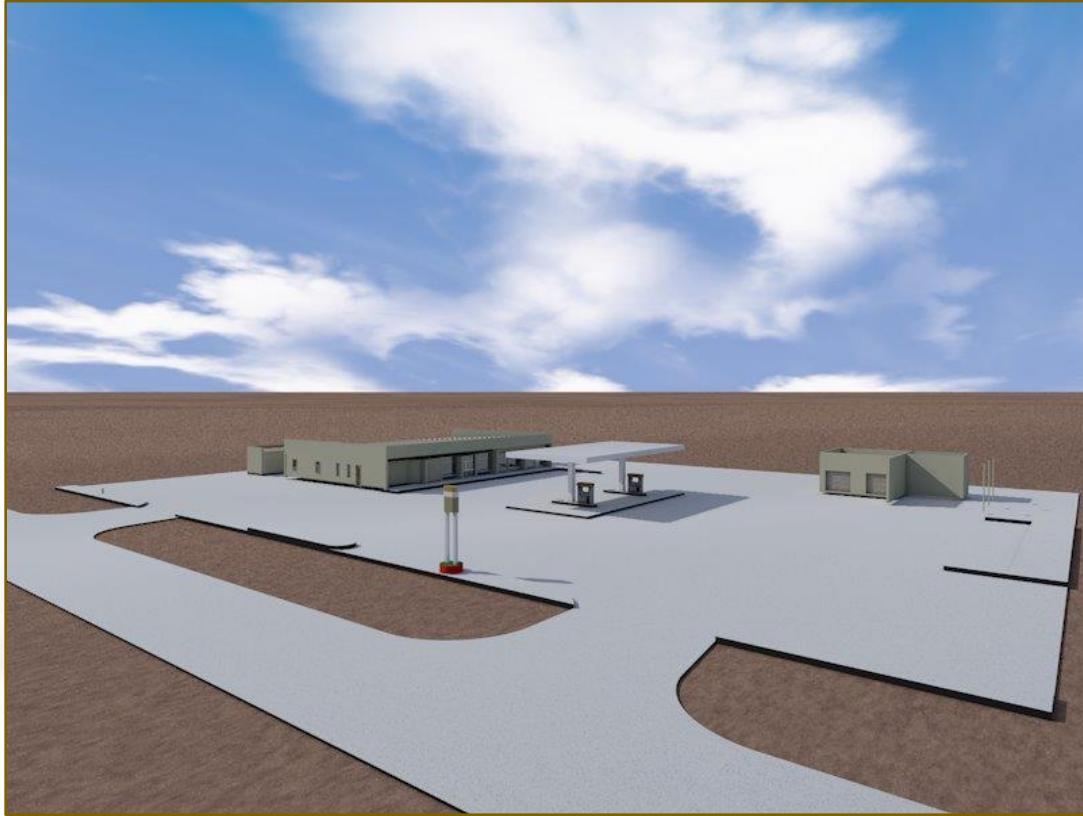


**ENVIRONMENTAL MANAGEMENT PLAN FOR //AIHA SERVICE STATION ON ERF 5,
WEST OF TSUMKWE SETTLEMENT, ALONGSIDE C44 MAIN ROAD,
OTJOZONDJUPA REGION**



CONSULTANT:

Seanton Investment Cc
P.O. Box 8857
Bachbrecht, Windhoek
Namibia
Tel: +264 857441144



March 2021

PROPONENT:

Gaoxa Trading Cc
P.O. Box 905
Grooifontein
Namibia
Tel: +264 812346929



Submitted to:

Ministry of Environment and Tourism
The Environmental Commissioners Office
Department of Environmental Affairs (DEA)
Private Bag 13306
Windhoek, Namibia

Distribution to:

Gaoxa Trading Cc
Tsumkwe Settlement Office
Otjozondjupa Regional Council
Ministry of Environment and Tourism
Ministry of Mines and Energy

Project Details	
Project Title	<p>The proposed development of //Aiha Service Station is planned to be on the land situated on GPS coordinates: 20°30' 4.869" E 19°35' 27.594" S</p> <p>The envisioned project entails the construction of a standard service station with two dispensing pumps (petrol and diesel) with double walled underground storage tanks of 30 000 liters with four compartments. With an average shopping complex with various service offerings including: Butchery, Express market, tyre servicing center, toilets and coffee shop.</p>
Environmental Clearance	Environmental Clearance Certificate to be issued in the name of the Proponent (Gaoxa Trading Cc) and, a copy be sent to the Environmental Assessment Practitioner.
Report Status	EMP
Proponent	<p>Gaoxa Trading Cc P.O. Box 905 Grootfontein Cell: 081 2346929 E-mail: MutjiPetrus@gmail.com</p>
Environmental Assessment Practitioner (EAP)	<p>Seanton Investment Cc Environmental Health and Safety Consultant Mobile: +264 85 7441144 E-mail: seanton.investmentcc@gmail.com</p>
Date:	20 March 2021
Approved by:	
Signature:	

Impact Identification and Assessment

A key part of the EIA Scoping Process is the preliminary identification and consideration of issues and concerns that may impact (positively and/or negatively) with the biophysical and socio-economic environments. Issues identified as potentially significant during the Scoping Phase form the basis on which further studies were conducted in the EIA.

The potential impacts on environmental and social resources arising from the proposed development include direct and indirect impacts. Potential impacts were also linked to the different stages of the project which are identified as construction, operation, and decommissioning phases. The following sections provides a brief description of the most important of these impacts.

Criteria	Severity/Risk Rating	
Impact	+VE	Positive
	0	No impact
	-VE	Negative
Significance	L	Low (Little or no impacts)
	M	Medium (Manageable impacts)
	H	High (Adverse impact)

Probability	Duration
5 Definite	5 Permanent
4 Highly probability	4 Long-term (impact ceases)
3 Medium probability	3 Medium-term (5-15 years)
2 Low probability	2 Short-term (0-5 years)
1 Improbable	1 Immediate
0 None	
Scale	Magnitude
5 International	10 Very high/extreme
4 National	8 High
3 Regional	6 Moderate
2 Local	4 Low
1 Site only	2 None
	0 None

Table 1: Impact Evaluation Criterion (DEAT 2006).

1. Construction Phase

During the construction phase it is expected that, the main sources of impact will result due to the use of heavy mobile duty vehicles during construction. The predicted impacts cannot be quantified, primarily due to the lack of detailed information related to scheduling and positioning of construction related activities which will only come out in the feasibility study. Instead a qualitative description of the impacts is done which involves the identification of possible sources of emissions and the provision of details related to their impacts. The primary HSES impacts from the construction of service stations include air and noise quality impacts.

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance		Mitigation Measures/Controls
						Inherent/Raw	Residual	
Dust	NEGATIVE	1	2	6	3	LOW	LOW	<ul style="list-style-type: none"> ▪ Ensure measures are in place to minimize dust generated during the construction phase. ▪ Use appropriate dust suppression measures when dust generation is unavoidable, e.g. dampening with water, particularly during prolonged periods of dry weather. ▪ Avoid excavation, handling and transport of materials which may generate dust under high wind conditions. ▪ Locate stockpiles of construction materials in sheltered areas where they are not exposed to erosive effects of the wind. ▪ Ensure all vehicle, plant and equipment are in good condition. ▪ Encourage reduction of engine idling.

The construction of a service station generally consists of a series of different operations, each which has a different duration and potential to impact air quality. The major impactor of air quality during the construction phase is dust emission. Dust emission will vary from day to day depending on the phase of construction, the level of activity, and the prevailing meteorological conditions. Dust will be generated significantly due to the dry conditions and the sandy texture of the soils in the project area. The following possible

sources of dust generation have been identified as activities which could potentially generate dust during construction operations at the site:

- Transportation of materials.
- Scraping.
- Debris handling.
- Land clearing for infrastructure.

To avoid the generation of unnecessary dust, material drop height will be reduced and material storage piles will be protected from wind erosion. This can take the form of wind breaks, water sprays or vegetation of piles. All stockpiles will be damped down, especially during dry weather. It should be noted that emissions generated by wind are also dependent on the frequency of disturbance of the erodible surface. Dust created during the transportation will be limited by watering the road sections that are being used and by either wetting the material being transported or covering the back of the trucks, to limit the windblown dust from the load.

