 2,800 mm/a. Table 5-2 contains a summary of climate conditions for the area.

Table 5-2. Summary climate data

Precipitation	450-500
Variation in annual rainfall (%)	< 30
Average annual evaporation (mm/a)	2,800-3,000
Water deficit (mm/a)	1,701-1,900
Temperature (°C)	21-22

5.3 TOPOGRAPHY AND DRAINAGE

The project area forms part of the Karstveld Landscape, with Kalahari surface deposits. The farm forms part of the Otavi Mountain Land which is dominated by hills rising to 500 m above the surrounding plains, with major east-west trending valleys with relatively flat valley bases. This is evident mostly to the south of the farm.

Drainage is poorly developed in the area. The site falls within the catchment of the Etosha Pan. The development of sinkholes, dolines and caves are common in the area, notably Lake Guinas at the north-western corner of the farm. Lake Guinas is similar to Lake Otjikoto, being a sinkhole, in which the groundwater is exposed.

5.4 GEOLOGY AND HYDROGEOLOGY

The geology underlying the farm formed during the Quaternary-, Tertiary- and Namibian Age. The geology from the Quaternary and Tertiary ages comprise of the Kalahari Group deposits which consists of sand, calcrete and gravel. The Kalahari Group sediments originate mainly from fluvial deposition with some reworking through aeolian processes. The Kalahari Group sediments locally overlie pre-Kalahari rocks, of Namibian Age. The Damara Sequence (Namibian Age) consist locally of the Mulden- and Otavi Groups. The Mulden Group comprises locally of arenite, subgreywacke and conglomerate of the Tschudi Formation and overlies the Otavi Group. The Otavi Group is made up of dolomite, limestone, shale, breccia and chert from the Tsumeb Subgroup.

According to DWAF (2006) the farm is located inside the Tsumeb-Otavi-Grootfontein Subterranean Water Control Area, Government Notice 1969 of 13 November 1970 and Proclamation 278 of 31 December 1976 (Extension). The farm also falls under a sub-division of the water control area (Guinas - B1), known as the western half of the Tsumeb-Abenab Synclinorium sub-catchment. Government regulates groundwater usage in this area and all other groundwater related activities like drilling, cleaning or deepening of boreholes and rates of water abstraction. All groundwater remains property of the Government of Namibia.

5.5 PUBLIC WATER SUPPLY

The only current available water supply in the area is groundwater (including water abstracted from Lake Guinas and Lake Oshikoto). Water is supplied to Tsumeb (the nearest town to the project area) by the municipality from boreholes roughly grouped in 3 areas: Extension 8, Nomtsoub and Extensions 6 and 7. The boreholes in the Nomtsoub Group have the highest yields. The projects area falls within the catchment of the Tsumeb Aquifer. The majority of farms surrounding the project area rely on Lake Guinas or boreholes installed on the farms for water supply.

5.6 FAUNA AND FLORA

The farm falls within the Savanna Biome with a Karstveld vegetation and Woodland structure. Namibia's biodiversity pattern is characterised by low species diversity, but high endemism, in the west while high species diversity, but low levels of endemism, is present in the central north and the northeast. Plant and animal diversity on Farm Guinas See would thus be expected to be relatively high in undisturbed areas, but with low endemism.

5.7 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

Prior to the farm being consolidated into one property with the surrounding farm, the property fell within the Otjozondjupa Region with a population of 143,903 and a density of approximately 1.4 people per km^2 (National Planning Commission, 2012). After consolidation of the farms, the area now falls in the Oshikoto Region. The Oshikoto Region has a population of 181,973 and a density of approximately 4.7 people per km^2 (National Planning Commission, 2012).

6 ENVIRONMENTAL MANGEMENT PLAN

The EMP provides management options to ensure impacts of the farm 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 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 farm 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 related to operational and construction activities of the operations;
- to prescribe the best practicable control methods to lessen the environmental impacts associated with the operations;
- 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.

