APP-006391

KARSTEN NAMIBIA AGRICULTURAL PROJECT AUSSENKEHR, NAMIBIA

UPDATED ENVIRONMENTAL MANAGEMENT PLAN

Compiled by:

Compiled for:

September 2025

Project:	**KARSTEN NANIBIA AGRICULTURAL PROJECT, AUSSENKEHR, NAMIBIA: UPDATED ENVIRONMENTAL MANAGEMENT PLAN**	
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Report Approval	 **Quzette Bosman** **Environmental & Social Practitioner**	

I Willie Vermeulen, acting as a representative of Karsten Namibia (Pty) Ltd, confirm 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 Aussenkehr on the 10 day of September 2025.

Karsten Namibia (Pty) Ltd

CY/2004/646

Company Registration Number

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1 INTRODUCTION

Grape Alliance Namibia (Pty) Ltd (Grape Alliance) manages several properties within Namibia's table grape sector (Figure 1-1). All of the properties are located next to each other and operated as a combined farming unit. In 2018, a combined Environmental Impact Assessment (EIA) was conducted for these properties, and individual Environmental Clearance Certificates (ECCs) were subsequently obtained for each property. All of the properties complied with and renewed their ECCs in 2021 and received their renewed ECCs in 2022. In 2023, Karsten Namibia Agriculture (Pty) Ltd (the Proponent) acquired all the properties and consolidated them into a single company. The title deed for the consolidated property has only recently been obtained. Geo Pollution Technologies was appointed to conduct the application for the consolidation and renewal of the ECCs under Karsten Namibia Agriculture (Pty). The operations primarily involve the cultivation and harvesting of table grapes and include all related activities such as vineyard management, maintenance of supporting infrastructure, operation of equipment, and labour management.

The updated EMP provides management options to ensure impacts of the agricultural project 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 (development, operational and decommissioning) of the mixed agricultural farms. All employees, contractors and sub-contractors taking part in all phases should be made aware of the contents of the EMP, to plan the relevant activities in an environmentally sound manner.

