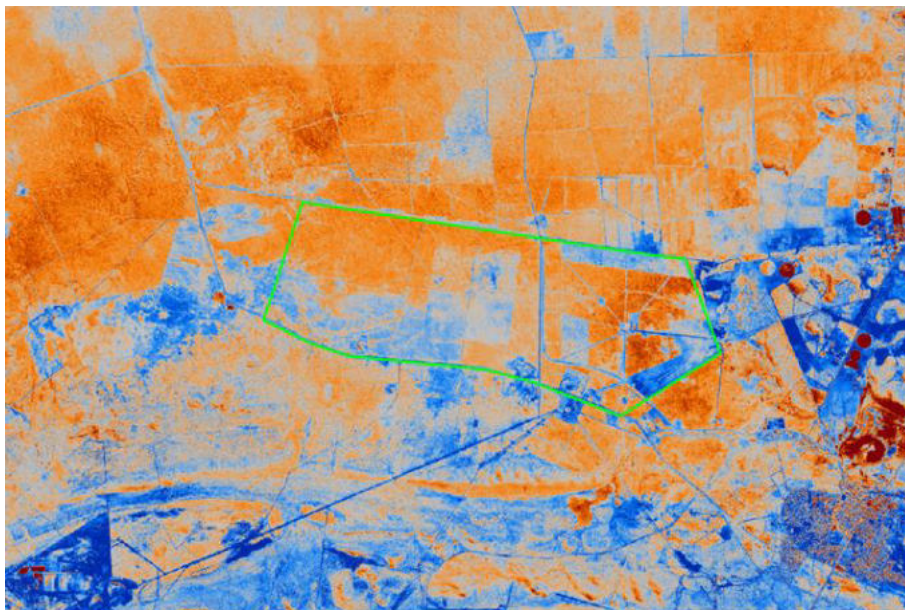


APP-001521
IRRIGATION ACTIVITIES OF HENNING CRUSHER ON
STEINQUELLE, OSHIKTOT REGION

UPDATED ENVIRONMENTAL MANAGEMENT PLAN



Assessed by:

Assessed for:



Henning Crusher (Pty) Ltd

May 2023

Project:	IRRIGATION ACTIVITIES OF HENNING CRUSHER ON STEINQUELLE, OSHIKOTO REGION: UPDATED ENVIRONMENTAL MANAGEMENT PLAN	
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1 BACKGROUND AND INTRODUCTION

Geo Pollution Technologies (Pty) Ltd was appointed by Henning Crusher (Pty) Ltd, to apply for a renewal of their existing environmental clearance certificate (ECC) for their agricultural activities on Portion 23 (Steinquelle) of Consolidated Farm Tsumore No. 761 in the Tsumeb District, Oshikoto region (Figure 1-1). To renew the ECC, an updated environmental management plan (EMP) (this document) was prepared for continued operations. Operations mainly involve installation of centre pivot irrigation system, preparation of soil, planting, abstraction of water, irrigation, harvesting, processing and storage of produce.

