

APP-007054

**HARVESTING OF THE WHITE MUSSEL, *DONAX SERRA*, ALONG THE
NAMIBIAN COASTLINE, SOUTH OF SANDWICH HARBOUR**

ENVIRONMENTAL MANAGEMENT PLAN



Prepared by:



Prepared for:

Citygate Trading CC

April 2026

Project:	HARVESTING OF THE WHITE MUSSEL, <i>DONAX SERRA</i>, ALONG THE NAMIBIAN COASTLINE, SOUTH OF SANDWICH HARBOUR ENVIRONMENTAL MANAGEMENT PLAN	
Report:	Final	
Version/Date:	April 2026	
19Prepared for: (Proponent)	Citygate Trading CC P.O. Box 9055 Walvis Bay	
Lead Consultant	Geo Pollution Technologies (Pty) Ltd PO Box 11073 Windhoek Namibia	TEL.: (+264-61) 257411 FAX.: (+264) 88626368
Main Project Team:	André Faul (B.Sc. Zoology/Biochemistry); (B.Sc. (Hons) Zoology); (M.Sc. Conservation Ecology); (Ph.D. Medical Bioscience) Ernest Pelser (B.Sc. Zoology/Microbiology); (B.Sc. (Hons) Environmental Science); (M.Sc. Environmental Science)	
Cite this document as:	Faul A, Pelser E; 2026 April; Harvesting of the White Mussel, <i>Donax Serra</i> , along the Namibian Coastline, South of Sandwich Harbour: Environmental Management Plan	
Copyright	Copyright on this document is reserved. No part of this document may be utilised without the written permission of Geo Pollution Technologies (Pty) Ltd.	

TABLE OF CONTENTS

1	INTRODUCTION.....	1
2	PERMITTING REQUIREMENTS	1
3	ENVIRONMENTAL MANAGEMENT PLAN.....	1
3.1	MANAGEMENT AND IMPLEMENTATION OF THE EMP	1
3.2	MANAGEMENT OF IMPACTS: ALL PHASES	3
3.2.1	<i>Planning.....</i>	3
3.2.2	<i>Employment.....</i>	5
3.2.3	<i>Skills, Technology and Development</i>	6
3.2.4	<i>Revenue Generation and Economic Development.....</i>	7
3.2.5	<i>Generation of Knowledge</i>	8
3.2.6	<i>Tourism Concession</i>	9
3.2.7	<i>Demographic Profile and Community Health.....</i>	10
3.2.8	<i>Health and Safety</i>	11
3.2.9	<i>Security.....</i>	13
3.2.10	<i>Noise.....</i>	14
3.2.11	<i>Fire.....</i>	15
3.2.12	<i>Waste Production.....</i>	16
3.2.13	<i>Ecosystem and Biodiversity Impact.....</i>	17
3.2.14	<i>Surface Water, Soil and Groundwater Contamination</i>	19
3.2.15	<i>Archaeological, Heritage and Cultural Impact.....</i>	20
3.2.16	<i>Cumulative Impact.....</i>	21
4	DECOMMISSIONING AND REHABILITATION	22
5	CONCLUSION.....	22

LIST OF TABLES

TABLE 4-1	PERMITTING AND AUTHORISATIONS	1
TABLE 5-1	SPECIFIC IDENTIFIED ACTIONS AND RELATED RESPONSIBLE PARTY.....	2

1 INTRODUCTION

Citygate Trading CC (the Proponent) requested Geo Pollution Technologies (Pty) Ltd to prepare an environmental management plan (EMP) for the harvesting of the white mussel, *Donax serra*, along the Namibian coastline, south of Sandwich Harbour. In August 2023, the Proponent obtained an exploratory right, in terms of Section 34 of the Marine Resources Act of 2000, from the Ministry of Fisheries and Marine Resources (MFMR) to harvest white mussels as a food source for export to international markets. Although the exploratory right is for the entire coastline south of Sandwich Harbour, only selected areas with suitable habitat for white mussels will be targeted within this area. The Proponent will implement this EMP for their proposed activities.

2 PERMITTING REQUIREMENTS

The Environmental Management Act defines the *environment* 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*”. Based on this, Table 2-1 provides a summary of the most pertinent environmental permitting requirements for the project.