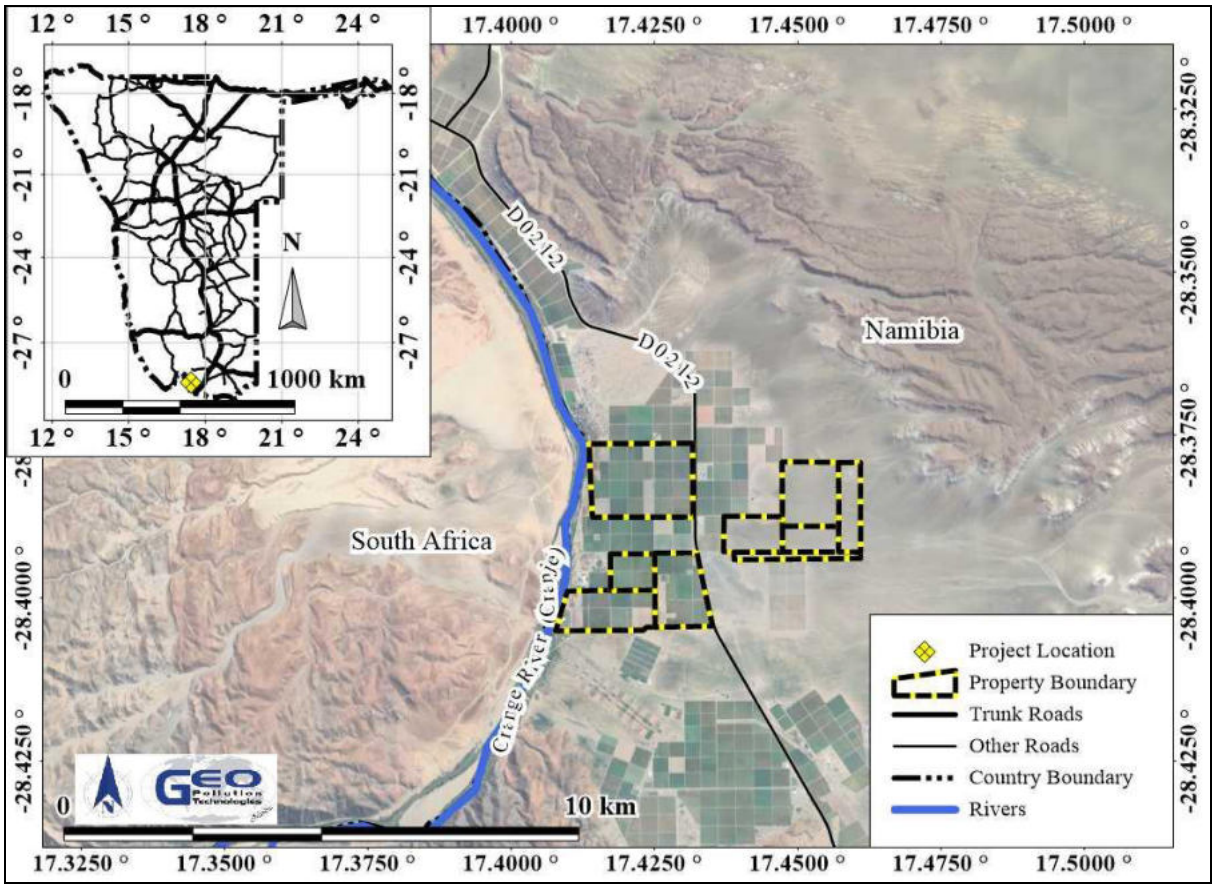

Figure 1-1 Project location

A risk assessment was undertaken in 2018 (Bosman et al. 2018) 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).

2 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 ECC, as per the Namibian legislation. The legislation and standards provided in Table 2-1 to Table 2-3 govern the environmental assessment process in Namibia and/or are relevant to the project.

Table 2-1 Namibian law applicable to the development

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 ♦ Promotes sustainable management of the environment and the use of natural resources ♦ Provides 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
Fertilizers, Farms 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, farms feeds, agricultural remedies and stock remedies ♦ Various amendments and regulations
Water Resources Management Act Act No. 11 of 2013, Government Notice No. 269 of 2023	♦ Provides for management, protection, development, use and conservation of water resources ♦ Prevention of water pollution and assignment of liability ♦ Requires licencing for water abstraction from an international river
Forest Act Act No. 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 for 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
Soil Conservation Act Act No. 76 of 1969, Government Notice No. 494 of 1970	♦ 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
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
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	♦ Defines the powers, duties and functions of local authority councils
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, Government Notice No. 2429 of 1972.	♦ 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
Road Traffic and Transport Act Act No. 52 of 1999 Government Notice No 282 of 1999	♦ Provides for the control of traffic on public roads ♦ and the regulations pertaining to road transport
National Heritage Act Act No. 27 of 2004, Government Notice No. 287 of 2004	♦ Provides for protection and conservation of places and objects of heritage significance and the registration of such places and objects
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

Table 2-2 Relevant multilateral environmental agreements

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 2-3 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

Standard or Code	Key Aspects
	distribution of petroleum products at fuel retail facilities and consumer installations ♦ SANS 10131 is specifically aimed at storage and distribution of petroleum products in aboveground storage tanks ♦ Both SANS standards provide requirements for spill control infrastructure

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

Section 1 of Government Notice No.29 of 20212: Energy, Transmission and Storage Activities

1 (a) The construction of facilities of generation of electricity. The Proponent use a photovoltaic solar system for some aspects of the operations.

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

7.5 Pest control: The Proponent uses Namibian approved and registered pesticides and herbicides as and when required, as part of vineyard and plantation management.

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: The Proponent abstracts water from the Orange River for irrigation purposes. The use is permitted as per the MAFWLR requirements.

8.3 Any abstraction from a river that form an international boundary: The Proponent abstracts water from the Orange River for irrigation purposes The Orange River is an international river.

8.3 Irrigation schemes for agriculture excluding domestic irrigation: The Proponent does not manage an irrigation scheme per se, although irrigation systems are in place for all operations.

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 has a 22 m^3 aboveground fuel storage facility.

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 has a 22 m^3 fuel aboveground storage facility. The facility is licenced as per the Ministry of Mines and Energy (MME) requirements.

9.3 Construction of filling stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin: The Proponent has a 22 m^3 fuel (diesel) aboveground storage facility.

3 ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides management options to ensure impacts of the agricultural and related activities on the farms are minimized. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit 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 execution of various activities on the farms. All personnel taking part in the operations of the farms should be made aware of the contents of this section, so as to plan the operations accordingly and in an environmentally sound manner.

The objectives of the EMP are:

- to include all components of the development;
- to prescribe the best practicable control methods to lessen the environmental impacts associated with the project;
- to monitor and audit the performance of personnel in applying such controls; and
- to ensure that appropriate environmental training is provided to all 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 dust impacts.

3.1 PLANNING

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

- Ensure that all necessary permits from the various ministries, local authorities and any other bodies that governs the operations of the agricultural project are in place and remains valid. This includes the water licenses and consumer fuel certificates.
- Ensure all appointed contractors and employees enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractors, sub-contractors, employees and all personnel present or who will be present on site.
- Make provisions to have a health, safety and environmental (HSE) coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.
- 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 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 (e.g. firefighting, first aid, etc.).
- Establish and maintain a fund for future ecological restoration, specifically for instances of environmental damage caused during operations including pollution remediation where required. Should project activities cease completely, and future land-use will not involve agriculture, the funds should be utilised to remove all redundant infrastructure and waste.

