

**APP-001168**

**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED  
CONSTRUCTION AND OPERATION OF A LIQUEFIED PETROLEUM  
GAS DEPOT AT PORTION 3 OF KATIMA MULILO TOWN, ZAMBEZI  
REGION**



*Picture for illustration purposes only*

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<b>PROJECT CONSULTANT</b>	Mr. Ipeinge Mundjulu
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## **ACRONYMS**

<b>AIDS</b>	Acquired Immuno Deficiency Syndrome
<b>DEA</b>	Department of Environmental Affairs
<b>EA</b>	Environmental Assessment
<b>EAP</b>	Environmental Assessment Practitioner
<b>ECC</b>	Environmental Clearance Certificate
<b>ECO</b>	Environmental Compliance Officer
<b>EIA</b>	Environmental Impact Assessment
<b>EMA</b>	Environmental Management Act (No. 7 of 2007)
<b>EMP</b>	Environmental Management Plan
<b>HFL</b>	Horizon Fuel and Logistics
<b>HIV</b>	Human Immuno Virus
<b>KM</b>	Katima Mulilo
<b>LPG</b>	Liquefied Petroleum Gas
<b>MET</b>	Ministry of Environment and Tourism
<b>NAMPOWER</b>	Namibia Power Utility
<b>PPE</b>	Personal Protective Equipment
<b>RDC</b>	Red-Dune Consulting CC
<b>SM</b>	Site Manager

## **Executive Summary**

Horizon and Logistics Pty Ltd is a Namibian company with an interest in the distribution of Liquefied Petroleum Gas (LPG). They intend on constructing and operating an above ground LP gas plant located on a 70 hectares' piece of land portion 3 in Katima Mulilo, Zambezi Region. Physically, LPG is defined as a colourless, odourless liquid that readily evaporates into gas. LPG is not known to have any adverse effects on human health except it being highly flammable, causing cold burns when in contact with human skin and acting as an asphyxiant (a substance that causes unconsciousness) at high concentration.

Other possible environmental threats such as land degradation, exhaust emission, biodiversity loss, oil leakages, employment, health and safety issues during construction and the operational phase are adequately addressed. The impact analysis of these environmental threats to physical environment, biological and human environment were low with the proposed mitigation measures. The information was analyzed with a high degree of certainty due to the adequate availability of literature and the global operation of LPG plants. The analysis further showed that the project is expected to positively contribute to the socio-economic development of Katima Mulilo Town Council as well as at national level through employment creation and contribution to the GDP.

Analysis of the no project alternative showed that the adverse impacts will be negative especially on the socio-economic aspects. With the adequate implementation of the EMP, the project is expected to be environmentally sustainable.

## **1. Overview**

This Environmental Management Plan (EMP) is developed following an Environmental Impact Assessment (EIA) for the proposed construction and operation of an LP gas depot. A comprehensive project description and impact assessment are contained in the EIA report.

## **2. Purpose of the EMP**

This Environmental Management Plan (EMP) is a risk strategy that contains logical frameworks, monitoring programmes, mitigation measures and management control strategies to minimize environmental impacts. It further stipulates the roles and responsibility of persons involved in the project. These strategies are developed to reduce the levels of impacts of the project.

## **3. Compliance to the EMP**

This EMP is a legally binding document as given under the provisions of the Environmental Management Act, 2007 (Act No. 7 of 2007). Horizon Fuel and Logistics and its contractors must adhere to the framework of this document

## **4. Roles and Responsibility**

### **4.1. Proponent**

The proponent, Horizon Fuel and Logistics shall take overall responsibility for proper implementation of the EMP. It remains the responsibility of the proponent to appoint key personnel for the implementation of the EMP such e.g. Site Manager and ensure that all employees and contractors are conversant with the EMP.

## **4.2. Site Manager**

The Site Manager (SM) represents the proponent on site. He/she shall be responsible for daily activities in ensuring environmental protection. All communication with regard to the implementation of EMP must be channelled through the SM

## **4.3. Employees**

It shall be responsibility of employees to adhere to the provision of the EMP at all times when on site.