Table 2-1 Permitting and authorisations

Act	Regulations	Type
Marine Resources Act of 2000	No person shall in Namibia or in Namibian waters harvest any marine resource for commercial purposes, except under a right, an exploratory right or a fisheries agreement.	Exploratory right to harvest white mussels
Nature Conservation Ordinance 4 of 1975	Prohibits entry into game parks or nature reserves without a permit.	Park access permit .
Diamond Act 13 of 1999	Prohibits unauthorised person from entering restricted diamond areas.	Minister may grant a permit authorizing any person to enter, reside, travel, work or be in, or to visit a restricted area.
Environmental Management Act 7 of 2007	List of activities that may not be undertaken without environmental clearance certificate: Environmental Management Act (Government Notice 29 of 2012)	Although harvesting of living marine resources is not a listed activity, the Proponent will apply for an ECC .
Water Resources Management Act 11 of 2013	Water Resources Management Regulations (Government Notice No. 269 of 2023)	Application for a licence to abstract and use seawater (processing plant). Application for licence to discharge effluent (processing plant).

3 ENVIRONMENTAL MANAGEMENT PLAN

3.1 MANAGEMENT AND IMPLEMENTATION OF THE EMP

Each business or project will have its own management structure tasked with the management and implementation of an EMP.

Successful implementation of an environmental management plan is hinged on appointing key responsibilities and tasks to identified personnel. Members of staff may be assigned more than

one position and carry the responsibility of more than one office. Therefore, for example, the environmental co-ordinator may also be the health and safety officer and / or community liaison officer. A list of key personnel as referred to in the documentation is as follows:

- ◆ General Manager
- ◆ Financial Manager
- ◆ Procurement Manager
- ◆ Maintenance manager
- ◆ Environmental Coordinator
- ◆ Financial Manager
- ◆ Human Resource Manager
- ◆ Community Liaison Officer (CLO)
- ◆ Health & Safety Officer

Table 3-1 provides a list of actions assigned to specific personnel as per the related environmental management plan. The table should be completed with the relevant responsible parties by the Proponent.

Table 3-1 Specific identified actions and related responsible party

Responsible Party	Action Intervals	Action	Appointed Person
General Manager	Ongoing	◆ Accountable and responsible for compliance and approval of any action plans.	
Financial Manager	Once-off	◆ Ensure budgetary allowance and / or insurance for any environmental incidents / damage (e.g. pollution clean-up due to fuel spills) or rehabilitation where infrastructure is removed.	
	Ongoing	◆ Financial provisions for employee development (training): ◆ Examples: ○ Educational and wellness programs (HIV/Aids, alcohol and drug abuse, financial advice, etc.). ○ Fire protection and prevention training. ○ Health and safety plan / first aid training. ○ Communication strategy.	
Procurement Manager	Ongoing	◆ Ensure contractors' are aware of and comply to the Proponent's requirements for contractors on site and to applicable sections of this EMP.	
Maintenance Manager	Ongoing	◆ Draft necessary maintenance programs and information on utilities (location, capacity, etc.)	
Compliance Manager	Ongoing	◆ Drafting and maintenance of permitting, registration and licensing register, etc.	
Human Resources Manager	Ongoing	◆ Keep labour related documentation. ◆ Employment contracts. ◆ Local labour requirement. ◆ Unskilled labour requirement. ◆ Logging of work hours. ◆ Identification card. ◆ Provide references to employees.	
Health and Safety Officer	Once-off	◆ Compile a health and safety plan.	
	Ongoing	◆ Health and safety incidents register and related actions.	

		- Health and safety committee meetings. - Legal appointments. - Safety training e.g. toolbox talks.	
Community Liaison Officer	As required	- Record communication to community members (of incidents of importance such as environmental incidents). - Record consultation with the local and regional authorities. - Record and respond to complaints from community members.	
Environmental Coordinator	Once-off	- Develop an environmental mitigation strategy / plan. - Develop a disciplinary policy for non-compliance.	
	Bi-annual report	- Record of site inspections. - Record of rehabilitation where required (dated photos of rehabilitated areas)	
	As required	Environmental training of relevant staff on various aspects of environmental management (compliance to, and implementation, of the EMP) to be covered. Proof in the form of attendance registers kept on file.	
	Ongoing	- Recording of environmental performance and management. - Recording of environmental incidents. Proof in the form of incidents register and communication to be kept on file.	

Section 3.2 outlines the management of the environmental elements that may be affected by the activities of the Proponent. Each impact is provided as a standalone impact for easy reference and distribution to relevant employees. Impacts are, however not always completely independent of each and overlaps between two or more impacts are common. Furthermore, impacts addressed and mitigation measures proposed are seen as minimum requirements which can be elaborated on by the Proponent as the execution of the project progresses and evolves. As such, the EMP is a living document that must be prepared in detail, and regularly updated, by the Proponent and / or its consultants.

