

**FRONTIER GRAPES AGRICULTURAL DEVELOPMENTS,  
KARAS REGION NAMIBIA**

**ENVIRONMENTAL MANAGEMENT PLAN**



Assessed by:



Assessed for:

**Frontier Grapes (Pty) Ltd**

December 2022

<b>Project:</b>	<b>FRONTIER GRAPES AGRICULTURAL DEVELOPMENT, KARAS REGION NAMIBIA: ENVIRONMENTAL MANAGEMENT PLAN</b>	
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# 1 INTRODUCTION

Frontier Grapes (Pty) Ltd (the Proponent) obtained an environmental clearance certificate (ECC) dated 05 December 2019 for their construction and operations of irrigation-based agricultural activities on various portions of the Farm Aussenkjer 147, in Aussenkehr (Figure 1) ||Karas Region. The operations refers to the cultivation and harvesting of mainly table grapes. It includes all activities required in terms of vineyard management, maintenance of support infrastructure, operational equipment and labour management.

The Proponent has requested Geo Pollution Technologies (Pty) Ltd (GPT) to apply for *Renewal of the existing environmental clearance certificate (ECC)* for the operations at the farm. An ECC for the operations of the farm was awarded in 2019 and will expire in December 2022. A renewal application is required as per the Environmental Management Act No. 7 of 2007 (EMA). In support of the ECC renewal application, an updated environmental management plan (EMP) will be submitted to the Ministry of Environment, Forestry and Tourism's Directorate of Environmental Affairs (DEA).

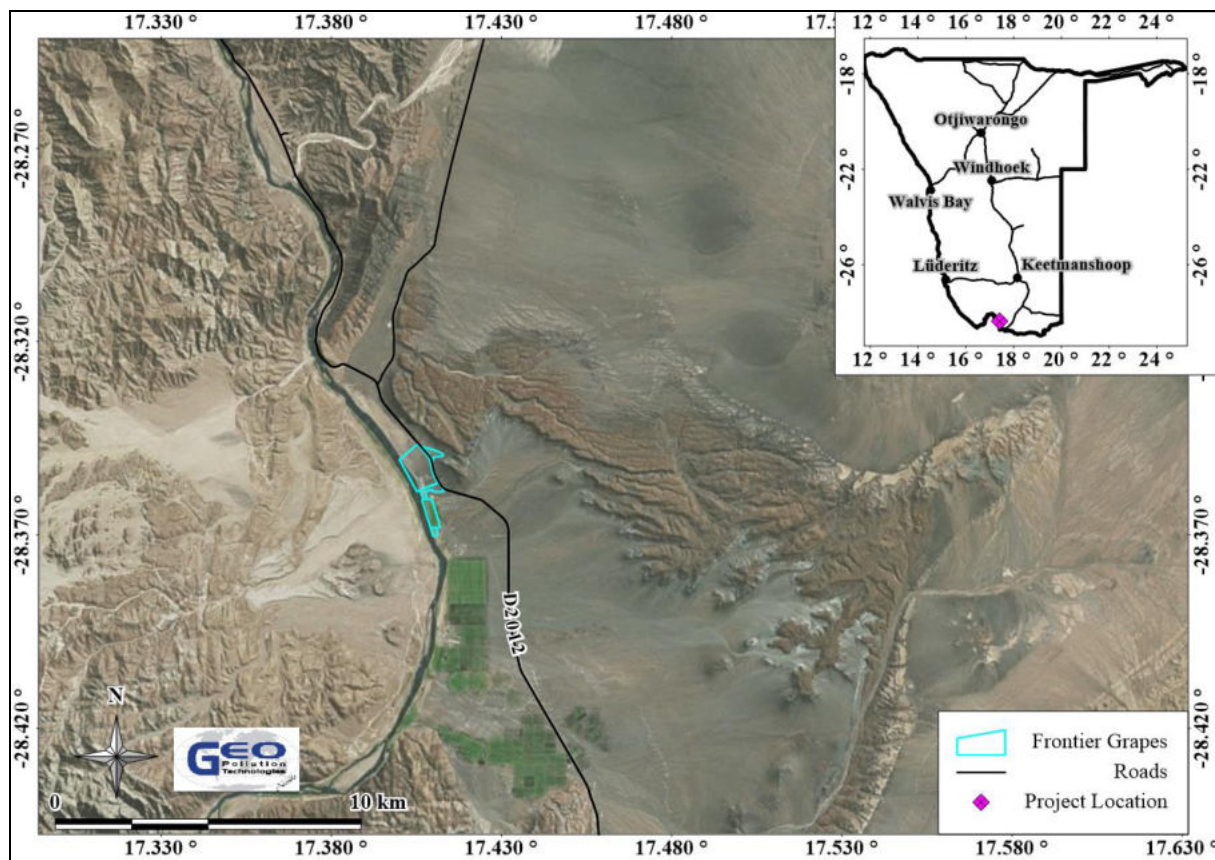


Figure 1 Project location

## 2 OBJECTIVES OF THE EMP

The Environmental Management Plan (EMP) provides management options to ensure impacts of the development 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 project. 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.