Various potential and definite impacts will emanate from the operations and possible future decommissioning phases. The majority of these impacts can be mitigated or prevented. The impacts with prevention and mitigation measures are listed below. Impacts related to the operational phase are expected to mostly be of medium to low significance and can mostly be mitigated to have a low significance. The extent of impacts are mostly site specific to local and are not of a permanent nature. Due to the nature of the surrounding areas, cumulative impacts are possible and include groundwater contamination and traffic impacts.

6.1.1 Planning

During the phases of planning for the operations, maintenance / construction and decommissioning phases of the operations, it is the responsibility of the 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, maintenance / construction and decommissioning activities of the project remains valid. These include the consumer fuel installation certificate, the water abstraction permit as well as the necessary authorisation from the National Commission on Research Science and Technology for the cultivation of any genetically modified produce.
- 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 Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.
- Make provision for a community liaison officer to deal with complaints.
- 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 health safety and environment (HSE) manuals;
    - Adequate protection and indemnity insurance cover for incidents;
    - Comply with the provisions of all relevant labour and safety standards;
    - Procedures, equipment and materials required for emergencies.
- If one has not already been established, establish and maintain a fund for future ecological 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 reporting system to report on aspects of operations, maintenance / construction, and decommissioning as outlined in the EMP.
- Submit monitoring reports to MEFT every six months to allow for future environmental clearance certificate renewal applications. This is a requirement by MEFT.
- Appoint a specialist environmental consultant to update the EMP and apply for renewal of the environmental clearance certificate prior to expiry.

6.1.2 Skills and Development

During the operations and maintenance / construction phases some training is provided to a portion of the workforce to be able to conduct certain tasks according to the required standards. Skills are periodically transferred to an unskilled workforce for general tasks. Development of people and technology are key to economic development. Agricultural activities on farm Guinas-See plays a role in promoting and sustaining the agricultural industry.

Desired Outcome: To see an increase in skills of local Namibians, as well as development and technological advancements in the agriculture industry.

Actions

Mitigation:

- If the skills exist locally, employees and contractors must first be sourced from the 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
- Contractors

Data Sources and Monitoring:

- Record should be kept of training provided.
- Ensure that all training is certified or managerial references provided (proof provided to the employees) inclusive of training attendance, completion and implementation.

6.1.3 Revenue Generation and Employment

Skilled and unskilled labour are required for the operations and maintenance / construction activities associated with the farm. Revenue is generated through the sale of agricultural products on national markets. According to the National Development Plan 5 (NDP5), although agriculture contributes only 3.8% to GDP, it supports 70% of the Namibian population and employs a third of the working force. One of the key strategies of the NDP5 is to increase horticulture.

Desired Outcome: Contribution to national treasury and provision of employment to local Namibians. Create a competitive environment to enhance service delivery to the area.

Actions

Mitigation:

- 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.

6.1.4 Demographic Profile and Community Health

The project is reliant on labour during the various phases. The scale of the project is limited and it has not created a large change in the demographic profile of the local community. Community health may be exposed to factors such as communicable disease like HIV/AIDS as well as alcoholism/drug abuse. These are typically aggravated during the presence of seasonal employees, and possible foreign construction teams and contractors. An increase in foreign people in the area may potentially increase the risk of criminal and socially/culturally deviant behaviour. However, such trends are considered unlikely.

Desired Outcome: To prevent the occurrence of social ills and prevent the spread of diseases such as HIV/AIDS.

Actions:

Prevention:

- Employ only local people from the area, deviations from this practice should be justified appropriately.
- Adhere to all local authority by-laws relating to environmental health which includes, but is not limited to, sanitation requirements.

Mitigation:

- Educational programmes for employees on various topics of social behaviour and HIV/AIDs and general upliftment of employees' social status.
- Appointment of reputable contractors.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Bi-annual summary report based on educational programmes and training conducted.
- Bi-annual report and review of employee demographics.

6.1.5 Agricultural Produce and Economic Diversification

The project is in line with Namibia's NDP 5, and contributes to the economy and food security on Namibia. The project increases the amount of crops produced locally, thereby decreasing the need to import crops.