A copy of the EMP and ECC must be present on site. All monitoring results must be reported on as indicated and copies of these reports must also be present on site for inspection by officials. Reporting is also important to allow for any future renewals of the ECC, when applied for, and must be submitted to the MEFT. Currently, all ECCs list a bi-annual monitoring frequency as one of the conditions. Should this change, the frequency of monitoring report submission should match the prescribed frequency.

Since the preventative and mitigation measures for various impacts are the same, regardless of whether it is the construction, maintenance, operational or decommissioning phases, these phases will be dealt with simultaneously to prevent duplication.

3.2 MANAGEMENT OF IMPACTS: ALL PHASES

3.2.1 Planning

During the planning phase, it is the responsibility of the Proponent to ensure they are, and remain, compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place 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 relevant bodies that governs the project are in place and remains valid. These include the exploration right and park access permits.
- ◆ Ensure a contractor management program is in place and that it includes the EMP.
- ◆ Employees to adhere to relevant sections of the EMP, as applicable to their scope of work and general operations.
- ◆ Make provisions to have a health, safety and environmental coordinator or similar to oversee implementation of the EMP, occupational health and safety, as well as general environmental related compliance.
- ◆ Make provisions for a community liaison officer to handle complaints from the public or other entities.
- ◆ Have the following monitoring programmes, emergency plans, equipment and personnel on site where reasonable to deal with all potential emergencies and incidents:
 - Environmental monitoring and reporting programme
 - Health, safety and environment (HSE) manuals
 - Emergency response plan
 - Procedures, equipment and materials required for emergencies.
 - Adequate protection and indemnity insurance cover for incidents
- ◆ Develop and adopt a waste management plan inclusive of a waste minimisation and waste disposal.
- ◆ Ensure availability of sufficient funds or insurance spill clean-up or pollution remediation if ever required.
- ◆ Submit bi-annual reports to the MEFT to allow for ECC renewal after three years. This is a requirement by MEFT.
- ◆ Update the EMP and apply for renewal of the ECC prior to expiry.

3.2.2 Employment

The Proponent employs approximately 9 workers dedicated to the mussel project at the processing plant in Lüderitz. More workers are employed for operations dealing with crayfish, oysters, etc. About 27 workers will be involved on a contract basis with the harvesting of white mussels. Successful implementation of the project is hinged on continued employment of such labourers. Continued employment in turn increases their economic stability and economic resilience. Third party contractors may be used for activities such as maintenance and refurbishment of the processing plant and transporting of products to markets. Thereby also sustaining employees working for such contractors.

Desired outcome: Reduction in unemployment and increased economic resilience in the local labour sector. Continued remuneration of employees as per the Labour Act. Continued contributions to social security.

Actions

Enhancement:

- ◆ The Proponent must employ local Namibians where possible. Deviations from this practice should be justified in accordance with the Immigration Control Act, 1993.
- ◆ Reputable, local, Namibian contractors should be used where available.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Bi-annual summary report based on employee records.
- ◆ Financial records of contributions to social security and employees' salaries.
- ◆ Service providers' contracts or agreement or records be kept.

3.2.3 Skills, Technology and Development

While the actual harvesting of white mussels is a relatively unskilled, support services and operations at the processing plant will require more specialised skills. Skills will thus be transferred to an unskilled or semi-skilled workforce to be able to perform certain tasks. The addition of the processing plant at Lüderitz contributes to the development and increase in technology in the town.

Through the collection of data on white mussels (refer to section 3.2.5) the possibility exist for students to participate and use the data to enrol in post graduate studies.

Desired outcome: To see an increase in skills of local Namibians, as well as development and technology advancements in the fisheries and marine resources industry.

Actions

Enhancement:

- ◆ If the skills exist locally, contractors and employees must first be sourced from the town, then the region and then nationally. Deviations from this practice should be justified in accordance with the Immigration Control Act, 1993.
- ◆ Training and skills development must be focussed on Namibians.
- ◆ Skills development and improvement programs to be made available as identified during performance assessments.
- ◆ Employees to be informed about parameters and requirements for references upon employment.
- ◆ Advocate for the use of data collected on white mussels to enrol for post graduate studies.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Record should be kept of training provided.
- ◆ Ensure that all training is certified or managerial reference provided (proof provided to the employees) inclusive of training attendance, completion and implementation.
- ◆ Bi-annual summary report based on records kept.