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.

Frontier Grapes (Pty) Ltd may implement an Environmental Management System (EMS) similar to for example ISO 14001. An EMS is an internationally recognised 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 to achieve compliance with the environmental policy; and
- ◆ Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.

### **3 THE EMP**

The following general guidance for the EMP is based on the findings of the combined environmental assessment and risk assessment carried out by Geo Pollution Technologies for Aussenkehr Agricultural developments in the ||Karas Region.

#### **3.1 Land Use, Planning, Development and Operational– Identified Impacts**

The following is the summary of pertinent impacts:

- ◆ Revenue generation (all phases) - International capital spent in the professional sector of Namibia. Contribution to national, regional and local economies. Contribution to sustainable development and investor's confidence.
- ◆ Contribution towards national and community development goals (development and operational phases) - Expansion of the table grape sector in Aussenkehr and development of related and required infrastructure (such as a capital projects of electricity and water supply).
- ◆ Loss of biodiversity and ecosystems integrity (development and operational phases) - Change in biodiversity associated with the river due to contribution of toxins and nutrients.
- ◆ Soil contamination and change in soil characteristics (development and operational phases) - Change in chemical composition of soil as a result of irrigation.
- ◆ Increased economic resilience of employees (all phases) - Continued permanent employment (direct & indirect) & increased employment of villagers (during harvesting season).
- ◆ Change (degradation) of Orange River water quality (operational phase) - Possible contamination by chemical and hydrocarbon spill. Leachate of septic tank systems. Inflow of irrigated runoff and drainage water.
- ◆ Poaching and illegal harvesting of plant material (development and operational phase) - Poaching and illegal harvesting of vegetation along the Orange River.

#### **3.2 Land Use, Development and Operational – Mitigating Measures**

The following is a summary of the proposed management plan, which will make the area for farming activities safe taking into consideration all the risk perceptions raised by all stakeholders:

- ◆ Namibian companies contracted to conduct professional services.
- ◆ Liaison with regional and national governmental agencies through appropriate financial and social responsibility reporting.
- ◆ Infrastructure developments such as electricity generation, water and sanitation systems and node development to be maintained by implementing agencies. Where possible, public and private partnership projects should be considered.

#### **4 THE IMPLEMENTATION OF THE EMP**

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Table 1 to Table 4 outline the management of the impacts during the development and operational phases. Contents of these tables could be incorporated into a HSEQ Management System. The proponent would be responsible to assign the responsibilities and to ensure that the tasks are executed.

**Table 1. Planning for Development, Operations and Future Decommissioning of the Project**

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
<b>Compliance</b>	To comply with all legal requirements for the development and operations in Namibia. To align the agricultural project with NDP4/5.	Apply for the necessary permits from the various ministries, local authorities and any other bodies that govern the development and operations of the project (such as water permits, fuel installations and waste disposal).	Prior to commencement of development of the farm and ongoing as required for renewal of rights.	All contracts, permits, certificates and other legal documents on file.	Proponent
<b>Appointments</b>	To appoint reputable contractors and/or operational personnel and establish the EMP, a legal requirement that forms part of the contract with the contractor and/or employees.	Appoint contractors and/or employees and enter into agreements which includes the EMP. Namibian companies to be contracted for services, deviations to be justified. Ensure that the contents of the EMP are understood by the contractor, sub-contractors, employees and all personnel who will be present on site.	Prior to commencement of contract.	Contracts on file.	Proponent; Contractor
<b>Management</b>	Establish a management system to implement and monitor health, safety and environmental matters.	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 in place to deal with all emergencies: Environmental management plan/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 emergency plans to be	Prior to development of the farm and during operations.	Documentation on file.	Proponent; Contractor