Desired Outcome: Maximum contribution to the security and economy of Namibia. Provide a positive contribution to the trade balance of Namibia by reducing the amount of produce that needs to be imported.

Actions:

Enhancement:

- Local employees should be coached on sustainable farming practices to enable the spread of knowledge and skills and thereby increasing the productivity of small-scale farming as well.
- Sustainability of the farm must be studied through careful monitoring of conditions to optimise the system.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Record should be kept of educational programmes and training conducted.
- Records to be kept in bi-annual report.

6.1.6 Traffic

Potential traffic impacts will mostly be limited to the turnoff from the main road (B1) and along the gravel road (D3043) to the farm. The traffic is mostly related to the transport of staff, the delivery of fertilizers, seed, etc., as well as the transport of crops to markets during harvesting time. As this is an existing operation, an increase in traffic impacts is not expected.

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

Actions

Mitigation:

- If any traffic impacts are expected, possibly as a result of delivery of equipment or construction material, traffic management should be performed to prevent these.
- The placement of signs to warn and direct traffic will mitigate traffic impacts.

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 every six months of all incidents reported, complaints received, and action taken.

6.1.7 Health, Safety and Security

Activities associated with operations and maintenance / construction is reliant on human labour and therefore health and safety risks exist. Activities such as the operation of vehicles and machinery as well as handling of hazardous chemicals with inherent health risks pose risks to employees. Encounters with wild animals and especially venomous species like snakes may pose risks to personnel on site. Security risks will be related to unauthorized entry, theft and sabotage.

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

Actions

Prevention:

- All health and safety standards specified in the Labour Act should be complied with.
- Clearly label dangerous and restricted areas as well as dangerous equipment and products.
- Equipment and goods locked away on site must be placed in a way that does not encourage criminal activities (e.g. theft).
- Provide all employees with required and adequate personal protective equipment (PPE) where required.
- Ensure that all personnel receive adequate training on operation of equipment and machinery / handling of hazardous substances.
- Personnel should be encouraged to, during times of mosquito activity, take measures to prevent mosquito bites including wearing long sleeved clothing, applying insect repellents and sleeping under mosquito nets.
- Implementation of maintenance register for all equipment and fuel/hazardous substance storage areas.
- All industry specific health and safety procedures and regulations applicable to the handling of produce for markets should be in place and adhered to.

Mitigation:

- Selected personnel should be trained in first aid and a first aid kit must be available on site. The contact details of all emergency services must be readily available.
- Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool.
- Educate staff on the symptoms of malaria and encourage them to report such symptoms.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

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

6.1.8 Fire

Construction activities, fuel storage, failing electrical infrastructure and fires outside of designated areas may increase the risk of the occurrence of uncontrolled fires which may spread into the nearby fields and surrounding farms.

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

Actions:

Prevention:

- Ensure all chemicals are stored according to MSDS and SANS instructions and all spills / leaks are cleaned.
- Maintain regular site, mechanical and electrical inspections and maintenance.
- Clean and maintain fire breaks at strategic locations around the property.
- Should firebreaks be made, the farmers' association, fire brigade as well as all surrounding farmers should be notified prior to commencement.
- Fire used for purposes such as cooking (by staff) must only be allowed within designated areas.
- Follow SANS standards for the operations and maintenance of the consumer fuel installation.

Mitigation:

- A holistic fire protection and prevention plan is needed. This plan must include evacuation plans and signage, an emergency response plan and a firefighting plan.
- Maintain firefighting equipment and promote good housekeeping.
- Personnel training (firefighting, fire prevention and responsible housekeeping practices).

Responsible Body:

- Proponent
- Contractors

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 every six months of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given.

6.1.9 Noise

Noise will be generated due to the operation of machinery, and vehicles accessing the site. Construction and maintenance activities may increase the amount of noise generating activities which may lead to hearing loss in workers.

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

Actions

Prevention:

- Follow World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment.
- All machinery must be regularly serviced to ensure minimal noise production.