3.2.4 Revenue Generation and Economic Development

Resources are produced or sourced locally and then exported internationally, contributing to the economy and trade balance of Namibia. Relevant taxes are paid to the National treasury. The successful implementation of the project and related return on investment for shareholders, will boost investors' confidence in Namibia. The successful implementation of the project will contribute to Namibia's sustainable development of Vision 2030 and the related development goals. The project may contribute to stimulation of growth in the region and increase localised expenditure.

Consulting and professional services are engaged with for assistance in applications for new permits and renewal for existing permits. During the application processes, information is generated which informs and facilitates planning of the Proponent as well as affected parties and governmental agencies. The professional service sector is further engaged with in terms of administrative processes. Such services mainly relate to the planning and operational services.

Desired outcome: Contribution to national treasury and increased economic resilience in the local labour sector.

Actions

Enhancement:

- ◆ Maximise contribution to the Namibian economy by contributing to industry development and using Namibian suppliers. Adhere to the Namibian Labour and Income Acts' requirements.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Financial records of contributions to social security and employees' salaries.
- ◆ Service providers' contracts or agreement or records be kept.

3.2.5 Generation of Knowledge

Recent scientific data on the distribution and abundance of white mussels along the Namibian coastline is lacking. Existing studies are more than twenty years old. In fulfilment of the exploration right's conditions, valuable scientific information on white mussels, and potentially other species or aspects of marine ecology, will be gathered by the Proponent and officials from MAFWLR. Should the exploratory right ultimately become a right to harvest, this knowledge base will further be broadened.

Desired outcome: To increase the scientific knowledge and data on white mussels and potentially other marine species or aspects.

Actions

Enhancement:

- ◆ In cooperation with MAFWLR device a data collection protocol prior to the onset of harvesting in terms of the exploration right. This should include what to measure and how to measure it.
- ◆ Ensure that all measurements, counts, location mapping, etc. are conducted scientifically by trained individuals to ensure sound data is collected that can reduce the knowledge gap and potentially lead to scientific publications.

Responsible Body:

- ◆ Proponent
- ◆ MAFWLR

Data Sources and Monitoring:

- ◆ Accurate record keeping with backups to ensure no data gets lost.
- ◆ Actively utilise data to contribute to the knowledge base of Namibia's marine resources through publications or post graduate studies.

3.2.6 Tourism Concession

Harvesting of mussels will take place within the Northern Dunes Tourism Development Area (TDA). Concession rights have been awarded to Living on the Edge to conduct guided tours into the area. The presence of the mussel harvesting team and associated campsite can pose possible negative impacts on the tourism activities, mainly as a result of visual impacts.

Desired Outcome: No negative impact on tourism in the TDA

Actions:

Prevention:

- ◆
- ◆

Mitigation:

- ◆ Use only material that blend into the surroundings for the temporary campsite (e.g. sand coloured canvas for tents) and no brightly coloured objects.
- ◆ Continuous liaison with the concession holder to, when tours are planned, schedule mussel harvesting away from main routes used for tours and from Anichab Pan.
- ◆ All other preventative and mitigation measures, such as those to prevent pollution and environmental damage, will further limit impacts on guided tours in the area.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Bi-annual summary report based on complaints received and action taken.

3.2.7 Demographic Profile and Community Health

The project is reliant on labour during the operational phase. It is not foreseen that the project will create a change in the demographic profile of the Lüderitz community, as employment will be sourced locally as far as possible. Community health may still to some extent be exposed to factors such as communicable disease like HIV/AIDS and alcoholism/drug abuse associated with increased disposable income of workers. Should an increase in foreign people (e.g. migrant workers) in the area take place, this may potentially increase the risk of criminal and socially/culturally deviant behaviour such as stealing of produce, poaching and the illegal harvesting of fish and marine resources. More people in the area will exert additional pressure on governmental services, particularly essential services such as health care. The impact may be reduced by the fact that Lüderitz is far removed from other inhabited areas, the distance factor hampering demographic processes.

Desired Outcome: To prevent the spread of communicable diseases and prevent / discourage socially deviant behaviour.

Actions:

Prevention:

- ◆ Employ only local people from the area.
- ◆ Adhere to all municipal by-laws relating to environmental health, such as sanitation requirements.

Mitigation:

- ◆ Provide educational, awareness information for employees on various topics of social behaviour and HIV/AIDs.
- ◆ Appointment of reputable contractors.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Bi-annual summary report based on employee demographics, educational programmes and training conducted.