- Establish and/or maintain a reporting system to report on aspects of operations, maintenance/construction, and decommissioning as outlined in the EMP. Keep monitoring reports on file for bi-annual submission to MEFT in support of environmental clearance certificate renewal applications. This is a requirement by MEFT.
- Appoint a specialist environmental consultant to update the environmental assessment and EMP and apply for renewal of the environmental clearance certificate prior to expiry.

3.1.1 Revenue and Information Generation

Consulting and professional services are engaged with for assistance in applications for new permits and renewal of existing permits such as the water licensees, fuel storage and environmental clearance certificates. In addition, specialist irrigation systems, pumps and implements used by the agricultural project, require specialist and professional services. Such services may further be extended to pest control for operations, and accounting and legal services for administrative processes. All of these services are paid for and therefore the agricultural project contributes to revenue generation in the local and national sectors. In addition, during many of these processes, such as per the renewal of water licenses, information is generated which informs and facilitates planning of the Proponent as well as affected parties and governmental agencies.

Desired Outcome: To maximise the benefits associated with the activity, continued consulting and professional services should be contracted from Namibia. Thereby revenue spent on such services remain within Namibia. Contribution to national treasury and increased economic resilience in the local and national professional sector.

Actions

Enhancement:

- Contract local Namibians where possible.
- Adhering to permit and license conditions regarding reporting.
- Deviations from this practice must be justified.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Service providers' contracts or agreements or records be kept.
- All reporting, monitoring and information sharing records kept on file.

3.1.2 National Development Goals: Water, Agriculture and Land Use Planning

The agricultural project pins down key development goals and challenges which were identified as part of the Namibian development goals. It may be considered as an agricultural / irrigation project which aims at generating income from foreign sectors by providing the most value per resource (water, soil and labour). In addition, the project is located in line with the regional planning initiatives which identified the location as an area for irrigation development. The project is unique in being one of only a handful table grape growing areas in Namibia. The project is considered a long term project.

Desired Outcome: Continued contribution to the development of the region as well as implementation of project activities in line with NDPs and Vision 2030.

Actions

Enhancement:

- Liaison with local and national governmental agencies through appropriate financial and social responsibility reporting.
- Increase recycling initiatives and incorporate additional greenhouse gas reduction activities such as conservation tillage and climate smart agriculture.
- Infrastructure maintenance and development such as, road servitude, water- and sanitation system developments (provision to employees) and development. Where possible, public and private partnership regarding projects should be considered.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- All project contributions towards regional development, inclusive of communications held with relevant authorities, to be kept on file.
- Monitoring water abstraction (monthly) and submit to the relevant custodian on a quarterly basis.

3.1.3 Skills and Development

Training is essential to all aspects of the operations. Relative to responsibility, every employee requires the skillset to conduct tasks which form part of the operation. General skills in pesticide handling, for example, may be acquired through on the job training and guidance from skilled workers. Progressive training in terms of safe pesticide use or specialised equipment handling (such as tractor operator) may require additional resources to aid in the training such as demonstrations, manuals and explanations. The skills and training of employees allow them to conduct certain tasks safely and or according to the required standard for continued operations.

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

Actions

Enhancement:

- Sourcing of employees and contractors must first be at local level and if not locally available, regional or national options should be considered. Deviations from this practice must be justified.
- Inform employees about parameters and requirements for references upon employment.
- Provide managerial references for unofficial training or skills transfer when conducted.
- Relative to their responsibilities, provide on-farms training for all staff involved in irrigation management, including but not limited to:
  - Correct agricultural techniques
  - Emergency procedures
  - System monitoring for problem identification
  - System maintenance.
- Relative to their responsibilities, provide on-farms training for all staff involved in pesticide application / agrochemical , including but not limited to:
  - The safe transport, handling and storage of pesticides
  - Warning and advice pictograms commonly used on pesticide labels
  - Disposal of leftover pesticide and or pesticide containers.
- Ensure first-aid and fire-fighting training for a portion of the workforce.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Keep records of all training provided to employees.
- Ensure that all training is certified or managerial references provided (proof provided to the employees) inclusive of training attendance, completion and implementation.
- Include all information in a bi-annual report.

3.1.4 Revenue Generation and Employment

Skilled and unskilled labour are required for the operations and maintenance/construction activities associated with the farms. Importantly, employment provided is permanent and long term. Livelihoods are thus sustained and the spending power of the local community increased. Through continued long term employment, economic resilience is enhanced of individual employees. Through employment, the Proponent also contributes to the Social Security while significant contributions are also made to the Namibian Revenue Services. Revenue is generated through the sale of products on international markets.

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 area, 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.