Noise	NEGATIVE	1	1	4	3	LOW	LOW	<ul style="list-style-type: none"> ▪ Ensure the use of construction vehicles and equipment that emit reduced noise levels. ▪ Ensure proper maintenance is conducted on vehicles to ensure the reduction of noise emission. ▪ The construction staff should be equipped with ear protection equipment. ▪ Audio equipment (if any) should not be played at levels considered intrusive by others. ▪ Construction activities will be limited to a period between 07h00 and 17h00.
-------	----------	---	---	---	---	-----	-----	---

The major part of service station construction usually takes place with heavy duty earth moving machinery such as bulldozers and heavy industrial activity such as welding etc. Excessive noise is generated during this process, which often can lead to disgruntled community members. Noise can also be generated during the transportation of the construction material, usually by truck, to and from the site. Noise impacts from the construction phase can be mitigated by restricting heavy duty work to hours of daylight.

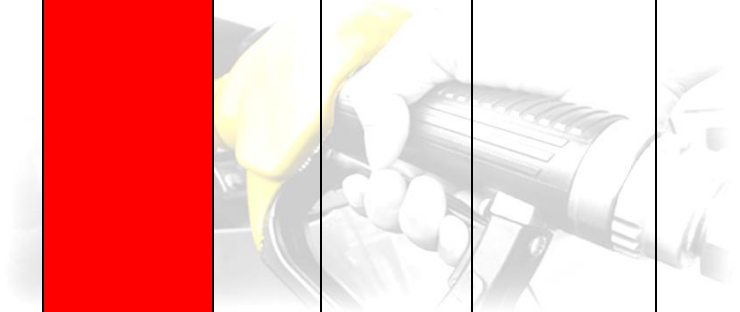
<p>Safety & Security</p>	<p>NEGATIVE</p>	<p>1</p>	<p>1</p>	<p>4</p>	<p>2</p>	<p>MEDIUM</p>	<p>LOW</p>	<ul style="list-style-type: none"> ▪ Display telephone numbers of emergency services at the project location. ▪ Provide suitable emergency and safety signage on site (manufactured of durable, weatherproof material). The signage signs should be placed at strategic locations to ensure awareness. ▪ Demarcate and barricade any areas which may pose a safety risk (including hazardous substances, deep excavations etc.). These notices must be worded in English and the local language. ▪ Always enforce the use of appropriate Personal Protective Equipment (PPE) for the right task or duties. ▪ Prevent unauthorized access to the construction site by implementing appropriate security measures. These security measures must not pose a threat to surrounding communities. ▪ Should a construction camp be necessary, it should be in such a way that it does not pose a risk to the public. ▪ Equipment housed on site must be placed in a way that does not encourage criminal activities. ▪ For safety and security reasons it is recommended that the entire site
-------------------------------------	------------------------	----------	----------	----------	----------	----------------------	-------------------	--

								<p>(construction site and camp) be fenced-off and security personnel be employed to safeguard the premises and to avert criminal activities.</p> <ul style="list-style-type: none"> ▪ Sensitize operators of earthmoving equipment and tools to switch off engines of vehicles or machinery not being used. ▪ The contractor is advised to ensure that the team is equipped with first aid kits and that they are available on site, always. ▪ Adequate lighting within and around the construction location should be erected, when visibility becomes an issue.
Traffic	NEGATIVE	1	2	2	2	LOW	LOW	<ul style="list-style-type: none"> ▪ Install and maintain official traffic signaling (where necessary) along the C44 road with local or national traffic regulations. The local or regional traffic law enforcement agency must be consulted in this regard. ▪ Speed limit and construction site warning signs must be erected to minimize accidents. ▪ Construction vehicles and machinery must be tagged with reflective signs or tapes to maximize visibility and avoid accidents. ▪ Where feasible, construction vehicles should not travel to and from the site

								<p>during peak times (07h00 to 09h00 and 16h00 to 18h00), to minimize impacts on traffic.</p> <ul style="list-style-type: none"> Construction vehicles should not be allowed to obstruct the road, hence no stopping in the road, wholly or partially, but rather pull off the road or park on the roadside.
Ground water	NEGATIVE	2	2	4	2	MEDIUM	LOW	<ul style="list-style-type: none"> To prevent spillages of any chemicals and petroleum products (i.e. oils, lubricants, petrol and diesel). Use drip trays, linings or concrete floors when evidence of leaks is observed on vehicles or equipment. All major servicing and maintenance of vehicles and/or equipment should be conducted at suitable workshops and containment structures. All fueling, storage and chemical handling should be conducted on surfaces provided for this purpose. Drip trays, linings or concrete floors must be used when removing oil from machinery. Spillage control procedures must be in place according to relevant SANS standards or better. Wastewater collection systems should be connected to these systems. Existing ablution facilities at the site should be used. No urinating outside these designated facilities shall be allowed.

								<ul style="list-style-type: none"> Should portable ablation facilities be necessary, adequate containment systems should be erected for these facilities. Waste should properly be contained to avoid any leakages and/or spillages and should regularly be disposed of at a suitable sewage disposal site. Run-off from these toilets due to overflows should be avoided at all cost. Proper environmental awareness and remedial response training of operators must be conducted on regular basis.
Surface water	NEGATIVE	2	2	4	2	MEDIUM	LOW	<ul style="list-style-type: none"> Use drip trays, linings, or concrete floors when evidence of leaks is observed on construction vehicles or equipment. Remove leaking vehicles from project site immediately. No servicing and maintenance of vehicles and/or equipment should be conducted on site. Any spillage of hazardous substances including fuel, oil, paint or cleaning solvent must be cleaned up immediately and disposed of at a designated disposal facility. Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and hydrocarbons into the nearby water ways and courses.

								<ul style="list-style-type: none"> ▪ Existing ablation facilities at the site should be used. No urinating outside these designated facilities will be allowed. ▪ Properly secure all temporary/portable toilets (if any) to the ground to prevent them toppling due to wind or any other cause. ▪ Maintain toilets in a hygienic state and remove waste to a licensed disposal facility. ▪ Ensure that no spillages occur when the toilets are cleaned or emptied. ▪ Prohibit urination on site, other than at designated facilities. ▪ Contain contaminated water from batching operations and allow sediments to settle before being disposed of as wastewater. ▪ Stabilize cleared areas as soon as possible to prevent and control surface erosion. ▪ Proper environmental awareness and remedial response training of operators must be conducted on a regular basis. ▪ An emergency plan will be in place on how to deal with spillages and leakages during this phase.
								<ul style="list-style-type: none"> ▪ Ensure that sufficient weather- and vermin- proof bins/containers are present on site for the disposal of solid



Waste Generation	NEGATIVE	1	2	6	4	MEDIUM	LOW	<p>waste. Waste and litter generated during this phase must be placed in these disposal bins.</p> <ul style="list-style-type: none"> ▪ Empty bins regularly as required. ▪ The Contractor shall institute a waste control and removal system for the site. ▪ All waste shall be disposed of site at an approved landfill site. ▪ No disposal of /or burying of waste on site should be conducted. No waste should be burned on site. ▪ Hazardous waste storage is to be clearly marked to indicate the presence of hazardous substances, and the protocols associated with handling of such hazardous wastes shall be known by all relevant staff members. ▪ Existing ablution facilities at the site shall be used by the contractor during this phase. No urinating outside these designated facilities. ▪ Regular inspection and housekeeping procedure monitoring will always be maintained. ▪ Awareness of the hazardous nature of various types of waste should be enforced.
								<ul style="list-style-type: none"> ▪ If such remains or objects with cultural values (e.g. bones, weapons, ancient cutlery, graves etc.) are uncovered at the project location or

Heritage	NEGATIVE	1	1	2	2	LOW	LOW	<p>surrounding, it should be barricaded off, and</p> <ul style="list-style-type: none"> The relevant authorities (i.e. the local police and National Heritage Council of Namibia) should be contacted immediately.
Ecology	NEGATIVE	1	1	2	2	LOW	LOW	<ul style="list-style-type: none"> Disturbance of areas outside the designated working zone is not allowed. No vegetation should be removed outside the designated project area.
Socio-economic	NEGATIVE	1	1	6	4	LOW	LOW	<ul style="list-style-type: none"> The construction contractor should be sourced from the settlement, or region at large (where feasible). The construction workers should be sourced from the settlement, or region at large (where feasible). Suppliers of construction materials should be sourced from the settlement, or region at large (where feasible). Locally source services required during the construction process, such as securities, rental of portable toilets, plant hire, etc.

