

**DITTA PROPERTY INVESTMENTS
AGRICULTURAL PROJECT
AUSSENKEHR NAMIBIA**

ENVIRONMENTAL MANAGEMENT PLAN



Assessed by:



Assessed for:

**Ditta Property
Investments (Pty) Ltd**

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Project:	DITTA PROPERTY INVESTMENTS AGRICULTURAL PROJECT, AUSSENKEHR, NAMIBIA: ENVIRONMENTAL MANAGEMENT PLAN	
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1 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.

Activities conducted by Ditta Property Investments (Pty) Ltd are managed by Cape Orchard Company (Namibia) (Pty) Ltd. The managing company 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.
- ◆ This EMP.

2 THE EMP

The following general guidance for the EMP is based on the findings of the EIA and risk assessment carried out by Geo Pollution Technologies and have been updated as per this updated EMP.

2.1 Land Use, Planning, Development and Operational– Identified Impacts

The following is the summary of the identified 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.
- ◆ Change of Orange River water demand (operational phase) – Abstraction of the water from the Orange River for irrigation purposes.
- ◆ Poaching and illegal harvesting of plant material (development and operational phase) - Poaching and illegal harvesting of vegetation along the Orange River.

2.2 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.

3 THE IMPLEMENTATION OF THE EMP

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
Compliance	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
Appointments	To appoint reputable 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
Management	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: EMP/ emergency response plan and HSE manuals Adequate protection and indemnity insurance cover for incidents; Comply with the provisions of all relevant safety standards; Procedures, equipment and materials required for emergency plans to be set up.	Prior to development of the farm and during operations.	Documentation on file.	Proponent; Contractor
Funding	To ensure funds are available	To establish funds for accidental	Prior	Financial statements and	Proponent

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
	for environmental restoration or pollution remediation if ever required.	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.	development of the farm and during operations.	projections of funds available.	
Economy	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
Reporting	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.	Bi-annual Monitoring Reports.	Proponent; Contractor
Public Communication / Communication strategy	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
Environmental Clearance Renewal	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	Mitigation	Monitoring	Responsible Body
Skills, Technology & Development	Enhanced skills and technology transfer to the region and subsequent promotion of economic development.	Training must be provided to Namibians to ultimately employ a predominantly Namibian workforce. 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.	Copies of training certification or managerial references on file. Annual training summary report.	Proponent; Contractor; Directors & Public Relations personnel.
HIV/AIDS, In-migration, Informal Settlements and Communicable Disease	Increased spread of HIV/AIDS and communicable disease; increased influx to the region and Aussenkehr in particular. Increased informal settlement and associated social challenges.	Employment for local people (already established) should be preferred. Deviations from this practice should be justified. Educational programs / material on HIV/AIDS and communicable diseases to be provided to employees.	Annual summary report of HIV educational programmes and training. Annual report and review of employee demographics (age, gender, number of sick days).	Proponent; Directors & Public Relations Personnel.
Employment	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.	Annual report of employee records.	Proponent; Directors & Public Relations Personnel.
Health & Safety	Risks include work related injuries such as falling from heights, accidents involving vehicles, heavy construction machinery and/or chemicals.	Qualified operators to work with heavy machinery. All Health and Safety standards specified in the Labour Act and other applicable legislation should be complied with. All staff members must be briefed about potential health risks and injuries on site. All staff involved in development activities or handling of chemicals must at all times wear personal protective equipment (PPE). Safe working conditions must be provided when working at heights or in confined spaces. Selected personnel should be trained in first aid. The contact details of all emergency services must be readily available.	Any incidents must be recorded bi-annual with action taken to prevent future occurrences. The report should contain dates when training was conducted and when safety equipment and structures were inspected and maintained.	Contractor; Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Traffic Impacts	Traffic incidents may occur during delivery of equipment and building materials, mostly at the turnoff to the project area.	<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>	Visual observation of impacts on traffic should be made.	Contractor, Proponent
Noise	Noise due to presence of heavy machinery on site	<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 (such as sand transportation). Transport labourers in custom transport units as far as possible.</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 bi-annual with action taken to prevent future occurrences.</p>	Proponent
Waste Production	Any waste produced as a result of the development process, including waste water.	<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 bi-annual with action taken to prevent future occurrences.</p>	Contractor
	All waste produced must be collected and sent to the existing disposal facility. Disposal of hazardous waste to be at a hazardous waste disposal facility.	Water contaminated with hydrocarbons may not be disposed of on-site.	A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.	