## **4.4. Environmental Compliance Officer**

Compliance to EMP is enforced by the environmental inspector as provided for under Environmental Management Act (No. 7 of 2007) (EMA)

## **5. Disciplinary Action**

This EMP is a legally binding document, non-compliance to the EMP is punishable in accordance to the provisions of EMA

## 6. Policy, Legal and Administrative Framework

**Table 1.** Regulatory framework applicable to the project

REGULATORY FRAMEWORK	SUMMARY	APPLICABILITY
<b>The Namibian Constitution</b>	The State shall actively promote and maintain the welfare of the people by adopting policies aimed “ <i>The maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future</i> ”	Protection of the environment and its biodiversity
<b>Environmental Management Act No. 7 of 2007</b>	This act aims to promote the sustainable management of the environment and the use of natural resources and to provides for a process of assessment and control of activities which may have significant effects on the environment; and to provide for incidental matters	The acts provide a list of activities that may not be undertake without an Environmental Clearance Certificate to prevent environmental damages
<b>Atmospheric Pollution Prevention Ordinance Act No.11 of 1976)</b>	This Ordinance serves to control air pollution from point sources, but it does not consider ambient air quality. This ordinance is being repealed by the proposed Pollution Control and Waste Management Bill. Any person carrying out a ‘scheduled process’	Generation of Greenhouse Gases by the fuel



REGULATORY FRAMEWORK	SUMMARY	APPLICABILITY
	<p>which are processes resulting in noxious or offensive gases typically pertaining to point source emissions have to obtain a registration certificate from the Department of Health.</p>	
<p><b>Water Resources Management Act (2004)</b></p>	<p>This Act provides a framework for managing water resources based on the principles of integrated water resources management. It provides for the management, development, protection, conservation, and use of water resources. Furthermore, any watercourse on/or in close proximity to the site and associated ecosystems should be protected in alignment with the listed principles.</p>	<p>Ensure well-constructed storm water systems and ensure pollution control mechanism to avoid water pollution</p>
<p><b>Petroleum Product and Energy Act No, 13 of 1990</b></p>	<p>This Act provides a framework for handling and distribution of petroleum products which may include purchase, sale, supply, acquisition, possession, disposal, storage or transportation thereof.</p>	<p>Safe handling of the fuel</p>
<p><b>Draft Pollution Control and Waste Management Bill</b></p>	<p>This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as providing for general waste management</p>	<p>To protect the environment from possible hydrocarbons and oil leaks from the machinery and vehicles</p>

<b>REGULATORY FRAMEWORK</b>	<b>SUMMARY</b>	<b>APPLICABILITY</b>
<b>Environmental Policy framework (1995)</b>	This policy subjects all developments and project to environmental assessment and provides guideline for the Environmental Assessment.	Consideration of all possible impacts and incorporate them in the development stages
<b>National Solid Waste Strategy</b>	The strategy to control and manage solid waste in Namibia	Solid waste disposed at the site
<b>Regulations Related to the Health and Safety of Employees at Work. Reg No. 156</b>	Promotes the Safety and Health of employees at the work place	Employees subjected to noise, dust and injuries
<b>Public Health and Environmental Act No. 1 of 2015</b>	To Protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.	Application of proper mitigation measure to prevent aesthetic pollution and water pollution
<b>Labour Act No. 11 of 2007</b>	This Act outlines the labour laws which encompass protection and safety of employees at work.	This project will require labour during its construction and operational stage
<b>Regional Council Act, 1992 (Act No. 22 of 1992)</b>	The Regional Councils Act legislates the establishment of Regional Councils that are responsible for the planning and coordination of regional policies and development. The main	Observe the regional by laws