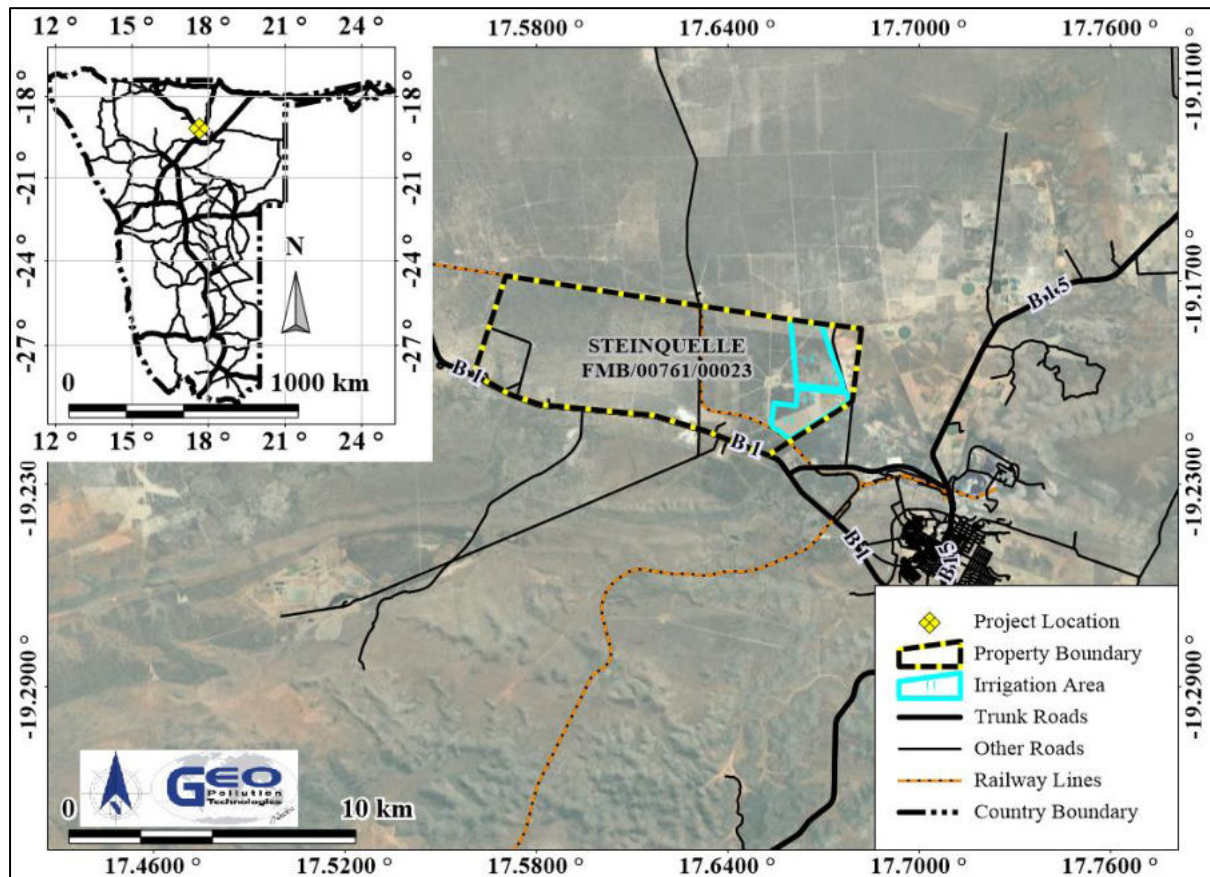


Figure 1-1 Project location

A brief risk assessment was undertaken to determine and update the potential impacts of the operational, maintenance (repairs, upgrades, replacements, etc.) and possible decommissioning phases of the operations on the environment. 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”

Project Justification – Intensive commercial agriculture has long been practiced in Namibia in areas with reliable water sources. It is a very important sector in Namibia in terms of feed and food production, employment and livelihoods, and revenue generation. Agriculture contributes 3.8% to gross domestic product of Namibia, but it supports 70% of the Namibian population and employs a third of the work force. One of the key strategies of the NDP5 is to increase agricultural production of cereals and horticulture. Henning Crusher’s planned irrigation development will contribute to feed and food production in Namibia.

Benefits of proposed irrigation activities include:

- ◆ 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 of the updated EMP is to:

- ◆ Determine the potential environmental impacts emanating from the proposed irrigation project.
- ◆ Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels.
- ◆ Comply with the requirements of EMA.
- ◆ Provide sufficient information to the relevant competent authority and Ministry of Environment, Forestry and Tourism (MEFT) to make an informed decision regarding the operations, maintenance and possible decommissioning.

3 METHODOLOGY

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

- ◆ Baseline information about the site and its surroundings was obtained from existing secondary information and the previous environmental assessment and EMP conducted for operations.
- ◆ Potential environmental impacts emanating from the operations and decommissioning of operations were determined and possible enhancement measures were listed for positive impacts while mitigation / preventative measures were provided for negative impacts.
- ◆ An updated environmental management plan was prepared to be submitted to the MEFT.