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Groundwater, Surface Water and Soil Contamination	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 drainage water discharge points where flow is concentrated.</p> <p>Implementation of incidents register.</p> <p>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.</p>	<p>Any complaints received regarding waste should be recorded monthly with notes on action taken.</p> <p>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.</p> <p>All spills or leaks must be reported on and cleaned up immediately.</p> <p>Any incidents must be recorded bi-annual with action taken to prevent future occurrences.</p>	Contractor
Fire	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</p>	<p>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.</p>	Contractor, Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Ecosystem and Biodiversity Impact	<p>The impact 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>	<p>be up to date. Firefighting measures as per the MSDS of products should be adhered to where relevant. No open fires should be allowed near vegetated areas. All large indigenous trees on the riverbank to be protected. If human wildlife conflict exists MEFT must be consulted. Limit clearing of land to areas that will be irrigated. Plan roads to minimize impact beyond irrigable land. Prevent off-road driving or movement of earthmoving equipment outside of areas designated for clearing. 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. Vehicle movement restricted to planned operational areas and no off-road driving to be allowed. Deviations to be motivated. It is recommended that dedicated roads be designed and maintained.</p>	<p>Any incidents must be recorded bi-annual with action taken to prevent future occurrences. Regular inspection must be performed to monitor for any irregular activities outside the development footprint. Any incidents must be recorded bi-annual with action taken to prevent future occurrences.</p>	Contractor, Proponent
Illegal Hunting and Poaching of Wild Animals and Plant Material	<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>All employees should be educated in induction about the value of biodiversity. Strict conditions prohibiting harvesting and poaching of fauna and flora should be part of employment contracts. Disciplinary actions to be taken against employees failing to comply with contractual conditions.</p>	<p>A register of all incidents must be maintained in a bi-annual report. This should include measures taken to ensure that such incidents do not repeat themselves.</p>	Contractor, Proponent
Dust	<p>Excessive dust generated from tillage and the movement of vehicles around the project area. This will be aggravated during periods of strong winds.</p>	<p>Personnel issued with dust masks where required and regular dust suppression on frequently travelled roads. Dust mitigation measures which may be considered include (but are not limited to) the following: Wetting of gravel roads (where appropriate). Main tillage activities to be conducted in calm conditions. Monitoring of dust accumulation on surrounding vineyards.</p>	<p>Any complaints received regarding waste should be recorded with notes on action taken. Any incidents must be recorded bi-annual with action taken to prevent future occurrences.</p>	Contractor, Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Impact on Infrastructure and Services	Any damage caused to existing infrastructure (such as roads) and water or electricity supply where present. Additional pressure on essential and related governmental services.	Use of shade netting along main routes. Appoint qualified and reputable contractors. Liaison with the local authorities and suppliers of services. The proponent to report the proposed increases in demand for services to regional council and continue lobbying for change.	Report proposed increase in demand for services to local and regional authorities.	Contractor, Proponent
Heritage and Archaeology	The discovery of archaeologically or culturally important sites. The damage and or destruction of important archaeological finds.	If any archaeologically important artefact is found, any work in that area must be halted and the relevant authorities must be informed. Firstly, the Namibian Police. Secondly, the National Monuments Council dealing with heritage. Implement chance-find procedures as stipulated in the Specialist Assessment Report for the project. Development phase activities may only continue at that location once permission has been granted.	Record any discoveries and proof of notifications to authorities on file. All information and reporting to be included in a bi-annual report.	Contractor
Cumulative Impact	These are impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. In relation to an activity, it means the impact of an activity that in itself may not be significant, may become significant when added to the existing and potential impacts resulting from similar or diverse activities or undertakings in the area. Possible cumulative impacts associated with the development phase include groundwater, surface	Addressing each individual impact recommended in the EMP would reduce the cumulative impact. 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. Stormwater measures to be designed as not to have a detrimental affect or concentrated flow onto adjacent farming operators.	Annual 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

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	water and soil pollution.			