3.1.5 Demographic Profile and Community Health

Farming activities rely on labour during both the harvesting and growing season. Change in the demographic profile of the local community will result with an influx of job seekers over time and densification of Aussenkehr. Community structures may change with an increase of population while the economic profile will be adjusted as the employment structure of the area is changed. Community health may be exposed to factors such as communicable disease like HIV/AIDS and alcoholism/drug abuse. An increase in people in the area may potentially increase the risk of criminal and socially deviant behaviour such as poaching of game and the illegal harvesting of fish. More people in the area will exert additional pressure on governmental services, particularly essential services. Medical assistance, emergency services and the policing of the community are strained especially during harvesting season. A dedicated clinic was established on-site, with a visiting doctor attending monthly, helping reduce strain on public health facilities. Apart from these services, electrical supply to Aussenkehr is lacking and additional development will contribute to the cumulative demand on electricity. The same is true for government sanitation services and water supply to Aussenkehr.

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

Actions

Prevention:

- Appointment of reputable contractors where applicable.
- Adhere to all local authority by-laws relating to environmental health, which includes, but is not limited to, sanitation requirements for employees.
- Provide educational, awareness information for employees on various topics of social behaviour and HIV/AIDs.
- Disciplinary steps, within the legal parameters of Namibia, to be taken for socially deviant behaviour at the employee-housing compound or during working hours should be clearly stipulated in employment contracts.

Mitigation:

- Take disciplinary action against employees not adhering to contractual agreements with regard to socially deviant behaviour (e.g. alcohol or drug abuse during working hours).

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Summary report based on educational programmes and training conducted.
- Employee contracts on file.
- Bi-annual report and review of employee demographics.

3.1.6 Health, Safety & Security

Daily operational and intermittent maintenance and construction activities is reliant on human labour and therefore exposes them to health and safety risks. Some activities, especially associated with the operation of machines and heavy motor vehicles and or hazardous chemicals, poses the main risks to employees. Fertiliser application method changed to piped-in liquid fertiliser, reducing employee exposure and use of tractors. In addition to these expected risks, severe climatic condition in Aussenkehr may contribute to conditions such as sunstroke, fatigue and related symptoms. Risks to human health and safety have been identified as a priority concern by the Proponent who have endeavoured to reduce the risk of incidents by implementing improved operating systems (such as worker transportation) and warnings (for dangerous substances). It is therefore foreseen that the improved operating procedures (in terms of health and safety) will be carried forward.

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.
- Comply with all health and safety standards as specified in the Labour Act and related legislation.
- Clearly label dangerous and restricted areas as well as dangerous equipment and products such as agrochemicals.
- Lock away or store all equipment and goods on site in a manner suitable to discourage criminal activities (e.g. theft).
- Provide all employees with required and adequate personal protective equipment where required.
- Ensure that all personnel receive adequate training on the operational procedures of equipment and machinery and the handling of hazardous substances.
- Train selected personnel in first aid and ensure first aid kits are available on site.
- The contact details of all emergency services must be readily available.
- Implement a maintenance register for all equipment whose malfunction can lead to injury or exposure to hazardous substances.
- Apply and adhere to all industry specific health and safety procedures and regulations applicable to the handling of food produce for markets.
- Ensure the clinic is stocked with appropriate medical supplies and maintained according to basic healthcare standards.
- Promote awareness campaigns or toolbox talks on seasonal risks (e.g. heatstroke, dehydration, pesticide exposure).
- Display clear signage with clinic location and operational hours for quick access in case of minor injuries.

Mitigation:

- Treat all minor work-related injuries immediately and obtain professional medical treatment if required.
- Assess any safety problems and implement corrective action to prevent future occurrences.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Record any incidents with the actions taken to prevent future occurrences.
- Compile a bi-annual report of all incidents reported. The report should contain dates when training was conducted and when safety equipment and structures were inspected and maintained.

3.1.7 Traffic

Additional traffic will be generated during the operational phase which will contribute to the cumulative collision- and road degradation risks of Aussenkehr, especially during the harvesting season. It is however not considered to be a significant impact. Traffic management and road degradation should be considered cumulatively for all operations within Aussenkehr and a combined initiative (from all operators together with the Roads Authority) should be considered to address possible issues such as road degradation (tar and collective dirt roads).

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 farming unit's' turnoffs as well as speed limits on the gravel roads within the farms where required.
- Only licenced drivers who are well trained to be allowed on the national roads. Only licensed drivers and vehicles of any state-owned organisation allowed on the farms.
- Collective road maintenance initiatives to be embarked upon.
- Implemented dust suppression measures (wetting of roads) on internal roads to increase visibility and reduce vehicle collision risks.
- All vehicles to be fitted and maintained with adequate signalling devices adequate to increase awareness over and above standard features.
- All operators / drivers to adhere to all the requirements of relevant traffic regulations and to be suitably trained.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Record all traffic related complaints and the actions taken to prevent impacts from repeating itself.
- Compile a bi-annual report of all incidents reported, complaints received, and actions taken.