Table 2: Construction Phase Health, Safety and Environmental Risk/Impact Identification, Assessment and Evaluation

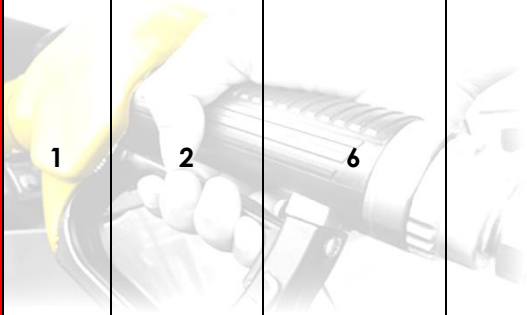
2. Operational Phase

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance		Mitigation Measures/Controls
						Inherent/Raw	Residual	
Spillages	NEGATIVE	1	2	6	4	MEDIUM	LOW	<ul style="list-style-type: none"> ▪ Risk of impact from will be lowered through proper training of staff. ▪ Installation of suitable containment structures around the dispensing points and all other operational areas. The containment system must be connected to a 2-chamber separator pit. ▪ Staff must be provided with emergency response procedures which they should be familiar with. ▪ Fuel storage tanks should be placed in suitable containment structures, such as bund walls or plastic liners to avoid the spread of spills. ▪ Staff should always be aware of the precautions associated with the handling of petroleum / chemical products as described in the relevant Material Safety Data Sheets.
<p>A spill management plan will be adopted to ensure effective response to spills. Ensure all staff are familiar with the plan and it is regularly updated. The general response to fuel spills at a service station is:</p> <ul style="list-style-type: none"> ▪ Switch off all pumps using the automatic pump cut-off. Switches should be located within easy reach of the console attendant and be clearly marked. Cut-offs at the fuse board is not acceptable. ▪ Contain the spill. Use booms or a sand / soil dam to prevent the spill from entering stormwater drains. Use the absorbents in the spill kit to soak up as much fuel as possible. ▪ Notify the site manager and / or relevant authority. ▪ Call the local Fire Brigade if a major spill occurs. ▪ Keep the public away from the spill. ▪ Contact a licensed waste contractor to dispose of the absorbents used in the clean-up operation. 								

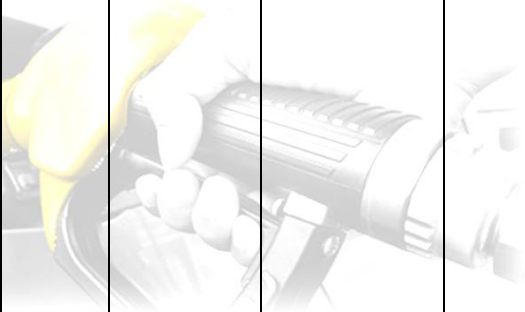
Air quality	NEGATIVE	1	4	4	2	LOW	LOW	<ul style="list-style-type: none"> ▪ Vent pipes should be placed in such a manner as to prevent impact on potential receptors. ▪ Use vapor recovery equipment and techniques to avoid air pollution and minimize fuel loss. ▪ Ensure fuel is delivered in the forecourt containment area and can't contaminate stormwater or land. ▪ Encourage reduction of engine idling at the project site. ▪ Regular air quality monitoring should be conducted at the facility. ▪ Keep a complaint register regarding vapor smells at the site; and act on it if becomes a regular complaint.
<ul style="list-style-type: none"> ▪ If Light Non-Aqueous Phase Liquids (LNAPL) are released into the vadose zone they could flow through the central portion of the soil pores until residual saturation is reached. If this happens, a three-phase system consisting of water, LNAPL, and air is formed. Infiltrating water dissolves the components within the LNAPL and transports them to the water table. These dissolved contaminants form a contaminated plume radiating from the area of the residual product. As these vapors diffuse into adjoining soil areas, they may partition back into the water phase and transfer contamination over wider areas. If the soil surface is relatively impermeable, vapors will not diffuse across the surface boundary and concentrations of contaminants in the soil atmosphere may build up to equilibrium conditions. Dissolved components of the LNAPL may also precede the less soluble components and may change the wetting properties of the water, causing a reduction in the residual water content and a decrease in the height of the capillary fringe. ▪ To mitigate the potential impact of the release of LNAPL into the atmosphere, the ground level surfaces of the project site will be covered with an impermeable material. This will reduce the diffusion of vapors into the atmosphere. Where the water table is high, cathodic protection should be used for single steel walled tanks. Otherwise, secondary contained tanks, i.e., a double-walled steel tank, double walled fiberglass, or jacketed steel tanks (with high density polythene or fiberglass outer wall) should be used. Suitable sand shall be used for both bedding and backfilling of steel tanks. Installed tank and pipe work shall be hydrostatically tested. 								

Fire & Explosions	NEGATIVE	1	1	6	2	MEDIUM	LOW	<ul style="list-style-type: none"> ▪ Emergency response procedures should be in place to alert the employees on how to react to fire and explosions incidents. ▪ An incident reporting procedure should also be implemented to make the employees aware of how, when and to whom to report fire and explosion incidents. ▪ Regular inspections should be carried out to inspect and test firefighting equipment and emergency response at the fuel retail facility. ▪ Ensure sufficient water is available all the time for firefighting purposes. ▪ It is highly recommended that electrical wiring of the facility be installed and approved by a qualified electrician who will issue a Certificate of Compliance.
Waste generation	NEGATIVE	1	4	4	2	LOW	LOW	<ul style="list-style-type: none"> ▪ Contamination of soil should be prevented using containment areas as provided. ▪ Any contaminated soil generated must be contained and bioremediated accordingly. ▪ Waste bins must always be available at the retail facility. ▪ Waste must be appropriately collected and disposed of at an approved appropriate waste disposal site.

								<ul style="list-style-type: none"> Oil-water separator effluent originating from storm water runoff, tank bottoms and washing activities should be separated before disposal of the water. Regular monitoring of the oil-water separator outflow must be conducted.
Surface water	NEGATIVE	1	2	6	3	MEDIUM	LOW	<ul style="list-style-type: none"> Proper containment mechanisms installed should be able to contain any spillages that might occur during the operation of the facility. Use drip trays, linings, or concrete floors when evidence of leaks is observed on construction vehicles or equipment. Remove leaking vehicles from project location immediately. The presence of an emergency response plan and suitable equipment is advised, to react to any spillage or leakages properly and efficiently. Remove all excess sedimentation, rubble and any other waste material present in the waterway and dispose of in a suitable manner to ensure proper drainage runoff. Ensure that stormwater management systems are regularly maintained and tested and are in good working order.



Soil and ground water	NEGATIVE	1	3	6	3	MEDIUM	LOW	<ul style="list-style-type: none"> ▪ Ensure that fuel is delivered in the forecourt containment area and must not contaminate stormwater or land. ▪ Proper monitoring of the product levels must take place to eliminate overfilling. ▪ All operational surfaces at the facility must be installed with spill containment areas. ▪ Ensure that any petroleum products, such as grease, waste oils and lubricants are contained in containment structures (e.g. plastic liners, drip trays etc.). ▪ Avoid discharge of pollutants (such as cement, concrete, lime, chemicals, contaminated wastewater, or leachate) into stormwater channels and water courses. ▪ All hazardous wastes generated in the project area should be safely contained, transported, and disposed of, or treated at a designated hazardous waste disposal or bioremediation facility. ▪ Equipment and materials to deal with spill cleanup must be readily available on site and staff must be trained as to how to use the equipment and briefed about reporting procedures.
-----------------------	----------	---	---	---	---	--------	-----	--