Table 3. The Operational Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Skills, Technology and Development	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>	Bi-annual report of training and the enhancement of skills and transfer of technology.	The Proponent
HIV/AIDS, Immigration, Informal Settlements and Communicable Disease	Increased spread of HIV/AIDS; Increased influx to the Karas Region; Increased informal settlement areas and associated social challenges.	<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 employed.</p>	<p>Bi-annual report of training conducted.</p> <p>Annual report and review of employee demographics (age, gender, number of sick days).</p>	Proponent; Directors & Public Relations Personnel.
Employment	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 annual employment.	Proponent
Pressure on Service Infrastructure	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
Health, Safety & Security	The risk of accidents or injuries due to incorrect use of machinery, equipment and/or chemicals, or equipment failure.	<p>The health and safety regulations of the Labour 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</p>	<p>Any incidents must be recorded bi-annual with action taken to prevent future occurrences.</p> <p>Bi-annual report of training,</p>	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>equipment, Safe work standard operating procedures, Health and safety training, Permits, where required, Emergency response plans, First aid treatment and training, Medical procedures and emergency services, Regular safety checks and/or drills. Procedures for dealing with health and safety issues must be in place and all contact details for emergency personnel and services available. Ensure that all staff members are briefed about the potential risks on site (including flash floods). Selected personnel should be trained in first aid. Equipment must be locked away so that it does not encourage criminal activities (e.g. theft). Access to the locked away equipment should always be strictly controlled. No alcohol or recreational drugs are allowed in workplaces or vineyards. No labourers under the influence of either alcohol or drugs should be allowed to conduct any work.</p>	<p>and inspections of safety equipment and structures.</p>	
Traffic	<p>General increase in traffic as a result of the project.</p>	<p>Signs to be placed at junctions with main roads to warn oncoming traffic of operational farming vehicles. All vehicles to be fitted and maintained with adequate signalling devices to increase awareness over and above standard features. All operators / drivers to adhere to all the requirements of the Traffic Act.</p>	<p>Any complaints received or incidents reported regarding traffic issues should be recorded in the bi-annual incident report. This should include mitigation measures to prevent future incidences.</p>	<p>Proponent</p>
Fire	<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>Any incidents must be recorded bi-annual with action taken to prevent</p>	<p>Proponent</p>

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	<p>areas.</p>	<p>Firefighting and Fire Prevention: Fire precautions and fire control must be present at the site. All flammable materials must be stored according to their material safety data sheet instructions. A holistic fire protection and prevention plan is needed. This plan must include an emergency response plan and firefighting plan. Experience has shown that the best chance to rapidly put out a major fire is in the first 5 minutes. It is important to recognise that a responsive fire prevention plan does not solely include the availability of firefighting equipment, but more importantly, it involves premeditated measures and activities to timeously prevent, curb and avoid conditions that may result in fires.</p>	<p>future occurrences. The report should contain dates of fire drills and when fire equipment was tested.</p>	
Noise	<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. 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 Bi-annual incident reports.</p>	<p>Proponent</p>
Dust	<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. 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. A bi-annual stakeholder complaints register must be maintained. Complaints must be investigated and, if appropriate, acted upon.</p>	<p>Proponent</p>
Waste Production	<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 authorisations should be obtained from the Ministry of Agriculture Water and Land Reform (MAWLR).</p>	<p>Any complaints received regarding waste should be recorded with notes on action taken.</p>	<p>Proponent</p>

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Groundwater, Surface Water and Soil Contamination	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. Spilled hazardous waste such as fuels and oil.	<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 and. All waste produced on site must be disposed of in the landfill on the property, until an official registered waste site is available for the area.</p> <p>All ablation 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.</p> <p>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>All vehicles must be serviced and maintained regularly. Spill control by making use of drip trays when needed.</p> <p>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>Maintain drainage channel.</p> <p>Employ best practice irrigation methods.</p> <p>Implementation of best salinity management practices</p> <p>Soil flushing should be minimised to reduce pollution of the Orange River.</p> <p>Monitor soil quality.</p> <p>Documentation of use of all chemicals, herbicide,</p>	All data to be compiled in a Bi-annual report.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>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>		
Surface Water Abstraction	Continued abstraction of water from the Orange River and possible increased abstraction to compensate for climate change (higher evaporation rates and decreased rainfall).	<p>Adhere to water abstraction permit regulations.</p> <p>Adhere to recommended abstraction volumes to ensure over abstraction does not take place.</p> <p>To prevent unnecessary water loss all pipeline and water storage infrastructure must be inspected and maintained regularly, and over irrigation should be avoided.</p> <p>Pressure and flow sensors can be installed that will shutoff water pumps if a leak is detected</p>	Monthly water abstraction records kept and submitted on a quarterly basis to the MAWLR.	Proponent
Poaching, Hunting or Removal of Plant Material	Personnel should be discouraged from partaking in poaching and made aware of the legal implications on conducting such offences.	All employees should be informed in induction 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.	A report of any incidents must be maintained in a bi-annual report	Proponent
Ecosystem and Biodiversity Impact	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>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 MAWLR 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>	Any incidents must be recorded Bi-annual with action taken to prevent future occurrences.	Proponent
Cumulative Impacts	These are impacts on the environment, which result from the incremental	Addressing each individual impact recommended in the	Annual summary report based on all incidents and	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	<p>impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. In relation to an activity, it means the impact of an activity that in itself may not be significant, may become significant when added to the existing and potential impacts resulting from similar or diverse activities or undertakings in the area.</p> <p>Possible cumulative impacts associated with the development phase include groundwater, surface water and soil pollution. Additional impacts include social impacts which relate to service delivery and social challenges.</p>	<p>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 in identifying cumulative impacts and help in planning if the existing mitigations are insufficient.</p> <p>Report poor water quality to ORASECOM.</p>	<p>water monitoring results and soil analyses.</p>	