3.1.8 Air Quality

During operations, dust is generated through a variety of activities. Travelling of vehicles and machines are some of the main dust generating activities. Dust may impair visibility along roads, pose health risks due to inhalation of suspended particulate matter, or inhibit plant health through settling on vegetation. Dust suppression measures are implemented on internal roads to increase visibility and reduce vehicle collision risks. Air quality is monitored through dust and carbon footprint calculations annually. Dust suppression and fewer infield tractors (due to in-field packing and piped fertiliser) reduce emissions.

Desired Outcome: To prevent health impacts and minimise the dust generated. Minimise contributions to greenhouse gas emissions.

Actions

Mitigation:

- Personnel issued with appropriate masks where excessive dust or vapours are present.
- A complaints register should be kept for any dust related issues and mitigation steps taken to address complaints where necessary e.g. dust suppression.
- Vehicles and emission releasing machines to be kept in a good working condition.
- Speed limits should be enforced for vehicles on gravel and internal roads to reduce dust uplift.
- Install dust screens or barriers around particularly dusty operational zones to contain the spread of particulates.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

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

3.1.9 Noise

Noise is generated by various operational and possible construction activities. Machinery like heavy machinery, tractors and vehicles cause elevated noise levels that may result in hearing impairment after long term exposure. Activities are generally remote from receptors other than the Proponent and his employees. The nature of the noise is related mainly to vineyard maintenance (for maintenance records) and mechanical maintenance typically on the farms.

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

Actions

Prevention:

- Conduct regular noise assessments.
- Follow Health and Safety Regulations of the Labour Act and/or World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment.
- Regularly service all machinery 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:

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

3.1.10 Fire

Construction activities, failing electrical infrastructure, mechanical operations and fires outside of designated areas, may increase the risk of the occurrence of unplanned and / or uncontrolled fires, which may spread into the nearby vineyards and surrounding farms. Lightning may cause natural fires during the dry season. Uncontrolled fires which have generated in other areas will present a risk to existing and prosed operations.

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

Actions

Prevention:

- Maintenance of firebreaks, especially along fences and the power line servitude.
- Ensure the integrity of power line servitudes are kept (cleared and free from structures).
- Prepare a holistic fire protection and prevention plan. This plan must include evacuation plans and signage, an emergency response plan and a firefighting plan.
- Ensure fire-fighting equipment are maintained in good working order at all times. Ensure such equipment is readily available / unobstructed access.
- Personnel training (safe operational procedures, firefighting, fire prevention and responsible housekeeping practices).
- Ensure all flammable chemicals are stored according to material safety data sheet (MSDS) and SANS instructions and all spills or leaks are cleaned immediately.
- Maintain regular site, mechanical and electrical inspections and maintenance.
- Maintain firefighting equipment and promote good housekeeping.
- Notify all surrounding farmers of planned burns.
- Investigate the implementation of an automated fire suppression system.

Mitigation:

- Implement the fire protection and firefighting plan in the event of a fire.
- Quick response time by trained staff will limit the spread and impact of fire.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Maintain a register of all incidents on a daily basis. Include measures taken to ensure that such incidents do not repeat themselves.
- Compile a bi-annual incidents report. The report should also contain dates when fire drills were conducted and when firefighting equipment were tested and training given.

3.1.11 Waste Production

Various waste streams result from the operational and possible construction and maintenance activities. Waste may include hazardous waste associated with hydrocarbon products and chemicals, as well as soil and water contaminated with such products. Construction waste may include building rubble and discarded equipment. Domestic waste will be generated by the residents and employees on the farm. Used wire and wooden poles were distributed to employees for personal use. Most of the farming related waste can be re-used and or recycled, however certain waste, such as empty pesticide containers are hazardous and should be disposed of according to hazardous waste requirements.

Waste presents a contamination risk and when not removed regularly may become a health and/or fire hazard and attract wild animals and scavengers. Sewage is a form of liquid biological waste that needs disposal. The Proponent is in the process of replacing soak-away systems with a system that can clean sewage water to a reusable form.