Mitigation:

- Hearing protectors as standard PPE for workers in situations with elevated noise levels.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- WHO Guidelines.
- Maintain a complaints register.
- Bi-annual report on complaints and actions taken to address complaints and prevent future occurrences.

6.1.10 Waste production

Various waste streams are produced during the operational and construction / maintenance phases. Waste may include hazardous waste associated with hydrocarbon products and chemicals, and soil and water contaminated with such products. Empty chemical containers, such as pesticide containers should be treated as hazardous waste. Domestic waste will be generated by the operations. Waste presents a contamination risk and when not removed regularly may become a health and / or fire hazard.

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 disposal storage facilities are available, which prevents contaminants potentially leaching from the waste entering the environment.
- Ensure waste cannot be blown away by wind.
- Prevent scavenging (human and non-human) of waste at the storage facilities.

Mitigation:

- Waste should be disposed of regularly and at appropriately classified disposal facilities, this includes hazardous material (empty chemical containers, contaminated materials, soil and water).
- Empty chemical containers that may present a contamination / health risks must rinsed (triple rinsing procedure) prior to disposal at a classified facility.
- Liaise with the applicable municipality 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/operations.
- 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.

6.1.11 Ecosystem and Biodiversity Impact

Agriculture and related activities is ongoing on the farm, therefor no further impacts on vegetation is expected. Pollution of the environment and the overutilization of water sources may however impact on the ecosystem and biodiversity. Poaching and illegal collection of plant and animal materials may occur.

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

Actions.

Prevention:

- If trees are to be removed at any stage, the necessary permits from the Ministry of Environment, Forestry and Tourism must be obtained for removal of all protected species.
- Educate all contracted and permanent employees on the value of biodiversity.
- Strict conditions prohibiting harvesting and poaching of fauna and flora should be part of employment contracts. This includes prohibitions or regulations on the collection of firewood.
- Regular inspection of fences and staff premises for snares, traps or any other illegal activities.
- Disciplinary actions to be taken against all employees failing to comply with contractual conditions related to poaching and the environment.

Mitigation:

- Report any extraordinary animal sightings to the Ministry of Environment, Forestry and Tourism.
- Mitigation measures related to waste handling, groundwater availability and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- Avoid scavenging of waste by fauna.

Responsible Body:

- Contractor
- Proponent

Data Sources and Monitoring:

- All relevant information and reporting to be included in a bi-annual report.

6.1.12 Groundwater, Surface Water and Soil Contamination

Leakages and spillages of hazardous substances from earthmoving vehicles and accidental fuel, oil or hydraulic fluid spills during the construction phase. Increase of nutrient levels (from over application of fertilizers) in the soil that can leach to the groundwater. Overuse / incorrect application of pesticides and fertilisers may also pose a risk. Leakage from sewerage system.

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

Actions

Prevention:

- Appoint reputable contractors.
- Vehicles may only be serviced on a suitable spill control structure.
- Regular inspections and maintenance of all vehicles to ensure no leaks are present.
- All hazardous chemicals should be stored in a sufficiently bunded area.
- Follow prescribed dosage of fertilizers and pesticides and to avoid over application.
- Maintain sewerage systems and conduct regular monitoring.
- All hazardous waste must be removed from the site and disposed of timeously at a recognised hazardous waste disposal facility, including any polluted soil or water

Mitigation:

- All spills must be cleaned up immediately.
- Consult relevant Material Safety Data Sheet information and a suitably qualified specialist where needed

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Maintain Material Safety Data Sheets for hazardous chemicals.
- Soil should be sampled and analysed annually to ensure the correct amounts of fertilizer is applied and soil and groundwater quality is maintained.
- Groundwater should be sampled and analysed to test for nitrate concentrations from the fertilizer and for traces of chemicals used in pesticides and herbicides.
- Registers be kept by the farmers on the type, quantities and frequency of application of fertiliser, pesticides and any other chemicals utilised in crop production.
- 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.
- All spills or leaks must be reported on to management and cleaned up immediately.