REGULATORY FRAMEWORK	SUMMARY	APPLICABILITY
	objective of this Act is to initiate, supervise, manage and evaluate development at regional level.	
<b>Local Authority Act No. 23 of 1992 Government Notice of No.116 of 1992.</b>	This Act underlines the duties and functions of the Local Authority	The town development and land acquisition
<b>Hazardous Substances Ordinance No. 14 of 1974</b>	This ordinance gives provision to control the handling of hazardous substance in all circumstances, such as manufacturing, importing and exporting of these to ensure human and environmental safety.	Handling of fuel, fire and explosion risks
<b>Soil Conservation Act No. 76 of 1969</b>	To promotes the conservation of soil, prevention of soil erosion	Uncontrolled movement of heavy vehicles and truck at areas surrounding the site may cause land degradation
<b>Water Resource Management Act No.11 of 2011</b>	The Act stipulates the prevention of both surface and ground water sources.	The possibility of surface and groundwater contamination.
<b>Word's Best Practices</b>	<b><i>Precautionary Approach Principle</i></b>  This principle is globally accepted when there is a lack of sufficient knowledge and information about the possible threats to the environment. Hence if the anticipated impacts are greater, then precautionary approach is applied. In this project, there are no	Precautionary measure must be applied during project operation

REGULATORY FRAMEWORK	SUMMARY	APPLICABILITY
	<p>eminent uncertainties however in cases when they arise, this approach should be applied.</p> <p><b><i>Polluter Pays Principle</i></b></p> <p>This principle ensures that proponents takes responsibility of their actions. Hence in cases of pollution, the proponent bears the full responsibility of cleaning up the environment.</p>	
<p><b>National Heritage Act No.27 of 2004</b></p>	<p>The Act gives provision of the protection and conservation of places and objects with heritage significance.</p>	<p>There were no heritage features identified on site nor within close vicinity of the site.</p>

## 7. The EMP table

The EMP is divided into three components; Physical Environment, Biological Environment, and Human Environment in accordance with the project phases. This is to ensure for easy implementation.

### 7.1. Construction Phase

#### 7.1.1. Human Environment

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
<b>Employment</b>	To ensure that locals benefit from the employment opportunities to be created during construction and operation of the project.	<ol style="list-style-type: none"> <li>1. Ensure that all general work is reserved for local people unless in circumstances where specialized skills are required.</li> <li>2. Fair compensation and labour practises as per Namibian Labour Laws must be followed</li> <li>3. Ensure skill transfer to the locals</li> <li>4. Use local suppliers for goods and services where possible</li> <li>5. All employees must go through an induction course for the provision of the EMP</li> </ol>	<ul style="list-style-type: none"> <li>• Employees record Labour unrest over unfair compensation</li> <li>• Induction minutes, reports and attendance registers</li> </ul>	Site Manager

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
<b>HIV/AIDS, Alcohol and Drug Abuse</b>	To sensitise employees about the dangers of alcohol, drugs and HIV/AIDS	<ol style="list-style-type: none"> <li>1. Provide awareness to the employees on dangers of HIV/AIDS, alcohol and drug abuse</li> <li>2. Provide condoms on site</li> </ol>	Awareness meeting minutes	Site Manager
<b>Health</b>	To ensure good health and safety of the employees and public	<ol style="list-style-type: none"> <li>1. Abide to the Occupational Health and Safety and Labour Act of Namibia and other statutory requirements such as International Labour Practise (Organization?) (ILO)</li> <li>2. Ensure adequate first aid kit</li> <li>3. Supervisors must undergo an occupational health and first aid course</li> <li>4. Train employees on the possible health hazards to avoid potential risks</li> <li>5. Provide appropriate Personal Protective Equipment (PPE)</li> <li>6. Employees must NOT be exposed to noise levels above the required -85dB (A) limit over a period of 8 hours</li> <li>7. Adhere to the Labour Act which stipulates that non-toxic human dust exposure levels may not</li> </ol>	<ul style="list-style-type: none"> <li>• Training minutes</li> <li>• Complaints of health issues by employees</li> <li>• Employees fitness certificates</li> <li>• First aid kit available</li> </ul>	Site Manager