<b>Activity</b>	<b>Objective</b>	<b>Action</b>	<b>Timing</b>	<b>Proof of Compliance</b>	<b>Responsible Body</b>
		set up.			
<b>Funding</b>	To ensure funds are available for environmental restoration or pollution remediation if ever required.	To establish funds for accidental pollution or future ecological restoration of the project site should project activities cease and the site is decommissioned and environmental restoration or pollution remediation is required.	Prior to development of the farm and during operations.	Financial statements and projections of funds available.	Proponent
<b>Economy</b>	Maintain a positive input into the local and regional economy and agricultural sector.	Implement project as planned with associated positive inputs into the economy and agricultural sector.	Continuous.	Finances paid into the local and regional economies; number of employees.	Proponent
<b>Reporting</b>	Establish a system to report on monitoring of the project as outlined in the EMP.	Establish a system of monitoring and reporting on aspects of the EMP, which will be required for submission with the environmental clearance certificate renewal applications.	Prior to development, during operations as well as possible future decommissioning of the project.	Monitoring Reports.	Proponent; Contractor
<b>Public Communication / Communication strategy</b>	Management of communication to interested and affected parties regarding future developments.	Open communication regarding future development and employment opportunities to employees through employees' management structures.  Liaison with regional and national governmental agencies through appropriate financial and social responsibility reporting.	Continuous.	Communication record to be kept on file.	Proponent
<b>Environmental Clearance Renewal</b>	Renew the Environmental Clearance Certificate every three years.	Apply for renewal of the Environmental Clearance Certificate.	Prior to expiry of Environmental Clearance Certificate.	Renewed Environmental Clearance Certificate.	Proponent; Independent Specialist Consultant



**Table 2. The Development Phase**

Criteria	Nature	Prevention / Mitigation Measure	Monitoring	Responsible Body
<b>Skills, Technology &amp; Development</b>	Enhanced skills and technology transfer to the region and subsequent promotion of economic development.	<p>Training must be provided to Namibians to ultimately employ a predominantly Namibian workforce.</p> <p>Trained personnel to be issued with training certificates or managerial reference letters. Skills development and improvement programs to be made available as identified during performance assessments.</p>	<p>Copies of training certification or managerial references on file.</p> <p><b>Annual</b> training summary report.</p>	Proponent; Contractor; Directors & Public Relations personnel.
<b>HIV/AIDS, In-migration, Informal Settlements and Communicable Disease</b>	Increased influx to the region and Aussenkehr. Increased informal settlement and associated social challenges such as increased spread of HIV/AIDS and communicable disease.	<p>Employment for local people (already established) should be preferred. Deviations from this practice should be justified.</p> <p>Educational programs / material on HIV/AIDs and communicable diseases to be provided to employees.</p>	<p><b>Annual</b> summary report of HIV educational programmes and training.</p> <p><b>Annual</b> report and review of employee demographics (age, gender, number of sick days).</p>	Proponent; Directors & Public Relations Personnel.
<b>Employment</b>	The agricultural sector plays an important role in providing employment to locals.	If skills exist locally, Namibians must be employed. Alternatively, training must be provided to Namibians to ultimately employ a predominantly Namibian workforce.	<b>Annual</b> report of employee records.	Proponent; Directors & Public Relations Personnel.
<b>Health &amp; Safety</b>	Risks include work related injuries such as inattentive use of equipment, accidents involving vehicles, construction machinery and/or chemicals.	<p>Qualified operators to work with heavy machinery.</p> <p>All Health and Safety standards specified in the Labour Act and other applicable legislation should be complied with.</p> <p>All staff members must be briefed about potential health risks and injuries on site.</p> <p>All staff involved in development activities or handling of chemicals must at all times wear personal protective equipment (PPE).</p> <p>Safe working conditions must be provided when working at heights or in confined spaces.</p> <p>Selected personnel should be trained in first aid.</p>	<p>Any incidents must be recorded <b>monthly</b> with action taken to prevent future occurrences.</p> <p>The report should contain dates when training was conducted and when safety equipment and structures were inspected and maintained.</p>	Contractor; Proponent.

Criteria	Nature	Prevention / Mitigation Measure	Monitoring	Responsible Body
		<p>The contact details of all emergency services must be readily available.</p> <p>Ensure that all personnel receive adequate instruction on operating of equipment / handling of hazardous substances.</p> <p>Confirm operators have the training and / or skills required for the use of heavy machinery.</p>		
<b>Traffic Impacts</b>	Traffic incidents may occur during delivery of equipment and building materials, mostly at the turnoff to the project area.	<p>Regulation of traffic during deliveries for development activities especially for any special or abnormal loads which may be required.</p> <p>Erect warning signs where heavy motor vehicles (HMV) may frequently operate. Erect adequate warning signs associated with any traffic risks. Cover all open loads (material transportation). Transport labourers in suitable transport units.</p> <p>Regular maintenance and servicing of all vehicles.</p> <p>All vehicles are to be roadworthy.</p> <p>All drivers are to adhere to all the Namibian requirements in terms of operating the vehicle driven.</p>	<p>Any traffic complaints received must be taken up with the relevant authorities and discussed with the Proponent.</p> <p>Any incidents must be recorded <b>monthly</b> with action taken to prevent future occurrences.</p>	Contractor, Proponent.
<b>Noise</b>	Noise due to presence of heavy machinery on site	<p>The site is situated in a rural area with no nearby villages.</p> <p>World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment is followed. This limits noise levels to an average of 70 dB over a 24 hour period with maximum noise levels not exceeding 110 dB during the period.</p> <p>Hearing protectors must be issued as part of PPE if required.</p>	<p>Any complaints received regarding excessive noise should be recorded with notes on action taken. Any negative effects caused from excessive vibrations should be recorded as well.</p> <p>Any incidents must be recorded <b>monthly</b> with action taken to prevent future occurrences.</p>	Proponent
<b>Waste Production</b>	Any waste produced as a result of the development process,	All waste produced must be collected and sent to the existing disposal facility. Disposal of	A register of hazardous waste disposal should	Contractor