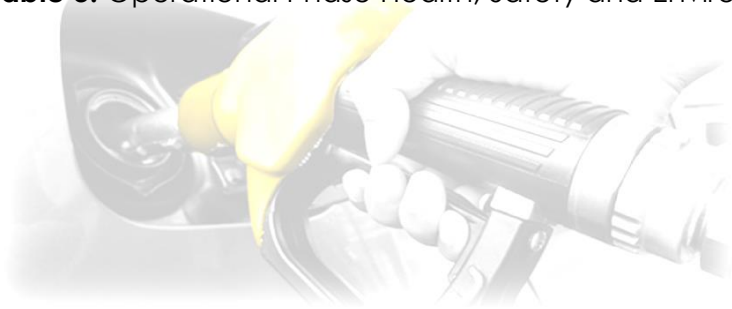


								<ul style="list-style-type: none"> ▪ Develop and implement a groundwater monitoring system and programme, with the aim of monitoring possible contamination to the water resources. ▪ Groundwater monitoring boreholes installed should be sampled and analyzed periodically. ▪ Regular tank and pipeline tightness inspections are advised to eliminate the risk of impact on the environment due to leakage. ▪
<p>Groundwater and soil pollution from hydrocarbon products are risks associated with the storage and handling of petroleum products (hydrocarbons). When a release of hydrocarbon products takes place into the soil, infiltrates the soil in the form of Light Non-Aqueous Phase Liquids (LNAPL). When this happens LNAPL start to migrate vertically downwards. The shallow ground zone between the land surface and the top of the ground water table where fuel tanks are installed is called the vadose zone.</p> <p>Other guiding principles to the prevention of potential leakages and/or spillages that could lead to groundwater pollution include:</p> <ul style="list-style-type: none"> ▪ Spillage control procedures must be in place according to SANS 10089-1:1999 and SANS 100131-2 standards, or better, including impounding around the loading areas by bunding with appropriate slopes of 1:100, construction of bund walls and floors that are liquid tight and that are not prone to deterioration under the effects of any petroleum product; ▪ The procedures followed to prevent environmental damage during service and maintenance, and compliance with these procedures, including the correct use of sumps and regular reporting of spillages must be audited and corrections made where necessary. ▪ The condition of the fuel reticulation system will have to be checked regularly and repaired to prevent leakages. ▪ Any spillage of more than 200 liters must be reported to the relevant authorities and remediation instituted (refer to section 49 of the Petroleum Products and Energy Act, 1990 (Act No. 13 of 1990)). 								

Health & Safety	NEGATIVE	1	3	6	3	MEDIUM	LOW	<ul style="list-style-type: none"> ▪ Staff must be properly trained and made aware of all the MSDS (Material Safety Data Sheets) sheets of all chemicals on site. ▪ Firefighting equipment and first aid kit should be made available and must be serviced regularly. ▪ Employees are expected to be trained on how to use all equipment and how to handle petroleum products, and training attendance lists must be kept. ▪ Display contact details of emergency services in the area at strategic locations of the facility. ▪ Demarcate and place signage on any areas which may pose a safety risk (including trenches, excavations etc.). ▪ The project personnel are advised to ensure that proper personal protective gear and first aid kits are available, always. ▪ Staff should be properly trained in first aid and safety awareness.
Traffic	NEGATIVE	1	4	6	3	MEDIUM	LOW	<ul style="list-style-type: none"> ▪ Speed limits and road signs as set out by national traffic regulations should be adhered to minimize accidents. ▪ Appropriate road signs should be erected to reduce these impacts and their spin-offs.

Ecology	NEGATIVE	1	2	2	2	LOW	LOW	<ul style="list-style-type: none"> ▪ The operational activities would not exceed the demarcated area of the fuel retail facility.
Socio-economic	NEGATIVE	1	1	8	2	LOW	LOW	<ul style="list-style-type: none"> ▪ Employment creation should be targeted at the immediate communities of Tsumkwe, or region at large ▪ Suppliers of operational stock should be sourced from the settlement, or region at large (where feasible). ▪ Locally source services required during the operational process, such as securities, rental of portable toilets, plant hire, etc.

Table 3: Operational Phase Health, Safety and Environmental Risk/Impact Identification, Assessment and Evaluation



Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Inherent	Raw Residual
Construction							
Possible cumulative impacts associated with the construction phase include an increase in traffic visiting the site. An increase in emissions from these vehicles will be experienced, decreasing the air quality around the proposed development. Wear and tear on the roads could be expected, coupled with increased risks of road traffic incidences. These impacts will be short lived for the duration of construction.							
Cumulative impacts	NEGATIVE	2	2	6	2	LOW	LOW
Operational							
Potential cumulative impacts associated with the operational phase include increase in traffic around the site. Emissions from vehicles visiting the proposed fuel retail facility are expected, coupled with the existing emissions from vehicles in the surrounding areas, the air quality will be impacted. Coupled potential hydrocarbon pollution from the existing fuel retail facility and the proposed facility could become significant if not managed properly. These impacts can be long-term as long as the retail facility is operating.							
Cumulative impacts	NEGATIVE	2	2	6	2	MEDIUM	LOW

Table 4: Cumulative impacts on construction and operational phases

3. Detecting Loss of Product

Leaks and spills of products do not necessarily indicate the potential spill size; however, the accuracy of stock monitoring techniques is critical to detecting leaks at an early stage. It follows that a larger quantity of product may lead to soil and groundwater from a long running undetected pipe work leak than from a catastrophic failure of an underground tank. Thus, it's very important to that proper stock management techniques are implemented prior to the operation of the filling station.

Loss of product are often indicated by stock reconciliation systems; upon investigation it may be determined that losses are not caused by leaks. Dispenser meters should be checked periodically and other sources of loss (e.g. theft, faulty gauge probes etc.) should be considered. The elimination of apparent losses should improve business, performance and improve the leak detection capacity of the systems in use.

4. Health, Safety, Environmental and Socio-Economic Impacts

The operation of service stations centrally involves the commercial transactions of hydrocarbon fuels (petrol, diesel, liquid, petroleum, gas, or paraffin). Additionally, //Aiha service station plans to provide additional services including bread baking, washing, and polishing vehicles, and other retailing activities. Regarding these activities, Health, Safety, Environment and Socio-economic impacts assessment will take into consideration the relationship between operational activities and the social life. This relationship is interlinked by the dependence of social activities on economic activities and economic activities on social activities. In most instances the focus is on the social impacts due to economic changes which, could trigger a change in an entire society or small changes within the community. Thus, in addition to soil and ground pollution as potential pollution hazards, there are other major health, safety and environmental issues associated with operating service stations. These are

classified into health risks, safety risks, environmental impacts, and socio-economic impacts. Table 9 below lists these activities, and a brief description is provided.

HSES Impacts	Description
Health Risks	
Noise impacts	Some noise will exist due to heavy and light motor vehicles accessing the site for delivering and collecting fuel during operations.
Air Quality	Hydrocarbon vapors containing volatile organic compounds, which harm human health and contribute to ozone pollution. Running motor vehicles produce carbon monoxide and particulate matter.
Manual handling	Hydrocarbons are carcinogenic and dermal contact and inhalation of fumes should be prevented.
Safety Risks	
Slips, trips and falls	Fuel, oil spills and water on the forecourt can put workers and others at risk of slip, trip or fall injuries.
Fire and explosion	Unleaded petrol is extremely flammable and if fuel is not handled according to Material Safety Data Sheet instructions and SANS requirements, a fire risk exist during the operational phase.
Compressed Air System	Compressed air is extremely forceful. Depending on its pressure, compressed air can dislodge particles. These particles are a danger since they can enter your eyes or abrade the skin.
Violence & harassment	There are many causes of violent behavior with customers. Some may be easy to identify, such as frustration, anger, misunderstanding, stress, communication problems, conflict with authority and theft/robbery.
Environmental Impacts	
Solid and liquid waste generation	Integral containers of adequate design and capacity should be provided for solid waste, such as discarded cans, bottles, etc. Proper facilities for storage and disposal of used and waste oil and gas must also be provided. Wastewater from the washing of motor vehicles and sewage must also be disposed of satisfactorily.
Ground water, surface water and soil contamination	Operations entail the storage and handling of various hydrocarbons (such as fuels and lubricants) which present a contamination risk. Contamination may either result from failing storage facilities, or spills and leaks associated with fuel handling. The facility provides fuel to public vehicles which may further present contamination risks through overfills. Such material may contaminate surface water, soil and groundwater. Modern retail facilities are well designed to reduce leakages and spillages form contaminating soil and water.
Traffic impacts	During operations some traffic impacts can be experienced in the vicinity of the fuel retail facility especially where vehicles gains access from and to the facility.
Socio-economic	
Economic benefits	Operations of the fuel retail facility provide employment opportunities to residents of Tsumkwe. The operational phase creates permanent employment opportunities and some training and skills development takes place.
Increased land value and real estate	The addition of the service station will potentially improve the adjacent land as new industrial activities will want to be located near a filling station.

Table 5: HSES impacts from operating service stations

5. Decommissioning Phase

The impacts associated with this phase will be like that of the construction phase. The supplier's guidelines for tank removal must be followed to reduce the risk of spillage and groundwater contamination. The Environmental Management Plan for this phase will have to be reviewed at the time of decommissioning to cater for changes made to the development.