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

Actions

Prevention:

- Put a site-wide waste management system is in place. Recycling initiatives include separation of recyclables and safe disposal of hazardous waste.
- Waste oil and old oil filters should be safely stored on-site and collected by a reputable waste company.
- Medical and sanitary waste must be disposed of together with the waste from the Aussenkehr Clinic. Agreement related to this disposal should be obtained from the Aussenklehr Clinic.
- Separate storage and clearly mark medical waste disposal bins in the clinic area.
- Use puncture-proof containers for sharps (e.g., needles, scalpels) and ensure they are sealed and disposed of properly.
- Ensure medical waste is collected and transported by a certified hazardous waste handler.
- All chemical containers to be chipped for recycling at local service supplier.
- Develop a site specific waste management plan.
- Implement waste reduction measures. All waste that can be re-used/recycled must be kept separate.
- All old oil and related re-using application should be conducted in a manner which will not constitute in hydrocarbon pollution of soil.
- Ensure adequate temporary storage facilities for disposed waste are available.
- Prevent windblown waste from entering the environment.
- Prevent scavenging (human and non-human) of waste at the storage facilities.
- Educate employees on the importance of proper waste handling and disposal.

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).
- Discarded waste should be disposed of and burned regularly at a dedicated site to reduce health and pollution risks.
- Empty chemical containers that may present a contamination/health risk must be treated as hazardous waste. Workers should not be allowed to collect such containers for purposes of storing water or food. This can be achieved by puncturing or crushing such containers prior to disposal.
- Liaise with the applicable authorities regarding waste and handling of hazardous waste.
- Ensure all ablution facilities are connected to properly constructed septic tank systems to prevent groundwater contamination.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Maintain a register of disposal of hazardous waste. 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 bi-annual report.

3.1.12 Water Abstraction

Although water abstraction volumes will remain within the allocated water rights, the continued abstraction will contribute to the overall water demand from the Orange River. Strongly cumulative in nature, the impact on its own is not considered to be significant, however in light of possible climate change considerations and demand increase of the combined water users, considerations should be given to future use and water security. Flow meters are installed and monitored continuously to track water abstraction volumes accurately. Sprinkler systems are being upgraded to water-saving versions to promote efficient irrigation and minimizing overwatering of vineyards.

Desired Outcome: To utilise water sustainably.

Actions

Prevention:

- Maintain safe abstraction volumes prescribed (an abstraction license with prescribed volumes from the MAFWLR is a requirement for this project).
- All irrigation infrastructure meets water license requirements related to flow meters, and limits on flow rate, volume and area irrigated.
- Regular maintenance of the irrigation system and related infrastructure be conducted.
- Where flow meters need to be replaced, the MAFWLR should be informed accordingly.
- Continual monitoring for blocked nozzles or emitters, leaking hydrants or hoses, irrigator alignment etc.
- Soil moisture assessment conducted along with daily visual checks for excessive runoff or ponding.
- Sampling of water intake and discharge.
- Reporting of poor water quality to ORASECOM, MAFWLR and the Gariep Watch.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Monthly water use (flow metre) monitoring.

3.1.13 Change in Soils Characteristics

The long term operational phase will see a high volume of water being irrigated on to the vineyards, a portion thereof penetrating the soil (not evaporating or being absorbed by the plants). Poor drainage may result in soil saturation and chemical alternation of the soil. Evaporation of salt and nutrient rich irrigation water may cause salt accumulation on and near the surface of the soil profile. Capillary action during saturated conditions may cause the upward migration of water in the soil profile. Salts present in the soil will then be dissolved and will migrate to the soil surface. Soil water evaporation can then cause further build-up of salts. Such increased levels of salt in the soil can be harmful to planted crops and soil flushing through the application of high water volumes are then often conducted to leach the salts from the soil. Installation of proper soil drainage mechanisms with the aim of preventing saturated conditions can prevent such situations. A further method that can be applied is improved irrigation methods (e.g. drip irrigation or micro irrigation) that supply only sufficient water to the plants to cater for their needs and for evaporation losses.

Irrigation fields at higher elevations may cause drainage problems for lower laying farmers, this is especially pertinent for the new expansion areas. Soil flushing should be avoided as it can impact on lower laying areas and can cause groundwater pollution and also pollute the Orange River water..

Desired Outcome: To prevent the contamination, compaction, erosion, or structure disturbance of soil.

Actions

Prevention:

- Appoint reputable contractors.
- Follow prescribed dosage of fertilizers and pesticides / herbicides and to avoid over application. Where possible application decision should be based on soil testing and plant analysis. Fertiliser application should consider soil temperature and moisture content and not be applied to severely compacted soils.
- Install drainage systems where needed, especially along lower lying areas which may receive drainage water from elevated irrigation fields.
- Apply improved irrigation methods (e.g. top spraying micro irrigation).
- Formulation of best salinity management practices and the application thereof on field, farms and scheme level.
- Use soil moisture sensors to avoid over-irrigation and reduce capillary rise of salts.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Record soil moisture levels.
- Monitor water quality.
- Flow rates of drainage systems.

3.1.14 Orange River Water Quality

Impacts on the water quality of the Orange River may stem from a variety of sources related to the project. Some of which may be direct and some of which can be considered to be in-direct. The latter may for example relate to the amount of human waste being washed into the Orange River (as the project will increase the amount of people in the area). Such waste include sanitation, physical and chemical forms). Both intake and discharge water samples are taken and analyzed three times a year as part of the Gariep watch program aiming to improve the Orange River water quality.