Criteria	Nature	Prevention / Mitigation Measure	Monitoring	Responsible Body
	including waste water.	<p>hazardous waste to be at a hazardous waste disposal facility.</p> <p>Water contaminated with hydrocarbons may not be disposed of on-site.</p>	<p>be kept. This should include type of waste, volume as well as disposal method/facility.</p> <p>Any complaints received regarding waste should be recorded <b>monthly</b> with notes on action taken.</p>	
<b>Groundwater, Surface Water and Soil Contamination</b>	Hydrocarbon pollution from spills or leaks from vehicles, or chemicals (such as herbicides and pesticides) may cause water pollution in cases where the leaks and spills are not controlled and left to seep into the ground (drainage water and ultimately the Orange River).	<p>Regular inspections and maintenance of all development vehicles to ensure no leaks are present.</p> <p>Vehicles to be serviced and fuelled at appropriate facilities (such as workshop) on an impermeable surface with related pollution management structures.</p> <p>All waste must be removed from the project operational area and disposed of timeously.</p> <p>Any spills must be cleaned up immediately.</p> <p>Select alternative chemicals/materials that would not pose a threat to the groundwater, e.g. water based paints vs. solvent based paints.</p> <p>Hydrocarbon fuel spills to be remediated and significant spills to be logged on an incident register.</p> <p>Polluted soil and building rubble must be transported away from the site to an approved and appropriately classified waste disposal site.</p> <p>Polluted soil must be remediated where possible.</p> <p>Flow attenuation structures to be employed at formal drainage water discharge points where flow is concentrated.</p> <p>Implementation of incidents register.</p>	<p>A register of all incidents must be maintained on a <b>daily</b> basis. This should include measures taken to ensure that such incidents do not repeat themselves.</p> <p>All spills or leaks must be reported on and cleaned up immediately.</p> <p>Any incidents must be recorded <b>monthly</b> with action taken to prevent future occurrences.</p>	Contractor

Criteria	Nature	Prevention / Mitigation Measure	Monitoring	Responsible Body
		Implementation of maintenance register for all equipment and fuel / hazardous substance (such as chemicals) storage areas. All chemicals to be handled and stored according to MSDS labels.		
<b>Fire</b>	The possibility of a fire spreading to the surrounding vineyards.	<p>Storage and handling of flammable products should be according to their Material Safety Data Sheet (MSDS) instructions.</p> <p>A holistic fire protection and prevention plan is needed.</p> <p>All fire precautions and fire control at the facility must be up to date.</p> <p>Firefighting measures as per the MSDS of products should be adhered to where relevant.</p> <p>No open fires should be allowed within operational areas of the development phase.</p>	<p>A register of all incidents must be maintained on a <b>daily</b> basis. This should include measures taken to ensure that such incidents do not repeat themselves.</p> <p>Any incidents must be recorded <b>monthly</b> with action taken to prevent future occurrences.</p>	Contractor, Proponent
<b>Ecosystem and Biodiversity Impact</b>	Impacts on the ecological environment caused by development activities, including the clearing and excavation of the land etc. which in turn can result in land degradation.	<p>All large indigenous trees on the riverbank to be protected.</p> <p>If human wildlife conflict exists, MET must be consulted. Limit clearing of land to areas that will be irrigated. Plan roads to minimize impact beyond irrigable land.</p> <p>Prevent off-road driving or movement of earthmoving equipment outside of areas designated for clearing. Deviations to be motivated. It is recommended that dedicated roads be designed and maintained.</p> <p>No dumping of rocks and removed soil in environmentally sensitive areas. Where possible, it can be used to fill erosion ditches, if any are present.</p>	<p>Regular inspection must be performed to monitor for any irregular activities outside the development footprint.</p> <p>Any incidents must be recorded <b>monthly</b> with action taken to prevent future occurrences.</p>	Contractor, Proponent
<b>Illegal Hunting and Poaching of Wild Animals and Plant Material</b>	Illegal hunting and poaching of wild animals and plant material in conservation area and along the Orange River (including Kudu and wild horses).	<p>All employees should be educated about the value of biodiversity.</p> <p>Strict conditions prohibiting harvesting and poaching of fauna and flora should be part of employment contracts.</p>	<p>A register of all incidents must be maintained in a <b>monthly</b> report. This should include measures taken to</p>	Contractor, Proponent