The decommissioning phase is associated with activities related to the demolition of infrastructure and the rehabilitation of disturbed areas. The total rehabilitation will ensure that the total area will be a free draining covered with topsoil and grassed. The following activities are associated with the decommissioning phase:

- Existing buildings and structures demolished, rubble removed, and the area levelled.
- Remaining exposed excavated areas filled and levelled using overburden recovered from stockpiles.
- Stockpiles and tailings impoundments to be smoothed and contoured.
- Topsoil replaced using topsoil recovered from stockpiles; and
- Land and permanent waste piles prepared for revegetation.

Possible sources of fugitive dust emission during the closure and post-closure phase include the following:

- Movements of stockpiles by bull dozers.
- Grading of the site.
- Transport and disposal of overburden for filling.
- Infrastructure demolition.
- Infrastructure rubble piles.
- Transport and disposal of infrastructure rubble.
- Transport and reuse of topsoil; and
- Soil preparation for revegetation

Exposed soil is often prone to erosion by water. The erodibility of soil depends on the amount of rainfall and its intensity, soil type and structure, slope of the terrain and the amount of vegetation cover (Brady, 1974). Revegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option.

Typically, the first stage of decommissioning involves demolishing the forecourt buildings and canopy. This gives clear access to the ground to remove the tanks and their associated pipe work. Next the site is checked for contamination before being backfilled and restored to a level surface.

6. Discussion

From the impact assessment conducted, we deduced that the proposed development of //Aiha Service Station is suitable for the site assessed. None of the adverse impacts that were identified are regarded as impacts that cannot be mitigated to acceptable levels. The benefits of the proposed development outweigh any negative impacts identified, therefore, the no-go option was also discounted and thus omitted from discussion. Most of the HSES impacts identified can be mitigated to acceptable standards and reasonably low and accepted standards.

A summary of the main HSES impacts may be summarized as follow:

- If the proposed development is managed appropriately the //Aiha Service Station could have a significant impact on the socio-economic environment and could even have a positive impacts on the socio-economic environment; including improved visual impacts, economic benefits, skills development and indirect economic impacts from additional traffic. If measured over the long term it is expected that the development will outweigh the negative socioeconomic aspects.
- The biophysical environment will mostly be affected by construction activities that could result in excessive noise and dust, however during operation, we expect waste and noise to be generated.
- The geotechnical and geo-hydrological aspects of the study area are regarded as the most sensitive. The soils of the study area are very permeable, and the corrosiveness of the soil also contributes to such sensitivities that must be taken into consideration.
- In terms of safety and health, most impacts are associated with operations and employee safety. These impacts are however not major and can be mitigated through the application of effective controls from injuries and occupational illnesses.
- The proposed development will have a positive impact on the economy due to temporary employment opportunities during the construction phase and permanent employment opportunities for the residents of Tsumkwe community. It will also have a positive impact on the social environment as there will be visible investment from the private sector within this undeveloped area.

Furthermore, the development should now be planned, constructed, and operated in strict accordance with the mitigation measures and an Environmental Management Plan (EMP) which must adhere to all requirement of any authorizations issued for the proposed development.

7. Environmental Management Plan

The Environmental Management Plan (EMP) provides management options to ensure impacts of the proposed development are minimized. An EMP is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented, and the positive benefits of the projects are enhanced.

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 construction of the development.
- to monitor and audit the performance of construction personnel in applying such controls; and

- to ensure that appropriate environmental training is provided to responsible construction personnel.

The EMP acts as a stand-alone document, which can be used during the various phases of the proposed fuel retail facility. All contractors taking part in the construction of the facility should be made aware of the contents of the EMP.

This section outlines how the HSES Impacts identified and assessed in chapter 6 can be incorporated and managed in the planning and design phases of the proposed //Aiha service station at Tsumkwe settlement. It forms part of the Environmental Management Plan (EMP) wherein the HSES impact mitigation measures are proposed and considered. The EMP is structured to provide various intended recipients (Developer, ER, consulting engineers and contractors) with mitigation measures immediately applicable to their respective scopes of work. The management requirements for the various recipients carrying out work for this project are divided according to the main project phases

7.1 Planning and Design

During the phases of planning for future operations, construction and decommissioning of the facility, it is the responsibility of Gaoxa Trading Cc to ensure they are and remain compliant with all legal requirements. Gaoxa Trading Cc will also ensure that all required management measures are in place prior to and during all phases, to ensure potential impacts and risks are minimized.

The following actions are recommended for the planning phase and should continue during various other phases of the project:

- Ensure that all necessary permits from the various ministries, local authorities and any other bodies that governs the construction (maintenance) activities and operations of the project remains valid.
- Ensure all appointed contractors and employees enter into an agreement which includes the EMP.
- Ensure that the contents of the EMP are understood by the contractors, subcontractors, employees, and all personnel present or who will be present on site.
- Make provisions to have a Health, Safety and Environmental Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.

Furthermore, the following emergency plans, equipment, and personnel on site where reasonable to deal with all potential emergencies:

- ✓ Risk management / mitigation / EMP/ Emergency Response Plan and HSE Manuals.
 - ✓ Adequate protection and indemnity insurance cover for incidents.
 - ✓ Comply with the provisions of all relevant safety standards; Procedures, equipment and materials required for emergencies.
 - ✓ If one has not already been established, establish, and maintain a fund for future ecological restoration of the project site should project activities cease and the site is decommissioned, and environmental restoration or pollution remediation is required.
- Establish and / or maintain a reporting system to report on aspects of construction activities, operations and decommissioning as outlined in the EMP.
 - Keep monitoring reports on file for submission with environmental clearance certificate renewal applications where needed.
 - Appoint a specialist environmental consultant to update the EA and EMP and apply for renewal of the environmental clearance certificate prior to expiry.

7.1.1 HSES Impacts mitigation strategies

The following general mitigation strategies are recommended for the planning and design phase to reduce identified HSES impacts:

- Locate access routes and other infrastructure to avoid the removal of bigger trees as far as possible.
- Design boundary fencing in such a way that small burrowing animals do not enter the project site.
- The intersection of the access road to the service station site will be designed by a professional engineer and submitted to the Roads Authority (RA) for approval. Gaoxa Trading Cc will notify RA well in advance as to when the actual construction phase will begin.
- Buildings will be designed such as to minimize the transmission of noise from the inside to the outdoors. In doing so, ensure that the facility is designed to consider the maximum allowable equivalent continuous day and night rating levels of the potentially impacted sites outside the project boundary.
- Fuel tanks and fuel dispensers will be designed and installed in line with SABS and the manufacturer's recommendations. Installation will be done with care as damage can occur during installation.
- Ensure landscaping designs prohibits the planting of potentially alien invasive plant species (e.g. *Tecoma stans*, *Pennisetum setaceum*, etc.) for decorative purposes (e.g. around offices, etc.) and incorporates indigenous vegetation (especially the protected species such as *A. Erioloba*, *Albizia anthelmintica*, *B. albitrunca*, *B. foetida*, *Faidherbia albida*, *Parkinsonia africana*, *Ziziphus mucronata*) into the developments as far as possible (e.g. around offices, etc.).

7.1.2 Strategies to optimize socio-economic benefits

The following mitigation measures are recommended for the planning and design phase to reduce the impact on the socio-economic aspects.

- The contractor will be required to employ local labor (i.e. from Tsumkwe Settlement and surrounding villages within Otjozondjupa region) where possible. The requirements for employing local people will be formalized within the contractor's contract. Should a position be offered to non-local person the contractor should be able to prove that no local person qualifies for such a position, through advertising.
- A provision stating that all unskilled labor should and will be sourced from local communities and be included within tenders concerning the construction and/or maintenance of services infrastructure.
- Provisions promoting gender equality pertaining to recruitment will be included within tender documents concerning the construction and/or maintenance of services infrastructure.
- Women will be given preference for certain unskilled jobs (e.g. flag bearers).
- It is crucial that the project procurement criteria include requirements for training and skills development of the contractor's workforce by the contractor. The training should be able to capacitate the employees to apply for permanent positions during the operations.
- Gaoxa trading Cc will follow up to ensure that the contractor is indeed following the guidelines as prescribed in this EMP.

7.2 Responsibilities

The responsibility for the implementation of the EMP ultimately lies with Gaoxa Trading Cc (the proponent), who is also responsible for the eventual operation of these developments. The implementation of the EMP requires the involvement of several key individuals appointed by the proponent, each fulfilling a different but vital role to ensure sound environmental management during each phase of these developments.

The following positions and their respective responsibilities are outlined below:

- Employer's Representative: to manage projects during different phases.
- Environmental Control Officer: to oversee the implementation of EMP
- HSE Officer: Construction and Operations and Maintenance.