4 OPERATIONS AND RELATED ACTIVITIES

Steinquelle has been under ownership of Henning Crusher for more than 25 years. During this period the area was used for livestock grazing as well as for sand mining and quarrying operations. The quarrying operations has a separate environmental clearance certificate and a separate related and approved environmental management plan. The updated EMP focusses only on proposed irrigation activities related to Steinquelle.

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 1 to Table 3 govern the environmental assessment process in Namibia and/or are relevant to the activities on the farm.

Table 1. Namibian law applicable to the development

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
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	<ul style="list-style-type: none"> ◆ 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	<ul style="list-style-type: none"> ◆ 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	<ul style="list-style-type: none"> ◆ 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	<ul style="list-style-type: none"> ◆ Provides for restrictions on the importation of seed ◆ Not in force yet

Law	Key Aspects
The Water Act Act No. 54 of 1956	<ul style="list-style-type: none"> ◆ 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	<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 ◆ Not in force yet
Forest Act (Act 12 of 2001, Government Notice No. 248 of 2001)	<ul style="list-style-type: none"> ◆ 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	<ul style="list-style-type: none"> ◆ Declares protected trees or plants ◆ Issuing of permits to remove protected tree and plant species
Soil Conservation Act Act No. 76 of 1969	<ul style="list-style-type: none"> ◆ 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
Biosafety Act Act No. 7 of 2006	<ul style="list-style-type: none"> ◆ 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
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
Public Health Act Act No. 36 of 1919	<ul style="list-style-type: none"> ◆ Provides for the protection of health of all people
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)

Law	Key Aspects
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 2. 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
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
International Treaty on Plant Genetic Resources for Food and Agriculture, 2001	<ul style="list-style-type: none"> ◆ 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 3. Standards or codes of practise

Standard or Code	Key Aspects
National Climate Change Strategy & Action Plan, 2013 – 2020 Republic of Namibia, Ministry of Environment and Tourism	<ul style="list-style-type: none"> ◆ 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

The agricultural and related activities that are listed as activities requiring an environmental clearance certificate are (Government Notice No. 29 of 2012):

7. Agriculture and Aquaculture Activities

- ◆ 7.5 Pest control (Crop cultivation will require a pest control through the application of approved Namibian pesticides. A pesticide management plan will be established by a related specialist and details annual pesticide requirements)

8. Water Resource Developments

- ◆ 8.1 The abstraction of ground or surface water for industrial or commercial purposes. (Abstraction of groundwater for the commercial production of crops.)
- ◆ 8.6 Construction of industrial and domestic wastewater treatment plants and related pipeline systems. (French drains for domestic use)
- ◆ 8.7 Irrigation schemes for agriculture excluding domestic irrigation. (No *irrigation scheme* will be developed, however, *irrigation systems* are used on the farm. Irrigation on the farm does not contribute to /or is part of any irrigation scheme as proclaimed by the Namibian Government.)

6 OBJECTIVES OF THE EMP

The Environmental Management Plan (EMP) provides management options to ensure impacts of the agricultural operations 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 EMP acts as a stand-alone document, which can be used during the various phases (operational and decommissioning) of the agricultural project. All employees, contractors and sub-contractors taking part in the operational phases should be made aware of the contents of the EMP, so as to plan the relevant activities accordingly in an environmentally sound manner.

The objectives of the EMP are:

- ◆ to include all components of the different activities on the farm;
- ◆ to prescribe the best practicable control methods to lessen the environmental impacts associated with the operations of the farm;
- ◆ to monitor and audit the performance of operational personnel in applying such controls; and
- ◆ to ensure that appropriate environmental training is provided to all operational personnel.

The Proponent could implement an Environmental Management System (EMS) similar to for example ISO 14001. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an ISO 14001 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; and
- ◆ Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.

7 ASSESSMENT AND MANAGEMENT OF IMPACTS

7.1 RISK ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN

Various potential and definite impacts will emanate from the construction and operational phases. The majority of these impacts can be mitigated. The impacts, risk rating of impacts as well as prevention and mitigation measures are listed below.

7.2 PLANNING PHASE

Although operations are ongoing, extraction of future resource areas are still being planned and therefore the planning phase is still applicable. However, the impacts expected as being generated during the planning phase (which is inclusive of the acquiring of the ECC) relate mostly to legal, planning and economic aspects.