3.2.8 Health and Safety

Activities associated with the project are reliant on human labour and therefore health and safety risks exist. Such risks will mostly be different for the harvesting of white mussels and operations at the processing plant. The main risks associated with the harvesting component include: vehicle accidents when accessing beaches, being swept into the ocean by unexpected waves or currents which can lead to hypothermia or worst case scenario drowning, hypothermia from continuously being in cold water during digging for mussels, sunstroke or sunburn, getting stung by bluebottles, minor injuries such as cuts or sprains, and, although relatively unlikely, arc-eyes from the sun's glare on the water. Workers can also get an illness not related to any of the activities while at the harvesting site (i.e. an underlying condition or bacterial or virus infection through exposure prior to going to site). Due to the remoteness of the harvesting sites, and the length of time required to drive through difficult terrain, treatment or assistance may not be immediately available.

At the factory, injuries can occur due to incorrect lifting of heavy equipment and materials, falling from heights, stacked items tipping over, slipping on wet floors, etc.

Molluscs often accumulate trace elements within their flesh and this may include heavy metals like cadmium and lead. They may also contain bacteria or can cause PSP and DSP. Both types of poisoning result when shellfish consume certain toxic microalgae. Health effects are thus also possible to the consumers of the molluscs ranches or harvested and distributed by the Proponent.

Desired Outcome: To prevent injury and health impacts.

Actions

Prevention:

At minimum the Proponent must:

- ◆ Comply with all health and safety standards specified in the Labour Act.
- ◆ Develop an emergency response plan for injuries and related risks.
- ◆ At least two persons who accompanies the harvesting team and two persons at the processing plant must be trained in first aid. Due to the remoteness of harvesting sites, first aiders there should have more advanced training.
- ◆ When areas with no cellular network reception is visited, a satellite phone should be present to contact emergency services for serious incidents that require search and rescue or evacuation.
- ◆ Suitably qualified and experienced drivers should be used to transport employees to and from harvesting sites.
- ◆ Provide all employees with required and adequate personal protective equipment (PPE) inclusive of insulating wetsuits for harvesters (these can also act as flotation devices).
- ◆ While harvesting white mussels, employees should be provided with enough fresh potable water to prevent dehydration and to wash the seawater (salt) off when finished.
- ◆ All personnel should have tents and bedding, sufficient to protect them from cold and wet conditions.
- ◆ Ensure that all personnel receive adequate training on safety aspects pertaining to the harvesting of mussels and operations in the processing plant.
- ◆ Clearly label dangerous and restricted areas as well as dangerous equipment and products at the processing plant.
- ◆ Sampling of molluscs as per the standards for mariculture industry in Namibia as performed by the Namibia Standards Institution.
- ◆ Develop *Hazard Analysis Critical Control Points (HACCP)* principles and develop an in-house food safety program.

Mitigation:

- ◆ Treat all minor work-related injuries immediately and obtain professional medical treatment if required.

- ◆ Assess any safety concerns and incidents and implement corrective action to prevent future occurrences.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ HACCP
- ◆ Sampling as per the existing standard for mariculture industry in Namibia as performed by the Namibia Standards Institution.
- ◆ Monitoring and analysis reports on file.
- ◆ Record any incidents with the actions taken to prevent future occurrences.
- ◆ Record all training which was conducted and when safety equipment and structures were inspected and maintained.
- ◆ A bi-annual report should be compiled of all incidents reported and all monitoring/analysis results. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.

3.2.9 Security

Security risks are mainly related to unauthorized entry and theft at the processing plant. The harvesting team may potentially access restricted diamond areas.

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

Actions

Prevention:

- ◆ Security procedures and proper security measures must be in place to protect workers and clients at the processing plant and to prevent theft.
- ◆ Harvesting teams must comply to the conditions and procedures required to access diamond areas which includes obtaining of police clearance certificates.

Mitigation:

- ◆ Take disciplinary steps within the legal parameters of Namibia against personnel who are found guilty of theft.
- ◆ Since harvesting operations will take place in mostly access controlled locations, report any suspicious onshore and offshore activity to the relevant authorities such as the MEFT, MAFWLR, Namibian Police, etc.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ A bi-annual report should be compiled of all incidents reported with actions taken to address such problems and prevent future incidents.

3.2.10 Noise

Noise impacts are limited to the processing facility where blowers and freezers may produce noise. The impact is not expected to be highly significant and will be limited to workers as the processing plant is located far from any other developments.