7.2.1 Employer's Representative (ER)

The ER is appointed by the developer to manage all contracts for work/services that are outsourced during all development phases. Any official communication regarding work agreements is delivered through this person. The ER should with the commencement of the project appoint a competent ECO who will represent the Developer on-site. He/she will have the responsibility regarding the implementation of this EMP to ensure the necessary legal authorizations have been obtained; and to develop, managing implementation of and maintaining all development.

7.2.3 Environmental Control Officer (ECO)

The ECO should be a competent person who is the Developer's on-site representative primarily responsible for the monitoring and review of on-site environmental management and implementation of the EMP by the Contractor. If no ECO is appointed the duties of the ECO fall upon the ER. The ECO's duties include but not limited to the following:

- Assisting the ER in ensuring that the necessary legal authorizations have been obtained.
- Maintaining open and direct lines of communication between the ER, Developer, the Construction and/or Operations and Maintenance Contractor, and Interested and Affected Parties (I&APs) regarding this EMP and matters incidental thereto.
- Monthly site inspection of all construction and/or infrastructure maintenance areas about compliance with this EMP.
- Monitor and verify adherence to the EMP (audit the implementation of the EMP) and verify that environmental impacts are kept to a minimum.
- Be fully conversant with the Environmental Management Plan.

7.2.4 Health, Safety and Environmental (HSE) Officer

The HSE Officer will be a competent person that will oversee the safety, health, and environmental affairs. The below will be the responsibilities:

- Convey the contents of this EMP to the contractor and undertake inspection of the site to monitor compliance with the EMP.
- Report any non-compliance or remedial measures that need to be applied to the appropriate environmental authorities, in line with the requirements of the EMP.
- Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting.
- Be fully conversant with the Environmental Management Programme.

7.3 Monitoring

A monitoring programme will be in place not only to ensure compliance with the EMP through the contract/work instruction specifications, but also to monitor any environmental issues and impacts which have not been accounted for in the EMP that are, or could result in significant environmental impacts for which corrective action is required.

The following measures will be incorporated as part of the monitoring programme:

- A monitoring programme will be implemented for the duration of the construction phase of the project. This programme will include Monthly audits will be conducted by the ECO/s for the duration of the construction phase – the ECO shall undertake this environmental monitoring with the audits considering compliance with the EMP, the EIA conditions, as well as the conditions of any permits and/or licenses.
- On-going monitoring is to be undertaken by the Contractors' Environmental Manager/Officer – this will include notification to the ECO and proponent EO should an incident take place.
- External auditing and inspection may take place at unspecified times by the authorities and/or other relevant authorities.
- An independent, suitably qualified, auditor will need to be contracted to conduct an audit once the construction phase of the project is completed according to the provisions of the EMP.
- The Contractor's Environmental Officer must undertake regular site inspections (at least twice weekly) to ensure all legislative requirements are adhered to. Proof of such inspections shall be kept on file for ease of reference or for audit purposes.

7.3.1 Contractor

The Contractor is responsible for the implementation of the EMP, on-site monitoring and evaluation of the EMP. It is envisaged that various contractors might be appointed at various periods for various tasks throughout the life cycle (construction through to decommissioning phase) of this project. To ensure sound environmental management, the relevant sections of this EMP will be included in all contracts of work outsourced thus legally binding all appointed contractors and sub-contractors.

Furthermore, all contractors shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers and visitors or new employees are inducted on the environmental, health and safety issues related to the project as well as importance and implications of the proposed EMP. The induction process shall be conducted, as far as is possible, in the employees' language of choice. All environmental training sessions, including names, dates and the information presented should be recorded and be kept on site.

7.3.2 Environmental Specifications: Awareness, Training and Competence

It is important to ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimization of environmental harm. To achieve effective environmental management, it is important that employees, contractors and subcontractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP. Environmental training may typically include the following:

- Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- Employees will be familiar with the requirements of the EMP and the environmental specifications as they apply to the construction of the power station.

- Basic training in the identification of archaeological artefacts, and rare and endangered flora and fauna that may be encountered on the site.
- Awareness of any other environmental matters, which are deemed to be necessary by the ECO.

Records will be kept of those that have completed the relevant training. Training can be done both in a written or verbal format and in an appropriate language but will be in an appropriate format for the receiving audience. Where training has been done verbally, persons having received training must indicate in writing that they have indeed attended a training session. A regular form of written or verbal testing will have to be designed.

7.4 The construction phase and its mitigation details

All activities involved in the development phases of the service station have been identified together with all aspects that may have potential impacts. The construction phase of the EMP aims to address environmental and social risk pertaining to the construction phase.

The following table provides the Environmental Management Plan and the EMP Implementation Strategy a large-scale overview of all the major environmental management themes pertaining to the project activities.



Aspect	Impact	Mitigation	Indicator	Implementer
Waste Management Plan	There is a potential environmental contamination and degradation from waste on site	The contractor will compile a waste management plan which will address as a minimum the mitigation measures below.	Correct handling of waste	Contractor ECO
Hazardous waste	Impact on soil and water.	<ul style="list-style-type: none"> • All heavy construction vehicles and equipment on site should be provided with a drip tray. • The drip trays should be cleaned daily, and spillage handled, stored and disposed of as hazardous waste. • Maintenance and washing of construction vehicles should be take place only at a designated workshop area. • The workshop should have an oil-water separator for collected run-off from washing. • Spilled cement and/or concrete (wet or dry) should be treated as hazardous waste and disposed of by the end of each day in the appropriate hazardous waste containers. • All hazardous substances (e.g. fuel etc.) or chemicals should be stored in a specific location on an impermeable surface that is bunded. 	Correct handling, use and storage of materials, including hazardous material.	Contractor and ECO
General waste	The incorrect management of solid waste can result in the pollution of soil, groundwater and the general environment. Windblown litter can also contribute to a negative visual impact.	<ul style="list-style-type: none"> • The construction site should be kept tidy at all times. All domestic and general construction waste produced on a daily basis should be cleaned and contained daily. • No waste may be buried or burned. • Waste containers (bins) should be emptied regularly and removed from site to a recognized (municipal) waste disposal site. All recyclable waste needs to be taken to the nearest recycling depot. • Enough separate bins for hazardous and domestic/general waste must be provided on site. These should be clearly marked as such. 	Complaints from neighbors. No windblown waste. Contamination of the ground and water resources	Contractor and ECO

		<ul style="list-style-type: none"> • Construction laborers should be sensitized to dispose of waste in a responsible manner and not to litter. • No waste may remain on site after the completion of the project 		
Sewage and grey water	Poor management of sewage and grey waste may contaminate the soil, vegetation and underground water resources.	<ul style="list-style-type: none"> • Sewage should not be discharged directly onto open soil. • All sewage must be removed regularly and disposed of at a recognized sewage treatment facility. • Grey water that is not recycled should be removed along with sewage on a regular basis. • Separate toilets should be available for men and women and should clearly be indicated as such. • Portable toilets (i.e. easily transportable) should be available at the construction site: • Sewage needs to be removed on a regular basis to an approved municipal) sewage disposal site. Alternatively, sewage may be pumped into sealable containers and stored until it can be removed. • Workers responsible for cleaning the toilets should be provided with latex. 	No sewage spills on site. No sewage and grey water pools on site.	ECO
Open Fires	Fire outbreak on communal lands.	No open fires may be made anywhere on site.	No sign of burnt material on site.	Contractor and ECO
Environmental Training of Workers	Without proper training the health and safety of workers will be at risk and Preventable environmental impacts could occur.	All construction workers are to undergo environmental induction (training) which should include as a minimum the following: <ul style="list-style-type: none"> • Discussion of the potential environmental impacts of construction activities. • Employees' roles and responsibilities, including emergency preparedness. • Explanation of the mitigation measures that must be implemented when work groups carry out their respective activities. 	All employees adhere to the mitigation measures provided in this document.	MET and Gaoxa Trading Cc
Communication	Inability to communicate the Environmental obligations effectively to responsible parties can result in unnecessary	To ensure that the construction activities do not result in avoidable impacts on the environment by anticipating and managing the impacts.	The ECO is aware of decisions taken by the engineer and contractors. All relevant	ECO, Contractor and Gaoxa Trading Cc