Direct impacts related to the water quality in the Orange River, as a result from possible pollution by chemicals and hydrocarbons and the administration of pesticides, herbicides and nutrients in irrigation water which drains to the Orange River. The leaching of soils may further directly contribute to change in the water quality. The effects of the possible water quality change are strongly cumulative in nature as the operations are part of several other irrigation, industrial and mining activities that can impact on the Orange River. Similar agricultural activities are conducted upstream of Aussenkehr at mainly Noordoewer and around Upington in South Africa.

Desired Outcome: Prevent contamination by chemical and hydrocarbon spill. Leachate of landfill and septic tank systems. Inflow of irrigated runoff and drainage water.

Actions

Prevention:

- Implement a monitoring system of intake water quality and drainage water quality.
- Soil flushing should be avoided to prevent Orange River water pollution.
- All waste produced on site must be removed and disposed of at a recognised disposal facility.
- No waste to be buried in unlined facilities.
- All ablution facilities to be operated and maintained according to specification and industry best practise.
- Education regarding the use of such facilities to be provided.
- Awareness to be raised regarding environmental degradation due to misuse of implemented systems.
- Staff to receive training on waste handling and the principles of reduce, reuse and recycle.
- Chemical and fuel handling and storage according to relevant MSDS.
- Chemicals to be stored in a way that runoff water would not wash such chemicals into the river.
- No chemical / fuel storage within the 1:100 year flood line of the Orange River.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Registers to be kept by the Proponents showing the type, quantities and frequency of application of fertiliser, pesticides and any other chemicals utilised in crop production.
- Maintain MSDS for hazardous chemicals.
- All spills or leaks must be reported on and cleaned up immediately.
- 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.

3.1.15 Change in Ecosystems and Biodiversity (riverine)

The change in the water quality and quantity may result in a change of the related ecosystems. Contribution of toxins and nutrients may alter and promote growth of various organisms. Primary and invader species are prone to proliferate in degraded ecosystems. The nature of the impact is strongly cumulative not only due to the upstream users but also the other local table grape growers and vineyards in Aussenkehr. Changes in the vegetation growth (as part of the ecosystem) is clearly visible in the Orange River at Aussenkehr which have a significant larger amount of reeds and rivers grasses established along the northern bank and drainage water diffuse area as opposed to the natural and more sparsely populated growth of the southern bank.

Desired Outcome: To prevent change in biodiversity associated with the river due to contribution of toxins and nutrients

Actions

Prevention:

- Implement an alien clearing plan.
- Ensure safe storage, handling, and mixing of chemicals away from watercourses and drainage areas.
- Prevent toxins and nutrient from entering the Orange River and groundwater.
- Documentation of all chemicals, herbicide, pesticides and nutrients administrated to the vines and or used as part of any other operational activity.
- Regular testing for nutrient levels, toxins, and biological indicators helps detect changes early and adjust practices accordingly.
- Limit vineyard expansion into natural drainage channels or undeveloped habitat areas.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Monitoring to be conducted on the water quality, upstream and downstream of the drainage water release points.
- Monitoring also to be conducted on the quality of the drainage water (at the outflow of the drainage pipes prior dilution in the river).
- Photographic documentation of the riverbank and vegetation growth of various points as identified for the integrated monitoring plan.
- Incidents record kept of all chemical and hydrocarbon spills inclusive of remediation measures taken.

3.1.16 Change in Ecosystems and Biodiversity (terrestrial)

Operational activities on the farm include activities such as land clearing, vineyard management, vehicle movement may lead to the displacement of faunal communities due to ongoing habitat disturbance (e.g., noise, dust, and vibration). However, much of the cultivated area is already cleared and maintained with minimal natural vegetation, and thus supports limited faunal presence. Remaining fauna are primarily found along the natural drainage washes that crosses the farm and along the river. Additionally, a powerline located near the river serves as a common perching and roosting structure for various bird species, which may be sensitive to increased disturbance or habitat changes in the surrounding area.

Desired Outcome: Minimise impacts on fauna and loss of biodiversity by reducing risks of habitat disruption and fragmentation, collision, and electrocution. Promoting biodiversity and compliance with wildlife conservation regulations.