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
		<p>exceed 5mg/m<sup>3</sup> for respiratory dust and 15mg/m<sup>3</sup> for total dust.</p> <p>8. Supply clean drinking water to the site</p>		
<b>Safety</b>	To ensure good health of the employees	<ol style="list-style-type: none"> <li>1. The installation of LPG storage tanks and associate infrastructures such as pipes, must conform with the necessary ISOs and regulatory guidelines for the LPG industry</li> <li>2. Develop a safety plan</li> <li>3. Ensure that every employee goes through an induction course about safety</li> <li>4. Employees must be equipped with all necessary Personal Protective Equipment (PPE) which includes helmets, overalls, safety shoes, safety glasses, gloves, earmuffs, etc.</li> <li>5. Only qualified and licenced personnel must be allowed to operate machinery and vehicles</li> <li>6. Adequate safety signs must be displayed on site</li> </ol>	<ul style="list-style-type: none"> <li>• PPE for all employees</li> <li>• Safety policy/plan in place</li> <li>• Training minutes</li> <li>• Licensed personnel operation specialized equipment</li> <li>• Safety signs on site</li> </ul>	Site Manager
<b>Visual Impact</b>	To prevent litter/waste scattered all over and preserve aesthetic value	<ol style="list-style-type: none"> <li>1. Maintain good house keeping</li> <li>2. Excavated heaps and construction material must be stored well</li> </ol>	<ul style="list-style-type: none"> <li>• Scattered litter, visual inspection</li> </ul>	Site Manager

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
		3. Trenches must be rehabilitated (backfilled and compacted)	<ul style="list-style-type: none"> <li>Construction site levelled and compacted</li> </ul>	
<b>Archaeology/ Heritage Resources/ Artefacts</b>	Preserve Heritage	1. Employees must be trained on the possible finding of archaeological material in the area 2. Implement a chance find and steps to be taken when archaeological material findings e.g. heritage rocks, paintings and drawings, human remains or artefacts are unearthed Stopping the activity immediately: <ul style="list-style-type: none"> <li>i. Informing the operational manager/supervisor</li> <li>ii. Cordoned off the area with danger tape and manager to take appropriate pictures</li> <li>iii. Manager/supervisor must report the finding to the National Museum (+ 264 61 276 800) or the National Forensic Laboratory (+ 264 61 240 461).</li> </ul>	Heritage resources/artefacts	Management or Site Manager
<b>Traffic</b>	To ensure coordinated movement of heavy vehicles	1. Trucks must be installed with a rotating headlight beam light	Complaints	Site Manager



Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
		2. Trucks must maintain a low speed to prevent excessive dust and accidents 3. Install warning signs where necessary		

7.1.2. Bio-Physical Environment

<b>Environmental / Social Impact</b>	<b>Objectives</b>	<b>Proposed Mitigation Measures</b>	<b>Monitoring Indicator</b>	<b>Party Responsible</b>
<b>Impact on Flora</b>	To ensure sustainable conservation of the vegetation	<ol style="list-style-type: none"> <li>1. Unless inevitable mature trees must not be cut down</li> <li>2. Do not plant alien trees</li> </ol>	Complaints and records	Site Manager
<b>Impact on Fauna</b>	To ensure protection of animals especially wild animals	<ol style="list-style-type: none"> <li>1. Do not kill animals if found on site (unless it is an eminent danger to human life)</li> </ol>	Records of animals killed	Site Manager
<b>Land Pollution / Surface and Ground Water Pollution</b>	To prevent water pollution	<ol style="list-style-type: none"> <li>1. Fueling of heavy vehicles on site must be well coordinated at designated places</li> <li>2. Stationary vehicles must be provided with drip tray to capture oil, lubricants and hydraulic fluid leakages</li> <li>3. All vehicles and machinery must be well serviced to avoid leakages</li> <li>4. Provide and train on oil spill emergency response</li> <li>5. Servicing of vehicles and machinery must take place at designated sites</li> </ol>	Physical inspections	Site Manager