	environmental degradation.	<ul style="list-style-type: none"> All site instructions pertaining to environmental matters issued by the Contractor are to be copied to the ECO. All sub-contractors, employees, suppliers, or agents etc. must be fully aware of the environmental management requirements detailed in this EMP. Have a copy of the EMP and ECC available on site at all times for reference purposes. 	stakeholders are kept in the loop of all activity taking place on site.	
Socio- economic impact	The activity could benefit local Communities through job creation, however negative impacts are also possible and must be controlled.	<p>Adhere to the legal provisions in the Labor Act (see Table 1) for the recruitment of labor (target percentages for gender balance, optimal use of local labor and SME's, etc.) in the Contract. The Contractor should compile a formal recruitment process including the following provisions as a minimum:</p> <ul style="list-style-type: none"> Recruitment should not take place at construction sites. Ensure that all sub-contractors are aware of recommended recruitment procedures and discourage any recruitment of labor outside the agreed upon process. Contractors should give preference in terms of recruitment of sub-contractors and individual laborers to those who are qualified and from the project area and only then look to surrounding towns. Clearly explain to all jobseekers the terms and conditions of their respective employment contracts (e.g. period of employment etc.) – make use of interpreters where necessary. 	Contribute to employment and capacity building in the local community. Creating awareness Amongst employees and the public.	Contractor and ECO
Heritage Resources	Heritage resources can be impacted on during the site clearance, earthworks, and the construction of the facility.	<p>Should a heritage site or archaeological site be uncovered or discovered during the construction phase of the project, a "chance find" procedure should be applied in the order they appear below:</p> <p>If operating machinery or equipment stop work.</p> <ul style="list-style-type: none"> Demarcate the site with danger tape. Determine GPS position if possible. Report findings to the construction foreman. Report findings, site location and actions taken to superintendent. 	No heritage artefacts are disturbed or destroyed on site and the NHC is informed should any heritage artefacts be discovered on site.	ECO, Proponent and Contractor

		<ul style="list-style-type: none"> • Cease any works in immediate vicinity. • Visit site and determine whether work can proceed without damage to findings. • Determine and demarcate exclusion boundary. • Site location and details to be added to the project's Geographic Information System (GIS) for field confirmation by archaeologist. • Inspect site and confirm addition to project GIS. • Advise the National Heritage Council (NHC) and request written permission to remove findings from work area; and • Recovery, packaging and labelling of findings for transfer to National Museum. • Should human remains be found, the following actions will be required: <ul style="list-style-type: none"> • Apply the chance find procedure as described above. • Schedule a field inspection with an archaeologist to confirm that remains are human. • Advise and liaise with the NHC and Police; and • Remains will be recovered and removed either to the National Museum or the <ul style="list-style-type: none"> • National Forensic Laboratory. 		
<p>Ecological conservation</p>	<p>Constructing the facility may have impacts on the fauna and flora. Additional pylon infrastructure to the substation areas is expected to be detrimental to larger avian species – i.e. potentially increase collision rates. Destruction of vertebrate fauna. Destruction of unique flora and special habitats</p>	<p>To prevent unnecessary disturbance to natural flora and fauna:</p> <ul style="list-style-type: none"> • Prevent and discourage the setting of snares (poaching), illegal collecting of veld foods (e.g. tortoises, etc.), indiscriminate killing of perceived dangerous species (e.g. snakes, etc.) and the collection of wood in and surrounding the project area. • Initiate a policy of capture, removal and relocation of fauna (e.g. slow-moving species such as tortoises and chameleon) encountered serendipitously within the project site. • Avoid off-road driving and unnecessary nocturnal driving in the area. • Prevent and discourage the setting of snares (poaching), illegal collecting of veld foods (e.g. 	<p>No animals are injured. No setting of snares No employees enter the no-go areas. No alien vegetation establishment. Implement speed limits and temporary speed humps. No off-road driving</p>	<p>ECO and Contractor</p>

		<p>tortoises, etc.), indiscriminate killing of perceived dangerous species (e.g. snakes, etc.) and the collection of wood in and surrounding the project area.</p> <ul style="list-style-type: none"> Initiate a policy of capture, removal, and relocation of fauna (e.g. slow-moving species such as tortoises and chameleon) encountered serendipitously within the Avoid the removal of bigger trees (especially protected species – i.e. Clostherpemum mopani [Forestry Ordinance No. 37 of 1952) – during the construction phase(s) – including the development of access routes and other infrastructure developments. Prevent planting of potential alien species of plants. 	<p>No setting of fires</p> <p>Establish an appropriate refuse removal policy.</p> <p>No domestic pests on site</p>	
Topsoil	<p>Topsoil may be removed during the site preparation and excavation process, which could lead to land degradation.</p>	<p>To minimize the erosion of topsoil:</p> <ul style="list-style-type: none"> When excavating, topsoil should be stockpiled in a demarcated area. Stockpiled topsoil should be used to rehabilitate the nearest borrow area (existing borrow pits), if such an area is located less than 20 km from the stockpile eg. Sand pits in the Tsumkwe Area 	<p>All topsoil removed is rehabilitated to its natural state at the end of the construction operations.</p>	<p>ECO and Contractor</p>
Stormwater runoff, erosion, and pollution of surface water and groundwater resources	<p>Contamination of stormwater runoff can impact on the surface and groundwater resources. The mismanagement of stormwater can furthermore, result in erosion</p>	<ul style="list-style-type: none"> Prevent storm water from eroding the land and becoming contaminated. Should construction activities for the proposed infrastructure need to take place within the drainage features (i.e. linear development including roads and transmission lines) this must transect the streams at right angles and be limited as far as possible to ensure minimum disturbance of such areas. Demarcate a 100 m no-go zone from ephemeral watercourses during construction to prevent construction activities from occurring near the ephemeral watercourses to prevent further loss of vegetation, erosion, and watercourse sedimentation. Any disturbed areas must be rehabilitated as Rubble, sand and waste material resulting from the construction activities must be cleared up but not disposed in any stream or drainage channels as it will impede on the flow in these channels. 	<p>Stormwater not contaminated by construction activities. Stormwater control measures are effective at regulating runoff from the site and erosion channels do not develop. Freshwater ecosystems are not unduly disturbed by construction activities within the drainage</p>	<p>Contractor and ECO</p>

		<ul style="list-style-type: none"> • The abstraction of groundwater must be properly controlled within a prescribed water demand management plan and as required by the license conditions. • A critical groundwater level must be determined, and the groundwater table must be maintained above such critical levels during water abstraction periods. 	channels.	
Traffic	During the construction phase, it is expected that there will be regular movement of vehicle to and from the site for transportation of workers and materials.	<p>To ensure that increased traffic volume is managed efficiently to minimize associated impacts:</p> <ul style="list-style-type: none"> • Demarcate roads clearly. • Off-road driving should not be allowed. • All vehicles that transport materials to and from the site must be roadworthy. • Drivers that transport materials should have a valid driver's license and should adhere to all traffic rules. • Loads upon vehicles should be properly secured to avoid items falling off the vehicle. • Access road entrances must be demarcated, both at their exit point from existing roads and the entry point to the site. • Erect signage to warn motorists about construction activities and heavy vehicle movement where appropriate. 	Traffic is orderly, free flowing and controlled.	Contractor
Dust	Dust generated from materials handling, roads and stockpiles can become a nuisance to neighboring landowners.	<p>To avoid nuisance impacts caused by dust as far as possible:</p> <ul style="list-style-type: none"> • A watering truck should be used on gravel roads with the heaviest vehicle movement especially during dry and windy conditions. • However, due consideration should be given to water restrictions during times of drought. 	No complaints received from public and or site staff.	Contractor and ECO
Noise	The increase in traffic and operation of equipment such as welding and fixing of the racks may result in noise becoming a nuisance.	<p>To ensure that noise from the construction activities do not exceed unacceptable levels:</p> <ul style="list-style-type: none"> • Work hours should be restricted to between 08h00 and 17h00 where construction involving the use of heavy equipment, power tools and the movement of heavy vehicles is less than 500 m from residential areas. If an exception to this provision is required, all residents within the 500 m radius should be given 1 week's written notice. 	No noise complaints received.	Contractor and ECO

		<ul style="list-style-type: none"> Workers will be required to wear ear protecting devices whenever possible. If the contractor needs to undertake activities outside the hours above, the residential and community receptors within audible range of the activity must be notified within 24 hours in advance of the planned activity. 		
--	--	--	--	--

Table 6: Environmental Management Plan (EMP)