During the phases of planning for future operations, construction and decommissioning of the farm, 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 construction (maintenance) activities and operations of the project 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 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:
 - Risk management / mitigation / EMP/ 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.
- ◆ 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 construction activities, operations and decommissioning as outlined in the EMP.
- ◆ Submit monitoring reports every six months to allow for future environmental clearance certificate renewal application.
- ◆ Appoint an environmental consultant to update the EMP and apply for renewal of the environmental clearance certificate prior to expiry. Bi-annual monitoring report will be required by the Ministry of Environment, Forestry and Tourism for the renewal of the ECC.

7.3 CONSTRUCTION AND OPERATIONAL PHASES

The definition of construction as per the Environmental Management Act and its regulations, include care and maintenance activities. Therefore, aspects of the construction phase are foreseen to continue through the operational phase. Most of the impacts initiated in the construction have been carried forward into the operational phase. Some of these impacts have been further developed (such as potential impacts on the groundwater). Potential impacts as well as related prevention and mitigation measures are detailed in Section 7.5.

7.4 DECOMMISSIONING PHASE

Closure and decommissioning of proposed irrigation activities on farm Steinquelle 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 as development continues. 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 facility and not dumped in the surrounding areas. The environmental management plan for the farm 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.

7.5 ASSESSED IMPACTS

A description of anticipated impacts resulting from current and proposed activities is presented below. Impact ratings are provided for relevant phases while prevention, mitigation and monitoring requirements conclude each impact description.

7.5.1 Revenue Generation and Employment

Skilled and unskilled labour will be required for the construction and operational activities associated with the project. Revenue will be generated through the sale of agricultural products on national markets. An increase in food security in Namibia will take place.

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:

- ◆ Summary report based on employee records.

7.5.2 Demographic Profile and Community Health

The project will rely on labour during the construction and operational phase. The scale of the project is limited and employees will not reside at the farm, thus the activities are not expected to create 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:

- ◆ Summary report based on educational programmes and training conducted.
- ◆ Report and review of employee demographics.

7.5.3 Agricultural Produce and Economic Diversification

The project is in line with Namibia's NDP 5, and will contribute to the development of crop production under irrigation, the economy and food security in Namibia. The project will increase the amount of crops and fodder produced locally, thereby decreasing the need to import crops and adding to the trade balance.

Desired Outcome: Maximum contribution to the food 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 a bi-annual report.

7.5.4 Traffic

Potential traffic impacts will mostly be limited to the turnoff from the main road to the farm. The increase traffic is mostly related to the transport of staff, the delivery of fertilizers, seed, etc., as well as the transport of crops to markets. As traffic during the operational phase will mostly be during harvesting season for a short period, traffic impacts are expected to be minor.

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 farm as well as speed limits on the gravel roads within the farm where required.

Mitigation:

- ◆ If any traffic impacts are expected, possibly as a result of delivery of equipment or construction material, traffic management should be performed.
- ◆ 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 bi-annual report should be compiled of all incidents reported, complaints received, and action taken.

7.5.5 Health Safety and Security

Activities associated with the operations and maintenance / construction on the farm are reliant on human labour. 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 hazards pose risks to employees. Encounters with wild animals and especially venomous species like snakes may pose risks to personnel on site. Security risks relates to unauthorized entry, theft and sabotage.

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

Actions

Prevention:

- ◆ 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.
- ◆ 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 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 first aid kits must be available on site. The contact details of all emergency services must be readily available.
- ◆ 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 bi-annual report should be compiled of all incidents reported. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.

7.5.6 Fire

Construction activities, failing electrical infrastructure and fires outside of designated areas may increase the risk of the occurrence of uncontrolled fires which may spread to nearby operations 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 bi-annual report should be compiled of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given.

7.5.7 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. It is however not expected that surrounding farms will be impacted by noise generated from the operations and construction activities of the project.

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.
- ◆ Report on complaints and actions taken to address complaints and prevent future occurrences.