Criteria	Nature	Prevention / Mitigation Measure	Monitoring	Responsible Body
		Disciplinary actions to be taken against employees failing to comply with contractual conditions.	ensure that such incidents do not repeat themselves.	
<b>Dust</b>	Excessive dust generated from tillage and the movement of vehicles around the project area. This will be aggravated during periods of strong winds.	<p>Personnel issued with dust masks where required and regular dust suppression on frequently travelled roads.</p> <p>Dust mitigation measures which may be considered include (but are not limited to) the following:</p> <p>Gravelling of dirt roads,</p> <p>Wetting of dirt roads (where appropriate),</p> <p>Use of shade netting along main routes.</p> <p>Main tillage activities to be conducted in calm conditions.</p> <p>Monitoring of dust accumulation on surrounding vineyards.</p>	<p>Any complaints received regarding waste should be recorded with notes on action taken.</p> <p>Any incidents must be recorded <b>monthly</b> with action taken to prevent future occurrences.</p>	Contractor, Proponent
<b>Impact on Utilities, Infrastructure and Services</b>	Any damage caused to existing infrastructure (such as roads) and water or electricity supply where present. Additional pressure on essential and related governmental services.	<p>Appoint qualified and reputable contractors / employees.</p> <p>Liaison with the local authorities and suppliers of services.</p> <p>The proponent to report the proposed increases in demand for services to regional council and continue lobbying for change.</p>	Report proposed increase in demand for services to local and regional authorities.	Contractor, Proponent
<b>Heritage, Palaeontology and Archaeology</b>	The discovery of archaeologically paleontological or culturally important sites. The damage and or destruction of important finds.	<p>If any additional archaeologically important artefact is found, any work in that area must be halted and the relevant authorities must be informed. The Namibian Police should be contacted first. Secondly, the National Monuments Council dealing with heritage.</p> <p>Development phase activities may only continue at that location once permission has been granted.</p> <p>All prevention and mitigation measures to be identified by a registered Archaeologist, should be adhered to according to the provisions of the National Heritage Act. Such measures should be</p>	<p>Record any discoveries and proof of notifications to authorities on file.</p> <p>All information and reporting to be included in a <b>monthly</b> report.</p>	Contractor, Proponent

Criteria	Nature	Prevention / Mitigation Measure	Monitoring	Responsible Body
		included in the EMP once determined.		
<b>Cumulative Impact</b>	Possible cumulative impacts associated with the development phase include groundwater, surface water and soil pollution.	<p>Addressing each individual impact recommended in the EMP would reduce the cumulative impact.</p> <p>Reviewing reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning, if the existing mitigations are insufficient.</p> <p>Stormwater measures to be designed as not to have a detrimental affect or concentrated flow onto adjacent farming operators.</p>	<b>Annual</b> summary report or close-out report based on bi-annual (one sample during peak usage and one sample during low usage) water monitoring results and soil analyses.	Proponent