Aspect	Impact	Mitigation	Indicator	Responsibility
Demarcate the construction site	Without proper demarcation, the public would be able to access the site and would be at risk.	It is of outmost importance to prevent the encroachment of construction areas into surrounding environments.	Proper fencing in place to demarcate the construction	Contractor
Stockpiling equipment and materials	Incorrect storing of materials can result in water and soil contamination, dust and or erosion. Incorrect storage and handling of materials also poses a risk of environmental contamination and could jeopardize the safety of public / site staff.	<ul style="list-style-type: none"> Ensure that all materials and equipment handled and stored in a manner that environmental contamination and safety hazards are limited. The IPP Contractor shall be advised by the Contractor of the housekeeping arrangements including areas intended for the stockpiling of materials. Implement General Specifications as presented in this document. 	<ul style="list-style-type: none"> No public complaints or water/ soil contamination Correct handling, use and storage of materials, including hazardous materials. No incidents of Environmental contamination. No accidents or incidents related to the handling of materials. 	Contractor and ECO
Ablution facility	The lack of adequate ablution facilities and recess areas can compromise the health of site staff and result in environmental degradation.	To minimize the potential environmental impacts associated with workers on the site: Implement General Specifications	Adequate ablution facilities are in place.	Contractors and ECO
Removal of vegetation	If the removal of vegetation is done incorrectly it may leave the site prone to erosion and	To ensure that the site is not prone to erosion and any disturbed areas can be rehabilitated as necessary	Topsoil conserved in stockpiles for later use if necessary.	Contractor and ECO

	compromise rehabilitation requirements post construction.	post-construction: Implement General Specifications.		
Excavations for bulk earthworks	Created embankments (cut and fill) and retaining walls are required to level and stabilize the site. Excavations are also required to accommodate bulk services which might impact on the environment.	To limit the impact to the environment caused by excavations: Implement General Specifications	No heaps of materials left on site after the construction phase.	Contractor and ECO
Removal of equipment and temporary structures	If the construction site is not decommissioned it can result in environmental degradation	It is very imperative to leave the impacted area in an acceptable state: Implement General Specifications.	The area impacted by the construction activities pose no threat to the environment	Contractor and ECO

Table 7: Working Area Mobilization



7.5 Operations and Maintenance

The following mitigation measures should be complied with and carried out during any maintenance works associated with the services infrastructure within the planned development areas.

Aspects	Mitigation Measures
EMP Implementation	If any construction is to be conducted as part of maintenance works for the services infrastructure within the project area reference must be had to the construction mitigation measures of this EMP.
EMP and Procedures	To ensure the operation of the facility does not result in avoidable impacts on the environment, and that any impacts are anticipated and managed. The proponent must appoint a suitably qualified independent ECO to monitor compliance and compile and environmental audit report. This must be coupled to a compliance audit with the provisions contained within the EMP.
Socio-economic Impacts	To ensure the operation of the facility maximizes positive impacts on the socioeconomic environment, the following must be done: <ul style="list-style-type: none"> • Employ local labor for the operational phase, where possible, and particularly for day to day operations and maintenance. • Where possible encourage the use of local suppliers for procurement of goods, materials, and services. • Implement training and capacity building programmes to enhance the ability of local community members to take advantage of available employment opportunities.
Protection of ecology	To prevent unnecessary disturbance to natural vegetation and fauna. <ul style="list-style-type: none"> • Any alien plants within the site footprint must be immediately controlled to avoid establishment of a soil seed bank. • Control measures must follow established norms and legal limitations in terms of the method to be used and the chemical substances used. • Ensure removal and control of existing invasive alien plant species (i.e. Prosopis sp.) onsite and within the surrounding 6 m wide fire break.
Stormwater runoff, erosion, and pollution of surface water and groundwater resources.	<ul style="list-style-type: none"> • Prevent stormwater from eroding the land and becoming contaminated. • The areas likely to contribute to contaminated runoff, such as the workshop must be designed to have hardened surfaces equipped with oil and grease traps to capture any contaminated runoff. These must be maintained during operation. • Should storm water infrastructure be required, a management plan must be in place to ensure as a minimum that the structures are visually monitored after large rainfall events to ensure that eroded areas do not develop. • Any refuse generated must be disposed of in suitable bins and removed from site at regular intervals. • Ensure proper groundwater abstraction Management strategies
Visual impact	To protect the sense of place: Keep access roads clear and keep all lighting minimal, within the requirements of safety and efficiency.
Monitoring	The ECO should monitor the implementation of the Property Development EMP: before, during and after construction.

Table 8: HSES mitigation measures during operation and maintenance

7.6 Complete Closure/Decommissioning

In terms of the Environmental Management Act, it is necessary to consider the environmental impacts of decommissioning of any development, however, //Aiha Service Station is expected to be operational for a period of 25 years or more. Thereafter, the service station facility could either be decommissioned or upgraded, depending on the feasibility.

According to Namibian Legislation, decommissioning is considered as a separate activity which should be dealt with on its own. This EMA requires the EIA to make recommendations that should be considered in the new EIA process prior to decommissioning. However, seeing the decommissioning phase is far in the future, these conditions are subject to change.

A decommission plan will address the removal of the main infrastructure associated with the service station such as fuel tanks and infrastructure. Such a plan must also address aspects such as monitoring and management of surface of surface water flows and erosion.

The following mitigation measures are recommended from an ecological point as part of the closure phase:

- Rehabilitate all areas impacted on by the infrastructure
- Remove all construction waste; rip temporary tracks, if feasible, and replace the topsoil.
- Re-introduce indigenous vegetation (especially protected species) should form part of the rehabilitation process.

In terms of socio-economic impacts, the following mitigation measures are recommended:

- Maximize the use of local labor on decommissioning activities.
- Provide adequate notification to staff and other stakeholders of the pending decommissioning.
- Provide staff with references so that they can pursue work with other companies.
- If feasible, assist staff in finding employment at other operations.

The Gaoxa Trading Cc will develop a closure plan to be updated annually commencing at least 10 years prior to the envisaged decommissioning. The closure plan will identify the targets and objectives for closure and will be important in allowing operations to work toward closure objectives. Gaoxa Trading Cc will employ and commission specialist inputs from time to time to provide direction on the closure plan to ensure the end result is as closely aligned with prevailing best practice as is possible, thereby minimizing the risk and potential costs associated with decommissioning phase. The various stakeholders will also be engaged as early in the closure planning process to ensure their interests are known and catered for from the point of origin. The construction phase EMP will be used as a guideline to facilitate the detailed decommissioning phase EMP.

8. Conclusion and recommendations

The Environmental Management Plan will be used as an on-site tool during all phases of the development. Monitoring of water pollution will be conducted every quarter month of the year.

Future environmental audits will be carried out to ensure compliance to the EMP and environmental regulations of Namibia. Parties responsible for non-conformances of the EMP will be held responsible for any rehabilitation that may need to be undertaken.

The environmental clearance is valid for 3 years only, as per the environmental management act No.7 of 2007, thus it is the responsibility of Gaoxa Trading Cc to commission an application for renewal of the permit by submitting an updated ESA/EMP document before it expires.

8.1 Conclusions

The construction of //Aiha service station at Tsumkwe settlement will have positive residual environmental impacts. The EIA study findings showed negative environmental impacts to the environment to varying degrees depending on the nature of the activity and impacts arising thereof; and it also shows positive impacts especially in terms of socio-economic aspects. The management and corrective measures to address the negative HSES impacts were formulated and implementation timelines proposed depending on the gravity of threat to human life and the environment.

The identified impacts, mitigation and monitoring activities, indicators, responsible parties and monitoring frequency are indicated in the EMP. The EMP will now form the obligatory conditions upon which the EIA clearance certificates will be issued, and non-compliance attracts prosecution. The EMP should be implemented throughout the project lifecycle and an Environmental Management System formulated and implemented based on the EIA study findings. Environmental monitoring and performance evaluations will be conducted and targets for environmental improvement set and monitored throughout the project lifespan. It is also our determination that the findings will be incorporated earlier and sound HSES policies and supportive programmes will be implemented.

8.2 Recommendations

Recommendations are developed to provide guidance to Gaoxa Trading Cc on key activities that will be done to effectively manage safety, health and environment. HSES policies will be developed based on the study findings and use impacts evaluation to formulate the objectives.

- Develop and implement Environmental Management Systems.
- Develop an occupational health and safety plan.
- Adhere to the environmental management obligations upon which the EIA clearance certificate will be issued by the MET: DEA.
- The EIA clearance will not exempt the Gaoxa Trading Cc from obtaining other relevant permits and should do as such:
 - o Permit to remove Mopani trees on a portion of the project site.
 - o Access roads etc.
- The HSES policies will provide relevant training to capacitate the workers with knowledge and skills to manage safety, health and the environment.