7.5.8 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. Construction waste may include building rubble and discarded equipment. Domestic waste will be generated by the farm and related 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 and contaminated materials, soil and water).
- ◆ Empty chemical containers that may present a contamination / health risk must be disposed of as hazardous waste. Prevent workers and other people from collecting such containers for purposes of storing water.
- ◆ Liaise with the applicable municipality regarding waste and handling of hazardous waste.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Maintain a register of hazardous waste disposal. This should include type of waste, volume as well as disposal method/facility.
- ◆ Record any complaints received regarding waste with notes on actions taken.
- ◆ All information to be included in a report.

7.5.9 Ecosystem and Biodiversity Impact

Land clearing for infrastructure and agricultural development will lead to vegetation and habitat loss, this is however expected to be minimal as the majority of the proposed area was previously impacted by debushing activities. Pollution of the environment and the overutilization of water sources may 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:

- ◆ The necessary permits from the Directorate of Forestry, Ministry of Agriculture, Water and Forestry, must be obtained for removal of all protected species.
- ◆ Where possible, removal of protected species and large indigenous trees must be avoided.
- ◆ During the construction activities, contain construction material to a designated laydown area and prevent unnecessary movement out of areas earmarked for clearing and construction.
- ◆ 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:

- ◆ For construction activities, if any, contain construction material to a designated laydown area and prevent unnecessary movement out of areas earmarked for clearing and construction.
- ◆ Report any extraordinary animal sightings to the Ministry of Environment and Tourism.
- ◆ Mitigation measures related to waste handling 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:

- ◆ Report on all extraordinary animal or plant sightings or instances of poaching.
- ◆ Keep frequent records of borehole water levels and abstracted water volumes to identify any trends or consistent reduction in water levels.
- ◆ All information and reporting to be included in a bi-annual report.

7.5.10 Groundwater, Surface Water and Soil Contamination

During construction and operations, sources will exist that may potentially pollute soil and subsequently groundwater. This include vehicles and machinery that leak oil or hydraulic fluids (e.g. tractors and harvesters). Increase of nutrient levels (from over application of fertilizers) in the soil that can leach to the groundwater, as well as excessive / incorrect application of pesticides, may also pose a risk.

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

Actions

Prevention:

- ◆ Proper training of operators of machinery and vehicles and employees must be conducted on a regular basis (spill detection, spill control).
- ◆ All vehicles / machines at the farm should be maintained to be in a good working condition during operations.
- ◆ Vehicles and machinery may only be serviced on a suitable spill control structure.
- ◆ Employ drip trays and spill kits when servicing / repairs of equipment is needed.
- ◆ Vehicles may only be refuelled at the designated areas of the adjacent mining activities.
- ◆ A pesticide plan should be compiled by a specialist and reviewed annually. This plan should be strictly followed, deviations should be approved by the specialist.
- ◆ MSDS instructions should be strictly followed for the use and application of chemicals.
- ◆ The proponent should consider and investigate conservation tillage methods, as this may reduce the amount of fertiliser and water required.

Mitigation:

- ◆ Any fuel spillage of more than 200 litre must be reported to the Ministry of Mines and Energy.
- ◆ Spill clean-up means must be readily available on site as per the relevant MSDS and spills must be cleaned up immediately.
- ◆ The spill containment (drip trays / bunding) of the chemical store must be cleaned if any products are present and this waste must be disposed of at a suitably classified hazardous waste disposal facility.
- ◆ Soil should be sampled and analysed annually to ensure the correct amounts of fertilizer is applied and soil and groundwater quality is maintained. Inputs on soil quality and fertilisation requirements can be provided by a soil specialist.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Effluent Disposal Permit
- ◆ Soil should be sampled and analysed annually to ensure the correct amounts of fertilizer is applied and soil and groundwater quality is maintained.

7.5.11 Groundwater Abstraction

The over abstraction of groundwater for irrigation and other activities may lead to declining water levels. This may negatively impacts on surrounding users as well as existing habitats that depend on groundwater. For example the availability of groundwater may have an impact on the farm and surrounding farms, as well as on a bigger scale due to the cumulative impact. Over abstraction from surrounding users may contribute to the decline in water levels (cumulative impact).