**Table 3. The Operational Phase**

<b>Criteria</b>	<b>Nature</b>	<b>Mitigation</b>	<b>Monitoring</b>	<b>Responsible Body</b>
<b>Skills, Technology and Development</b>	Enhanced skills to the Karas Region.	<p>The proponent must employ local Namibian's where possible. Deviations from this practice should be justified.</p> <p>Maximise contribution to the Namibian economy by contribution to industry development and using Namibian suppliers.</p> <p>The proponent should consider making economic education available to employees who wish to receive it (outside of normal business hours).</p> <p>Ensure that any training (on the job and/or certified) is recorded and/or managerial reference provided to the employees.</p>	<b>Monthly</b> report of training and the enhancement of skills and transfer of technology.	The Proponent
<b>HIV/AIDS, In-migration, Informal Settlements and Communicable Disease</b>	Increased spread of HIV/AIDS; Increased influx to the Karas Region; Increased informal settlement areas and associated social challenges and communicable disease.	<p>Primarily employ local people (already residing in the area) as far as possible.</p> <p>Educational programs and or material on HIV/AIDS and Communicable Disease should be displayed.</p> <p>Facilitate provision of disease combatting instruments, material and medicine where feasible and appropriate according to the Guidelines for integrating HIV and Gender related issues for Capital Projects.</p>	<p><b>Monthly</b> report of training conducted.</p> <p><b>Annual</b> report and review of employee demographics (age, gender, number of sick days).</p>	Proponent; Directors & Public Relations Personnel.
<b>Employment</b>	The project will sustain and increase employment in the Karas Region.	<p>Local Namibian's must be employed. Deviations from this must be justified.</p> <p>Adhere to all Namibian Labour Act requirements.</p>	Maintain documentation of <b>annual</b> employment.	Proponent
<b>Pressure on Service Infrastructure</b>	Sustained employment and increased employment during harvesting season increases pressure on public infrastructure and services which include, but are not limited to, health, education, sanitation and security.	<p>The proponent to continue reporting possible increased demand for services to regional council and continue lobbying for change.</p> <p>Where feasible, the company may consider assisting government projects.</p>	Maintain documentation of annual employment.	Proponent
<b>Health, Safety</b>	The risk of accidents or injuries	The health and safety regulations of the Labour	Any incidents must be	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
<b>&amp; Security</b>	due to incorrect use of machinery, equipment and/or chemicals, or equipment failure.	<p>Act must be adhered to. An integrated health and safety management system should be implemented. Typical preventative or mitigating measures within the health and safety management systems include:</p> <p>Qualified operators to work machinery and/or equipment,</p> <p>Safe work standard operating procedures,</p> <p>Health and safety training,</p> <p>Permits, where required,</p> <p>Emergency response plans,</p> <p>First aid treatment and training,</p> <p>Medical procedures and emergency services,</p> <p>Regular safety checks and/or drills.</p> <p>Procedures for dealing with health and safety issues must be in place and all contact details for emergency personnel and services available.</p> <p>Ensure that all staff members are briefed about the potential risks on site (including flash floods).</p> <p>Selected personnel should be trained in first aid.</p> <p>Equipment must be locked away so that it does not encourage criminal activities (e.g. theft).</p> <p>Access to the locked away equipment should always be strictly controlled.</p> <p>No alcohol or recreational drugs are allowed in workplaces or vineyards.</p> <p>No labourers under the influence of either alcohol or drugs should be allowed to conduct any work.</p>	<p>recorded <b>monthly</b> with action taken to prevent future occurrences.</p> <p><b>Monthly</b> report of training, and inspections of safety equipment and structures.</p>	
<b>Traffic</b>	General increase in traffic as a result of the project.	<p>Signs to be placed at junctions with main roads to warn oncoming traffic of operational farming vehicles.</p> <p>All vehicles to be fitted and maintained with adequate signalling devices to increase awareness</p>	Any complaints received or incidents reported regarding traffic issues should be recorded in the <b>monthly</b> incident report.	Proponent



Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>over and above standard features.</p> <p>All operators / drivers to adhere to all the requirements of the Traffic Act.</p>	<p>This should include mitigation measures to prevent future incidences.</p>	
<b>Fire</b>	<p>Outbreak of an uncontrolled fire in vineyards, pack-houses or operational areas.</p>	<p>Open fires should not be allowed outside of designated areas.</p> <p><b>Firefighting and Fire Prevention:</b></p> <p>Fire precautions and fire control must be present at the site.</p> <p>All flammable materials must be stored according to their material safety data sheet instructions.</p> <p>A holistic fire protection and prevention plan is needed. This plan must include an emergency response plan and firefighting plan..</p>	<p>Any incidents must be recorded <b>monthly</b> with action taken to prevent future occurrences.</p> <p>The report should contain dates of fire drills and when fire equipment was tested.</p>	Proponent
<b>Noise</b>	<p>Noise as a result of either machine and / or equipment operations.</p>	<p>Follow World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment. This limits noise levels to an average of 70 dB over a 24 hour period with maximum noise levels not exceeding 110 dB during the period.</p> <p>Personnel working in noisy environments must be issued with hearing protectors.</p>	<p>Any complaints received regarding excessive noise should be recorded with notes on action taken, in <b>monthly</b> incident reports.</p>	Proponent
<b>Dust</b>	<p>Dust generated from the movement of vehicles around operational areas and the exposure of bare soil during agricultural activities. This will be aggravated during periods of strong winds.</p>	<p>Personnel must be issued with dust masks if required.</p> <p>Dust abatement measures to be employed and where applicable maintained on the most frequently used roads. These include measures as stipulated in the development phase.</p>	<p>Regular visual inspection.</p> <p>A <b>monthly</b> stakeholder complaints register must be maintained.</p> <p>Complaints must be investigated and, if appropriate, acted upon.</p>	Proponent
<b>Waste Production</b>	<p>Any waste which can include hazardous waste, such as hydrocarbons or domestic waste.</p>	<p>All legal requirements regarding effluent handling and disposal should be followed. In particular the necessary water abstraction permits and</p>	<p>Any complaints received regarding waste should be recorded with notes on</p>	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>authorisations should be obtained from the Ministry of Agriculture Water and Forestry (MAWF).</p> <p>All other organic/biological waste must be disposed of or treated without delay to prevent attracting pests.</p> <p>Ensure that any planned landfills on the property are lined.</p> <p>All ablution facilities to be operated and maintained according to specification. Education regarding the use of such facilities to be provided, and the environmental degradation due to misuse.</p> <p>Staff to receive training on waste handling and the principles of reduce, reuse and recycle.</p> <p>Chemical and fuel handling and storage according to MSDS labels. Chemicals to be stored in a way that runoff water would not wash chemicals into the river. No chemical / fuel storage should be within the 1:100 year flood line of the Orange River</p> <p>Follow internal guideline procedures for storage and handling of chemicals to prevent toxins and nutrient from entering the Orange River and groundwater.</p>	<p>action taken.</p> <p>All data to be compiled in a <b>6 monthly</b> report.</p>	
<b>Groundwater, Surface Water and Soil Contamination</b>	<p>Hydrocarbon pollution may result from machine and equipment spills and or leakages. Increase of nutrient levels or organic pollutants (from effluents and fertilizers) in the soil that can leach to shallow ground water.</p> <p>Spilled hazardous waste such as fuels and oil.</p>	<p>All vehicles must be serviced and maintained regularly. Spill control by making use of drip trays when needed. All hydrocarbon based fluids must be removed from site and disposed of at a recognised hazardous waste disposal facility.</p> <p>Any polluted soil or water to be treated as a hazardous waste.</p> <p>Employ best practice irrigation methods.</p> <p>Implementation of best salinity management practices</p> <p>Soil flushing should be minimised to reduce</p>	<p>Bi-annual monitoring of intake water quality; drainage water quality and water upstream and downstream of the drainage points.</p> <p><b>Monthly</b> reporting of all spills or leakages. The report should contain the following information:</p>	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>pollution of the Orange River.</p> <p>Monitor soil quality.</p> <p>Documentation of use of all chemicals, herbicide, pesticides and nutrients. Minimise application of herbicides, pesticides and nutrients as far as possible to minimise toxins and nutrients entering the groundwater.</p> <p>Incident records kept of all significant chemical and hydrocarbon spills and remediation measures taken.</p> <p>Re-use drainage water where possible (for example dust suppression).</p>	<ul style="list-style-type: none"> <li>◆ Date and duration of spill</li> <li>◆ Product spilled</li> <li>◆ Volume of spill</li> <li>◆ Remedial action taken</li> </ul>	
<p><b>Poaching, Hunting or Removal of Plant Material</b></p>	<p>Illegal hunting and poaching of wild animals and plant material in conservation area and along the Orange River (including Kudu and wild horses).</p> <p>Personnel should be made aware of the legal implications on conducting such offences.</p>	<p>All employees should be informed of the value of biodiversity. Rules and regulations regarding the illegal harvesting of natural resources from the surroundings must be made clear and the disciplinary steps that will be followed against perpetrators must be issued in writing and form part of the employee's contracts.</p>	<p>A report of any incidents must be maintained in a <b>monthly</b> report</p>	<p>Proponent</p>
<p><b>Ecosystem and Biodiversity Impact</b></p>	<p>Ecosystem and biodiversity impacts will mostly be as a result of the cumulative effect of other impacts such as groundwater, surface water and soil contamination, fire, poaching or illegal harvesting of plant material.</p>	<p>Trees listed as threatened by IUCN or in Appendix 2 of CITES and those protected by forestry legislation should not be removed unless permits from MAWF have been obtained. Such trees include large trees on the banks of the Orange River.</p> <p>Photographic documentation of vegetation on the riverbank and at points along the drainage lines to monitor potential changes over time.</p> <p>Raise awareness of workers on the value of biodiversity and the need for its protection.</p>	<p>Any incidents must be recorded <b>monthly</b> with action taken to prevent future occurrences.</p>	<p>Proponent</p>
<p><b>Cumulative Impacts</b></p>	<p>Possible cumulative impacts associated with the development phase include groundwater, surface water and soil pollution.</p>	<p>Addressing each individual impact recommended in the EMP would reduce the cumulative impact.</p> <p>Reviewing bi-annual and annual reports for any new or re-occurring impacts or problems would aid</p>	<p><b>Annual</b> summary report based on all incidents and water monitoring results and soil analyses.</p>	<p>Proponent</p>

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	Additional impacts include social impacts which relate to service delivery and social challenges.	in identifying cumulative impacts and help in planning if the existing mitigations are insufficient. Report poor water quality to ORASECOM.		