6.1.13 Groundwater Abstraction

The over abstraction of groundwater / surface water for irrigation and other activities may result in the lowering of the water table. This may lead to the collapse of underground cave roofs where the hydrostatic pressure used to support the roof of a cave decrease, as well as an increase in karst structures. Lowering of water tables may further lead to the drying up of boreholes, springs, underground caves and the subsequent loss of organisms that lives in the subsurface and surface water. Vegetation will also be impacted where such vegetation has access to groundwater. Over abstraction by surrounding users may contribute to the decline in water levels (cumulative impact).

Desired Outcome: To utilise the groundwater on a sustainable base.

Actions

Prevention:

- Adhere to water abstraction permit regulations.
- Spread the water abstraction points over a larger area to diffuse the impact.
- Adhere to recommended abstraction rates provided during the borehole efficiency tests to ensure over abstraction does not take place.
- Set baseline values for abstraction, which included groundwater level and abstraction rate according to borehole efficiency tests, and install or use water monitoring devices to record water levels and usage. Reduce abstraction when the water levels nears 22 m below surface.
- To prevent unnecessary water loss all pipeline and water storage infrastructure must be inspected and maintained regularly, and over irrigation should be avoided.
- Pressure and flow censors can be installed that will shutoff water pumps if a leak is detected.

Mitigation:

- Reduce abstraction when the water levels decrease below the long-term average (use water level recording datum point as reference).

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Monthly rest water level monitoring.
- Baseline values should be reviewed every 3 years based on all historic water level data.
- 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.

6.1.14 Visual Impact

This impact relates to the aesthetic appearance of the site during operations. This impact will be minimal due to the area already being disturbed and widely utilised for agricultural activities. The impact will therefore mostly relate to poor housekeeping and waste not disposed of timeously. Operations at the farm are well kept with the highest standard of neatness and cleanliness exhibited throughout all components of the operations, inclusive of employee housing.

Desired Outcome: To minimise aesthetic impacts associated with the operations.

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
- Contractors

Data Sources and Monitoring:

- A report should be compiled every six months of all complaints received and actions taken.

6.1.15 Cumulative Impact

Possible cumulative impacts associated with the operational phase and any maintenance / construction activities are mainly linked to reduction in soil and groundwater quality and groundwater availability, some traffic impacts may also be aggravated due to the cumulative nature thereof.

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

Actions

Mitigation:

- Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- Reviewing biannual 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.

6.2 DECOMMISSIONING AND REHABILITATION

Closure and decommissioning of agricultural activities on Farm Guinas-See as a whole is not foreseen during the validity of the environmental clearance certificate or in the foreseeable future. However, it is more likely that certain components may be decommissioned. Decommissioning is therefore included for this purpose as well as the fact that construction activities may also include modification and decommissioning. Future land use after decommissioning should be assessed prior to decommissioning and rehabilitation initiated if the land would not be used for future purposes. 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. 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 WHO standards and waste should be contained and disposed of at an appropriately classified and approved waste operations and not dumped in the surrounding areas. The Environmental Management Plan for the operations will have to be reviewed at the time of full decommissioning to cater for changes made to the site and to implement guidelines and mitigation measures.

6.3 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
- The EMP.

7 CONCLUSION

Agricultural activities on Farm Guinas-See contributes positively to the agricultural sector of Namibia. Food and fodder is produced for national markets and own use. It provides employment opportunities and skills development to a local workforce. Revenue is generated that contributes to the Namibian economy.

Negative impacts associated with the operations and maintenance / construction activities can successfully be mitigate by implementing strict monitoring and control methods. All regulations relating to agriculture and health and safety legislation should be implemented. Groundwater and soil pollution must be prevented at all times. Mitigation measures relating groundwater abstraction should be adhered to, this included adherence to water abstraction permit requirements. Fire prevention should be key and fire response plans must be in place. All staff must be made aware of the importance of biodiversity and the poaching or illegal harvesting of animal and plant products prohibited. Any waste produced must be removed from site and disposed of at an appropriate operations or re-used or recycled where possible. Hazardous waste must be disposed of at an approved hazardous waste disposal site.