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

Actions

Prevention:

- ◆ Adhere to the applicable prescribed noise levels as contained in the Labour Act, 1992: Regulations relating to the health and safety of employees at work.
- ◆ All machinery must be regularly serviced to ensure minimal noise production.
- ◆ Blower fans and pumps can be enclosed to reduce noise.

Mitigation:

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

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Labour Act, 1992: Regulations relating to the health and safety of employees at work.
- ◆ Maintain a complaints register.
- ◆ Report on complaints and actions taken to address complaints and prevent future occurrences.

3.2.11 Fire

Fire risks are mostly linked to the processing plant and the unlikely possibility of a vehicle catching fire. Construction and maintenance activities, failing electrical infrastructure, short circuits and poorly maintained vehicles can for example result in a fire.

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

Actions:

Prevention:

- ◆ Prepare a holistic fire protection and prevention plan. This plan must include evacuation plans and signage, an emergency response plan and a firefighting plan.
- ◆ 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) instructions and all spills or leaks are cleaned immediately.
- ◆ Maintain regular site and vehicle mechanical and electrical inspections and maintenance.
- ◆ Maintain firefighting equipment and fit all vehicles with a fire extinguisher.
- ◆ Candles or open flames should at no time be allowed within tents, save for the kitchen tent.

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 serviced and when training was conducted.

3.2.12 Waste Production

Minimal waste will be produced by the Proponent. Waste streams generated include domestic waste, biological waste (dead molluscs and mollusc shells) and sewage, and waste generated during the cleaning of holding tanks. Construction and maintenance waste may include building rubble and discarded equipment. Contaminated soil and water (by hydrocarbons or chemicals) may be considered as hazardous waste. Unconfined wastes / litter such as empty cement bags may be blown away by strong winds and end up in the surrounding environment.

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

Actions

Prevention:

- ◆ Develop and implement a waste management program, this should include waste reduction and recycling initiatives and regular inspection and maintenance of waste storage and disposal areas.
- ◆ All employees should be educated on proper waste handling and disposal and importantly on the segregation of waste according to the different waste streams and their appropriate disposal locations.
- ◆ Ensure adequate temporary waste storage facilities are available that prevents waste being blown away by wind and prevent scavenging (human and non-human) of waste.
- ◆ No waste may be buried at white mussel harvesting sites and all waste should be contained and transported back to Lüderitz for disposal at the registered landfill.
- ◆ Mobile toilets should be transported to and from white mussel harvesting sites and the contents of the holding tanks must be disposed of at a registered sewage treatment plant. No sewage related waste may be disposed of at the mussel harvesting sites.
- ◆ Waste should be disposed of regularly and at appropriately classified disposal facilities, this includes hazardous materials (empty chemical containers, contaminated rugs, paper water and soil), if any. See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers.
- ◆ A contingency plan must be developed to handle any hazardous biological waste, for example disease-bearing molluscs. This should include proper disposal methods to prevent spread of contamination or scavenging by animals or humans.

Mitigation:

- ◆ In the event of fuel or oil spills or leaks en route to, or at the mussel harvesting sites, all contaminated soil should be collected for disposal at a registered disposal facility for hazardous products.
- ◆ Beneficial use of shells may be investigated e.g. as source of calcium carbonate, in order to minimize this type of waste associated with the processing plant
- ◆ Weekly inspections and clean-ups of the shoreline near the processing plant to ensure waste from the industry does not pollute the environment.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Waste management plan on file.
- ◆ A record should be kept of any disposal of hazardous waste.
- ◆ Any complaints received regarding waste should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

3.2.13 Ecosystem and Biodiversity Impact

White mussel harvesting sites will mainly be accessed by four-wheel drive vehicles. Such vehicles have the potential to cause significant damage if driving on sensitive habitats. Tracks created when driving through the shifting sand dunes typically quickly covers with sand. However, some desert dwelling animals such as the sidewinder snake, geckos, spiders, scorpions and beetles may be present on or between dunes, or just beneath the sand of the dunes. These can be injured or killed by vehicles' wheels. Driving near the shore has more potential for damage as biodiversity increases due to the presence of more food. This may include, depending on the area accessed, various birds, jackals, brown hyenas, seals, numerous arthropods and the occasional chameleon. Driving between the high and low water mark can injure or kill burrowing animals living in the sand. This includes white mussels. One of the largest Damara Tern breeding areas are associated with the Anichab Pan.