Table 4. Decommissioning Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Waste Production	<p>Upon decommissioning, waste will be produced in the form of building rubble, and obsolete equipment, structures, and/or residual products that can be used elsewhere or sold as scrap.</p> <p>Soil polluted by hydrocarbons must be treated as hazardous waste.</p>	<p>To reduce the amount of waste all re-usable material must be removed to another site or sold.</p> <p>Those items that cannot be used again must be scrapped in the appropriate manner.</p> <p>Upon demolition of the buildings and concrete the rubble must be removed from the property and taken to an approved dumpsite.</p> <p>Rehabilitation if necessary is to be done using funds set aside for such purpose.</p>	<p>Regular visual inspections to be performed during decommissioning.</p> <p>A register of waste produced and disposal methods to be maintained during decommissioning.</p>	<p>Proponent; Contractor</p>
Ecological Impact	<p>Operations spanning many years may create new habitat for fauna and flora.</p> <p>Upon decommissioning these habitats</p>	<p>Where new habitats were created, that are now occupied by sensitive or protected fauna or flora, the Ministry of Environment, Forestry and Tourism (MEFT) or other</p>	<p>A report should be compiled of any sensitive or protected fauna and</p>	<p>Proponent; Contractor</p>

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	will be destroyed.	appropriate organizations must be contacted to establish the conservation status and handling thereof.	flora that established itself on the premises. The report should include all actions taken to relocate or deal with the situation.	
Employment	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.
Dust	Dust will be generated during the Decommissioning Phase and might be aggravated during periods of strong winds.	It is recommended that regular dust suppression be included in the Decommissioning Phase, when dust becomes an issue. Personnel should be issued with dust masks for work in dusty environments.	Regular visual inspection. 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; Contractor
Noise	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.
Groundwater, Surface Water and Soil Contamination	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	Reporting of all spills or leaks is to be completed by decommissioning Contractor.	Proponent; Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Health, Safety and Security	Health and Safety risks, similar to previous phases will be present. All other risks associated with demolitions must be considered.	<p>Adequate measures to ensure safety of staff on site, including:</p> <ul style="list-style-type: none"> Proper training of operators; First aid treatment; Medical assistance; Emergency treatment; Protective clothing, footwear, gloves and belts; safety goggles and shields. 	During decommissioning, a register of all incidents must be maintained on a weekly basis. This should include measures taken to ensure that such incidents do not repeat itself.	Proponent; Contractor
Fire	Outbreak of an uncontrolled fire.	<p>Open fires should not be allowed outside designated areas.</p> <p>Firefighting and Fire Prevention:</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>Experience has shown that the best chance to rapidly put out a major fire is in the first 5 minutes. It is important to recognise that a responsive fire prevention plan does not solely include the availability of firefighting equipment, but more importantly, involves premeditated measures and activities to timeously prevent, curb and avoid conditions that may result in fires.</p>	<p>Any incidents must be recorded bi-annual 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
Poaching, Hunting or Removal of Plant Material	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 bi-annual with action taken to prevent future occurrences.	Proponent

4 CONCLUSIONS

The above updated 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 annually by the proponent.

The EMP 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.