The EMP should be used as an on-site reference document for the operations of the farm. 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 EMS in

conjunction with the environmental management plan. All operational personnel must be taught the contents of these documents.

Should the Directorate of Environmental Affairs (DEA) of the MEFT find that the impacts and related mitigation measures, which have been proposed in this report, are acceptable, the ECC may be renewed. The ECC issued based on this EMP, will render the EMP a legally binding document to which the Proponent should adhere to at all times.

8 REFERENCES

Botha P, Bosman Q, van der Merwe J, Brunette C, Coetzer W, Faul A. 2019 November; Irrigation Activities of Henning Crusher on Farm Guinas-See 1403, Oshikoto Region: Environmental Assessment Scoping Report

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.

National Planning Commission, 2012. Namibia 2011 Population and Housing Census – Preliminary Results

Appendix A: Consultant Curriculum Vita

ENVIRONMENTAL ASSESSMENT PRACTITIONER **Quzette Bosman**

Quzette Bosman has 16 years' experience in the Impact Assessment Industry, working as an Environmental Assessment Practitioner and Social Assessment practitioner mainly as per the National Environmental Legislation sets for South Africa and Namibia. Larger projects have been completed in terms of World Bank and IFC requirements. She studied Environmental Management at the Rand Afrikaans University (RAU) and University of Johannesburg (UJ), including various Energy Technology Courses. This has fuelled a passion towards the Energy and Mining Industry with various projects being undertaken for these industries. Courses in Sociology has further enabled her to specialize in Social Impact Assessments and Public Participation. Social Assessments are conducted according to international best practise and guidelines. Work has been conducted in South Africa, Swaziland and Namibia.

CURRICULUM VITAE QUZETTE BOSMAN

Name of Firm	:	Geo Pollution Technologies (Pty) Ltd.
Name of Staff	:	QUZETTE BOSMAN
Profession	:	Social Impact Assessor / Environmental Assessment Practitioner
Years' Experience	:	16
Nationality	:	South African
Position	:	Senior Environmental Consultant
Specialisation	:	ESIA & ESMP; SIA
Languages	:	Afrikaans – speaking, reading, writing – excellent English – speaking, reading, writing – excellent German –speaking, reading - fair

First Aid Class A	EMTSS, 2017
First Aid LSM	OSH-Med International 2022
Basic Fire Fighting	EMTSS, 2017
Basic Industrial Fire Fighting	OSH-Med International 2022

EDUCATION AND PROFESSIONAL STATUS:

BA	Geography & Sociology	:	Rand Afrikaans University, 2003
BA	(Hons.) Environmental Management	:	University of Johannesburg, 2004

PROFESSIONAL SOCIETY AFFILIATION:

Namibian Environment and Wildlife Society
International Association of Impact Assessors South Africa (IAIA SA)
Member 2007 - 2012
Mpumalanga Branch Treasurer 2008/2009

OTHER AFFILIATIONS
Mkhondo Catchment Management Forum (DWAF): Chairperson 2008-2010
Mkhondo Water Management Task Team (DWAF): Member 2009

AREAS OF EXPERTISE:

Knowledge and expertise in:

- environmental impact assessments
- project management
- social impact assessment and social management planning
- community liaison and social monitoring
- public participation / consultation, social risk management
- water use licensing
- environmental auditing and compliance
- environmental monitoring
- strategic environmental planning

EMPLOYMENT:

2015 - Present	:	Geo Pollution Technologies – Senior Environmental Practitioner
2014-2015	:	Enviro Dynamics – Senior Environmental Manager
2010 - 2012	:	GCS – Environmental Manager (Mpumalanga Office Manager)
2007 - 2009	:	KSE-uKhozi - Technical Manager: Environmental
2006 -2007	:	SEF – Environmental Manager
2004 - 2005	:	Ecosat – Environmental Manager

PUBLICATIONS:

Contract reports	: +190
Publications	: 1