Actions

Prevention / Mitigation:

- Establish an ecological buffer zone, along the river. This area should not be fenced to allow for wildlife passage.
- Regular biodiversity surveys focusing on species presence, signs (e.g., burrows, tracks), and population indicators near the riverbank.
- Limit unnecessary human movement and machinery operation near the riverbanks, especially during breeding seasons.
- Promote the use of wildlife-friendly farming practices that protect small animals and ground-nesting birds.
- Create awareness on the negative impacts of poaching and the importance of recording all incidents.
- It is important to note that habitats can be created inadvertently by solar panels, especially when situated in a slanted, fixed position. Regular inspection must be performed to monitor for bird impacts and mitigation measures investigated if required.
- Report any extraordinary animal sightings, conflict or incidents to the MEFT.
- Take disciplinary action against any employees failing to comply with contractual conditions related to poaching and the environment.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Photographic documentation of riparian habitats and visible changes in faunal activity.
- All information and reporting to be included in a bi-annual report.
- Report any extraordinary animal sightings to the MEFT.

3.1.17 Poaching an Illegal Harvesting

Although wildlife is limited in the area (as per the harsh conditions) clear evidence of poaching of the limited wildlife is visible. An increase in the number of people in the area is expected to increase the poaching activities.

Desired Outcome: To avoid poaching on the ecological environment.

Actions

Prevention:

- Prevent pesticides from ending up in the hands of potential poachers.
- Educate all contracted and permanent employees on the value of biodiversity and strict conditions prohibiting harvesting and poaching of fauna and flora must be part of employment contracts. Include prohibitions or regulations on the collection of firewood.
- Education should include informing workers on permit requirements for fishing and the prohibition of harvesting wild animals or plants

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 MEFT.
- Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- Take disciplinary action against any employees failing to comply with contractual conditions related to poaching and the environment.

Responsible Body:

- Contractor
- Proponent

Data Sources and Monitoring:

- Report on all extraordinary animal or plant sightings or instances of poaching.
- Compile a bi-annual report on all monitoring results.

3.1.18 Groundwater and Soil Contamination

As drainage water (potentially laden with herbicides, pesticides and nutrients) moves through the soil, it may dissolve additional nutrients and salts which may lead to a build-up of those nutrients and salts in the groundwater. In addition to the drainage water, chemical and hydrocarbon spills from fuels, herbicides and pesticides may penetrate the soil and contaminate the groundwater. The relative high number of Ventilated Improved toilet (VIP) toilets can contribute further to groundwater pollution. Groundwater can form a pathway of pollutants to the Orange River.

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

Actions

Prevention:

- Implementation of a Filling Point Improvement Plan.
- 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 and fuel should be stored in a sufficiently bunded area, as per MSDS requirements and filling point improvement plan.
- Spill kits should be kept at filling points while drip trays should be employed for all and other areas when conducting filling of fuel of chemicals.
- Ensure all waste oil handling is conducted on impermeable or bunded areas.
- Follow prescribed dosage of fertilizers and pesticides / herbicides and to avoid over application.
- Maintain sewerage systems and conduct regular monitoring. However also investigate alternatives means of sewage management.
- 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.
- Train and or guide persons involved with the sewerage systems, or any related effluent system, in terms of maintenance and operation to ensure the system is operated effectively.

Mitigation:

- All spills must be cleaned up immediately.
- Consult relevant MSDS information and a suitably qualified specialist where needed.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Maintain MSDS 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 fertilizers and for traces of chemicals used in pesticides and herbicides.
- Registers be kept by the Proponent 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 and cleaned up immediately.

3.1.19 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. Solar power has been installed across the farm to reduce grid dependency and lower the operation's carbon footprint. Operations at the farms are well kept with the highest standard of neatness and cleanliness exhibited throughout all components of the operations.

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

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.
- Ensure design and maintenance of solar systems will decrease glare and not result in a blinding effect, especially related to areas where there is a lot of machine of vehicle operations.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Compile a bi-annual report of all complaints received and actions taken.

3.1.20 Cumulative Impact

Operational phase activities are all cumulative in nature as the agricultural project is located amongst similar projects in Aussenkehr. Operational activities are reliant on water abstracted from the Orange River while at the same time drainage water will flow back into the river. The most significant biophysical impacts therefore relate to the Orange River and soils. The project will however generate revenue and provide employment for a large number of employees thereby contributing significantly to the economy and related development set for the industry and //Karas Region.

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

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:

- Compile a bi-annual report of all complaints received and actions taken.

3.2 DECOMMISSIONING AND REHABILITATION

Closure and decommissioning of agricultural and related activities on the farms as a whole is not foreseen during the validity of the environmental clearance certificate or in the near 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 of infrastructure. 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 irrigation 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 Labour act and WHO standards. Waste should be contained and disposed of at a dedicated waste disposal site and not dumped in the surrounding areas. The EMP for the farms 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.

3.3 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.

4 CONCLUSIONS

The above EMP, if properly implemented will help minimise adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. As a living document and to ensure the relevance this EMP must be reviewed (where applicable) continually by the Proponent.

The EMP should 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 properties, and 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 MEFT every six months to allow for environmental clearance certificate renewal after three years. This is a requirement by MEFT.