**Table 4. Decommissioning Phase**

Criteria	Nature	Mitigation	Monitoring	Responsible Body
<b>Waste Production</b>	Upon decommissioning, waste will be generated in the form of building rubble, and obsolete equipment, structures, and/or residual products that can be used elsewhere or sold as scrap. Soil polluted by hydrocarbons must be treated as hazardous waste.	To reduce the amount of waste all re-usable material must be removed to another site or sold. Those items that cannot be used again must be scrapped in the appropriate manner. Upon demolition of the buildings and concrete the rubble must be removed from the property and taken to an approved dumpsite. Rehabilitation if necessary is to be done using funds set aside for such purpose.	Regular visual inspections to be performed during decommissioning. A register of waste produced and disposal methods to be maintained during decommissioning.	Proponent; Contractor
<b>Ecological Impact</b>	Operations spanning many years may create new habitat for fauna and flora. Upon decommissioning these habitats will be destroyed.	Where new habitats were created, that are now occupied by sensitive or protected fauna or flora, MET or other appropriate organizations must be contacted to establish the conservation status and handling thereof.	A report should be compiled of any sensitive or protected fauna and flora that established itself on the premises. The report should include all actions taken to relocate or deal with the situation.	Proponent; Contractor
<b>Employment</b>	Decommissioning of the agricultural project will lead to retrenchments or re-location of staff.	Plan in advance for meeting the Labour Act's requirements for retrenching staff if required.	In the year prior to decommissioning, draft plans for handling of employees. The report should include budgeting for retrenchments and possible alternative positions elsewhere.	Proponent; Directors & Public Relations personnel or Human Resource Department.
<b>Dust</b>	Dust will be generated during the Decommissioning Phase and	It is recommended that regular dust suppression be included in the Decommissioning Phase, when dust	Regular visual inspection.	Proponent; Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	might be aggravated during periods of strong winds.	becomes an issue. Personnel should be issued with dust masks for work in dusty environments.	A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.	
<b>Noise</b>	Noise pollution will exist due to heavy vehicles accessing the site to collect rubble from demolished building materials.	Noise levels during this phase should follow the World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment. This limits noise levels in industrial areas to an average of 70 dB over a 24 hour period with maximum noise levels not exceeding 110 dB during the period.  All personnel must be issued with hearing protectors and neighbours must be notified of the time and duration of decommissioning.	A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.	Proponent; Public Relations Personnel; Contractor.
<b>Groundwater, Surface Water and Soil Contamination</b>	Hazardous and ecologically detrimental substances (such as hydrocarbons and chemicals) which are spilled may contaminate soil and drainage water as well as water in the Orange River.	All precautions are to be taken to prevent contamination of the soil as this could enter the ecosystem. Leakages from vehicles might occur especially if they are serviced on site. Drainage water might spread pollutants to neighbouring receptors. Pollutants in the soil and building rubble must be transported away from the site to an approved, appropriately classified waste disposal site.	Reporting of all spills or leaks is to be completed by decommissioning Contractor.	Proponent; Contractor
<b>Health, Safety and Security</b>	Health and Safety risks, similar to previous phases will be present. All other risks associated with demolitions must be considered.	Adequate measures to ensure safety of staff on site, including: Proper training of operators; First aid treatment; Medical assistance; Emergency treatment; Protective clothing, footwear, gloves and belts;	During decommissioning, a register of all incidents must be maintained on a <b>weekly</b> basis. This should include measures taken to ensure that such incidents do not repeat	Proponent; Contractor

<b>Criteria</b>	<b>Nature</b>	<b>Mitigation</b>	<b>Monitoring</b>	<b>Responsible Body</b>
		safety goggles and shields.	itself.	
<b>Fire</b>	Outbreak of an uncontrolled fire.	<p>Open fires should not be allowed outside designated areas.</p> <p><b>Firefighting and Fire Prevention:</b></p> <p>Fire precautions and fire control must be present.</p> <p>All personnel to be sensitised about fire protection measures.</p> <p>A holistic fire protection and prevention plan must be drafted for the decommissioning phase and include an emergency response and firefighting plan.</p>	<p>Any incidents must be recorded <b>monthly</b> with action taken to prevent future occurrences.</p> <p>The report should contain dates when fire drills were conducted and when fire equipment was tested.</p>	Proponent
<b>Poaching, Hunting or Removal of Plant Material</b>	Personnel staying and working on site may use the opportunity to illegally hunt or trap animals.	Education is key to prevention. All employees must be informed of the value of biodiversity. Rules and regulations regarding the illegal harvesting of natural resources from the surroundings must be made clear and the disciplinary steps that will be followed against perpetrators must be issued in writing and form part of the employee's contracts.	Any incidents must be recorded <b>monthly</b> with action taken to prevent future occurrences.	Proponent

## **5 CONCLUSIONS**

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The above Environmental Management Plan, 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 annually by the proponent.

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

Monitoring reports and rehabilitation plans and results must be kept available for submission with future renewal applications for environmental clearance certificates.