Desired Outcome: To prevent the over abstraction of groundwater.

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 sensors can be installed that will shutoff water pumps if a leak is detected.

Responsible Body:

- ◆ Department of Water Affairs, Ministry of Agriculture, Water Affairs and Forestry.
- ◆ Proponent

Data Sources and Monitoring:

- ◆ Monthly water rest water level monitoring.
- ◆ Baseline values should be reviewed every three 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.
- ◆ Bi-annual summary report based on all information.

7.5.12 Air Pollution

Excessive dust generated from the movement of heavy vehicles across the farm, as well as from the land preparation activities. Excessive dust may be generated during cultivation and tillage of soil. This will be aggravated during the dry season and periods of strong winds. Pesticides may pose a health risks if not applied correctly.

Desired Outcome: To minimise the dust generated and prevent nuisance and health impacts.

Actions

Mitigation:

- ◆ Personnel issued with dust masks and regular dust suppression if required.
- ◆ Heavy vehicles to maintain low speeds on gravel roads.
- ◆ Cultivation and tillage of soils should be prevented on windy days if practically possible.
- ◆ A complaints register should be kept for any dust related issues and mitigation steps taken to address complaints where necessary.
- ◆ Conservation tillage methods should be investigated and considered as this may minimize the amount of tillage required and dust generated.
- ◆ All chemical applications should be according to regulations and material safety data sheet instructions.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

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

7.5.13 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. This impact that not only affects the aesthetic appearance, but also the integrity of the farm.

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

Actions

Mitigation:

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

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

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

7.5.14 Impacts on Utilities and Infrastructure

Existing infrastructure and services supply like roads, pipelines and power lines may get damaged during operational, construction and maintenance activities. This may lead to services disruption in certain sections of the area.

Desired Outcome: No impact on utilities and infrastructure.

Actions

Prevention:

- ◆ Adhere to servitude restrictions around powerlines.
- ◆ Appointing qualified and reputable contractors and employees (for specific tasks) are essential.
- ◆ If applicable, the contractor must determine exactly where amenities and pipelines are situated before construction commences (utility clearance e.g. ground penetrating radar surveys).
- ◆ Liaison with the suppliers of services is essential.

Mitigation:

- ◆ Emergency procedures for corrective action available on file.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Utility maps.
- ◆ A bi-annual report should be compiled of all incidents that occurred and corrective action taken.

7.5.15 Heritage

The discovery / accidental destruction of archaeological or culturally important sites during construction and land clearing.

Desired Outcome: To prevent the damage to, or destruction of, any archaeological or culturally important (heritage) site.

Actions

Mitigation:

- ◆ If such a site or any other archaeologically important artefact is found during any phases, any work that may damage / impact the site must be halted and the relevant authorities must be informed. Firstly, the Namibian Police must be informed. Secondly, the National Monuments Council dealing with heritage should be informed. Construction work may only continue at that location once permission has been granted.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Record of any discoveries and proof of notifications to authorities on file.
- ◆ All information and reporting to be included in a bi-annual report.

7.5.16 Cumulative Impact

Possible cumulative impacts associated with the construction and operational phase are mainly linked to increased traffic, reduction in soil and groundwater quality and groundwater availability.

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

Actions

Mitigation:

- ◆ Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- ◆ Reviewing biannual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts. Planning and improvement of the existing mitigation measures can then be implemented.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

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

8 CONCLUSION

The above updated EMP, if properly implemented will help to continually minimise adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. To ensure the relevance of this document to the specific stage of project, it needs to be reviewed throughout all phases.

The EMP should continue to be used as an on-site reference document during all phases of the project, and auditing should take place in order to determine compliance with the EMP for the proposed site. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken.

Monitoring reports must be submitted to the Ministry of Environment, Forestry and Tourism every six months (bi-annually) to allow for the future renewal of the ECC.

9 REFERENCES

Botha P, Bosman Q, Coetzer W, van der Merwe J, Faul A.; 2019 December; Proposed Irrigation Activities of Henning Crusher on Steinquelle, Oshikoto Region: Environmental Assessment Scoping Report