Overharvesting of white mussels can disrupt the food web and lead to population decline. Returning of undersized mussels to the water, without placing them back into the sand, will expose an unnaturally high number of mussels to predators which may, together with the harvesting thereof, impact population sustainability.

At the processing plant, bright lighting may blind and disorientate birds like flamingos that fly at night. This can result in collisions with man-made structures.

Desired Outcome: To prevent or minimise disturbance and destruction of the ecological environment and prevent contamination thereof.

Actions.

Prevention:

- One of the most important actions to prevent environmental impacts is education of all workers on the importance of protection of biodiversity and the environment. This should include creating an understanding of why it is important and not simply a "you may not" command.
- Drivers of vehicles should specifically be trained to be vigilant for any signs of animals and plants and to avoid these. Specifically, vigilance for bird nests (often very well camouflaged) and bird chicks is important. Chicks often cannot get out of deep vehicle tracks in time and can be driven over.
- Vehicles should drive in convoy and only on existing tracks with a lead vehicle and all other vehicles following in its tracks to reduce the potential impact on the environment.
- Where tracks are not visible in the dune areas, the same route should be used each time, by driving according to GPS tracks, in order to minimise possible environmental impacts.
- No vehicles may access the beach between the high and low water mark.
- All vehicles' wheels must be deflated to less than 1.4 bar to reduce soil compaction and injury to soil dwelling animals (this will also be required to drive on sandy terrain to prevent getting stuck and may require dropping tyre pressure to as low as 0.8 bar).
- When driving past flocks of birds or seals on the beach, vehicles should slow down and attempt to pass them at a distance as not to disturb them, but also not damaging other sensitive habitats.
- The campsite footprint should be kept to a minimum and no vegetation may be removed or damaged to establish the camp.
- Before choosing the campsite location, inspect the areas for any visible signs of animal burrows and activity around hummocks and vegetation. Choose sites with no or little animal activity.
- Workers' movements must be restricted to the campsite and to the sandy beach area. A dedicated route from the beach to the campsite should be used at all times.
- All rocky shores, the Anichab Pan, hummocks and vegetated areas, save for the campsite, should be avoided at all times.
- Digging for white mussels may only be by hand and no equipment such as spades or forks may be used.

- ◆ Only white mussels meeting the size limits imposed by MAFWLR may be collected. Too small white mussels must be placed back in the sand and suitably covered to ensure they do not wash away and are targeted by predators.
- ◆ During the exploration phase, sustainable yield will be determined by MAFWLR whose officials will also periodically accompany the Proponent to harvesting sites. The Proponent must adhere to the harvesting quota prescribed by MAFWLR based on the determined sustainable yield.
- ◆ Waste handling should be according to section 3.2.12.
- ◆ At the processing plant, all lighting used at night should be directed downwards as not to impact birds flying at night. This will also decrease the visual impact of the facility.
- ◆ No diseased animal found in the holding tanks of the facility may be discarded into the ocean. Handling of hazardous biological waste should be according to section 3.2.12.
- ◆ The water of any holding tank where a diseased animal was found must be sterilised before being disposed of.

Mitigation:

- ◆ Harvested sites should be given enough time to recover before being harvested again.
- ◆ Continuous monitoring of population distribution and abundance should be performed in order to timeously detect decreasing populations (whether as a result of the Proponent's harvesting or from natural causes such as sea surface temperature disruptions influencing reproduction). Should such decreases be detected the collection strategy and quota should be reviewed in conjunction with MAFWLR.
- ◆ Report any injured animals or extraordinary sightings of animals to MEFT and/or MAFWLR.

Responsible Body:

- ◆ Proponent
- ◆ MAFWLR

Data Sources and Monitoring:

- ◆ Records should be kept of all mussels as per the requirements of MAFWLR which, among others, include parameters such as location, quantity, sizes, etc.
- ◆ All monitoring information to be included in a bi-annual report or as per the requirements of MAFWLR.

3.2.14 Surface Water, Soil and Groundwater Contamination

Leaks and spillages from vehicles or illegal dumping of waste may lead to surface water (ocean), groundwater and soil contamination. Localised reduction in seawater quality can occur at the processing plant when pollutants including high organic loads enter the ocean. Fresh groundwater sources and fountains are present near the mussel harvesting area. Disposal of sewage or other forms of pollution may impact these resources.

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

Actions

Prevention:

- ◆ Develop a spill response plan with adequate spill response materials for unlikely events of fuel or oil spills.
- ◆ Stay clear at all times from the areas identified in the EIA as having boreholes and fountains.
- ◆ All equipment, engines and parts that can potentially result in pollution due to breakages must be regularly maintained and serviced to reduce the probability of such events from occurring (e.g. inspection and replacement of fuel hoses).
- ◆ Vehicles may not be serviced while on site to collect white mussels.
- ◆ Follow waste management measures as per section 3.2.12, specifically with reference to the handling of sewage.

Mitigation:

- ◆ Any spill must be cleaned and disposed of at a registered waste disposal facility.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Keep a maintenance schedule for all equipment.
- ◆ A report should be compiled of all incidents with actions to rectify the problem recorded.

3.2.15 Archaeological, Heritage and Cultural Impact

Lüderitz has a rich heritage due to it being one of the oldest towns in Namibia with a rich history in the diamond mining sector. No known heritage, archaeological or cultural artefacts are present in the direct vicinity of the processing plant.

The road to the mussel harvesting area, and the surroundings at the mussel harvesting area, hosts known sites of archaeological significance. As long as the Proponent do not deviate from the access routes as presented in this report, none of these sites will be impacted, even though the road does come close to some of them. The possibility exist that new sites may be exposed during strong winds and as a result of shifting sands.

Desired Outcome: To preserve any artefacts of archaeological, heritage or cultural significance.

Actions

Prevention:

- ◆ Inform all employees to be vigilant for any extraordinary finds and to take action not to cause any damage to such finds, but report it to the manager present at the site.
- ◆ The campsite should not be located closer than 200 m from the known archaeologically significant site.
- ◆ Workers' movements must be restricted to the campsite and to the sandy beach area. A dedicated route from the beach to the campsite should be used at all times.

Mitigation:

- ◆ If a site or any other archaeologically important artefact is found a "chance finds procedure" must be initiated which includes stopping any further work that can cause damage and reporting to superiors and the relevant authorities.
- ◆ For any human remains, the Namibian Police must be informed as a first action.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Compile a bi-annual report of all chance finds, proof of reporting to authorities and actions taken.

3.2.16 Cumulative Impact

Cumulative impacts associated with the project are minimal. It mainly includes increased traffic on the roads to the processing plant at Lüderitz. The areas to be accessed to harvest white mussels are strictly controlled with only concession holders and their clients, mining companies, and officials from MEFT or MAFWLR periodically entering these areas.

Desired Outcome: To minimise cumulative impacts associated with the project.

Actions

Mitigation:

- ◆ Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- ◆ Reviewing biannual and annual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Bi-annual summary reports based on all other impacts will give an overall assessment of the possible cumulative impacts of the operational phase.

4 DECOMMISSIONING AND REHABILITATION

Decommissioning of the processing plant is not foreseen during the validity of the ECC. Decommissioning was however assessed as construction activities include modification and decommissioning. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including buildings and underground infrastructure. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within Labour Act and WHO standards and waste should be contained and disposed of at an appropriately classified and approved waste facility and not dumped in the surrounding areas. Future land use after decommissioning should be assessed prior to decommissioning and rehabilitation initiated appropriately. The environmental management plan for the facility will have to be reviewed at the time of decommissioning to cater for changes made to the site and implement guidelines and mitigation measures. Decommission of the tented camp will require the removal of all equipment and waste and leaving the site as it was before the camp was erected.

5 CONCLUSION

Responsible and sustainable harvesting of white mussels as a resource for export can contribute to employment and revenue generation in Namibia. The purpose of the exploratory right is to determine harvesting quotas and the sustainability of the resource.

Through adherence to the EMP, negative impacts associated with the project can successfully be prevented or mitigated. Implementing a SHE policy or similar will contribute to effective management procedures to prevent and mitigate impacts. All regulations relating to the exploratory right, as well as those governing the areas to be accessed, should be implemented and adhered to. All staff must be made aware of the importance of biodiversity and the poaching or illegal harvesting of animal and plant products prohibited. Any waste produced must be removed from site and disposed of at an appropriate facility or re-used or recycled where possible. Hazardous waste, including sewage, must be disposed of at an approved waste disposal site. Soil, surface- and ground-water pollution must be prevented at all times. In terms of mussel harvesting the EMP must be followed with specific attention to the protection of the environment and sites of archaeological or scientific significance. The local mussel population must be carefully monitored in cooperation with MAFWLR. No driving outside of existing tracks should be allowed. The chance find procedure must be implemented for any archaeological finds.

The EMP should continue to be used as an on-site reference document for the project. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may need to be undertaken. All operational personnel must be taught the contents of these documents.