<b>Environmental / Social Impact</b>	<b>Objectives</b>	<b>Proposed Mitigation Measures</b>	<b>Monitoring Indicator</b>	<b>Party Responsible</b>
<b>Oil Leakages</b>	Manage fuels, oils and lubricants leakages from vehicles and machinery to prevent pollution	<ol style="list-style-type: none"> <li>1. Ensure all vehicle are well serviced and leak inspections are done,</li> <li>2. Provide drip trays to stationary vehicle</li> <li>3. Servicing of vehicles must be done at an approved site;</li> <li>4. Re-fuelling and oil / replacement must be done on approved sites,</li> </ol>	Physical verification and routine monitoring	Management or Site Manager
<b>Land Degradation</b>	To prevent soil erosion	<ol style="list-style-type: none"> <li>1. Movement of heavy vehicles must be coordinated and restricted to be on access roads</li> </ol>	Physical inspection	Site Manager
<b>Waste Generation</b>	To ensure good housekeeping and prevent littering	<ol style="list-style-type: none"> <li>1. Develop a waste management strategy</li> <li>2. Provide skip bins to collect waste and be disposed of at an approved disposal site</li> <li>3. Provide mobile toilets at the site</li> <li>4. Do not burry waste on site</li> <li>5. Used oil, grease and lubricants cans must be collected in appropriate drums and disposed of at an approved site.</li> </ol>	<p>Waste bins on site</p> <p>Physical inspection</p>	Site Manager
<b>Air Pollution</b>	To prevent / minimize all source of air pollution	<ol style="list-style-type: none"> <li>1. Movement of heavy vehicles must strictly be restricted within the site;</li> <li>2. Adhere to the minimum speed limit of 30 or</li> </ol>		

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
		<p>40km/hour;</p> <ol style="list-style-type: none"> <li>3. Do not excavate and/or offload sand during heavy winds;</li> <li>4. Trucks carrying sand must be covered,</li> <li>5. Sand stock piles must be covered or regularly water sprayed with water;</li> <li>6. On site where soil is loosened by vehicle movement, apply dust a suppression method such as water spraying,</li> <li>7. Cement and concrete must be mixed with concrete mixers and not manually in the open,</li> <li>8. Cement bags must be stored and disposed of properly and may not be shaken in the open</li> </ol>		
<b>Noise Impacts</b>	To prevent noise pollution from flying aircraft	<ol style="list-style-type: none"> <li>1. Heavy vehicles must be well serviced</li> <li>2. Switch off engine off vehicles when not in use</li> <li>3. Drive at 30 km/h while on site</li> </ol>	Complaints from farmers and members of public	Site Manager

## 7.2. Operational Phase

### 7.2.1. Human Environment

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
<b>Employment</b>	To ensure that locals benefit from the employment opportunities to be created during construction and operation of the project.	<ol style="list-style-type: none"> <li>1. Ensure that all general work is reserved for local people unless under circumstances where specialized skills are required.</li> <li>2. Fair compensation and labour practises as per Namibian Labour Laws must be followed</li> <li>3. Ensure skill transfer to the locals</li> <li>4. Use local suppliers for goods and services where possible</li> <li>5. All employees must go through an induction course for the provision of the EMP</li> </ol>	Employee records Labour unrest over unfair compensation Induction minutes, reports and attendance register	Site Manager
<b>HIV/AIDS, Alcohol and Drug Abuse</b>	To sensitise employees about the danger of alcohol, drugs and HIV/AIDS	<ol style="list-style-type: none"> <li>1. Provide awareness to the employees on danger of alcohol, (HIV/AIDS) and drug abuse</li> <li>2. Provide condoms on site</li> </ol>	Awareness meeting minutes	Site Manager

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
<b>Health</b>	To ensure good health and safety of the employees and public	<ol style="list-style-type: none"> <li>1. For cold burns, immediately flush with cold water.</li> <li>2. If exposed to high concentration, switch off the gas transmission and go to an open area with sufficient air circulation.</li> <li>3. Abide by the Occupational Health and Safety and Labour Act of Namibia and other statutory requirement such as International Labour Practise (ILO)</li> <li>4. Ensure adequate first aid kit</li> <li>5. Supervisors must undergo an occupational health and first aid course,</li> <li>6. Train employees on the possible health hazards to avoid potential risks</li> <li>7. Provide appropriate Personal Protective Equipment (PPE)</li> <li>8. Supply clean drinking water to the site;</li> </ol>	<p>Induction Minutes</p> <p>Valid driver licenses for heavy vehicles</p> <p>Complain of health issues by employees</p> <p>PPE registers all employees</p>	<p>Site Manager</p>
<b>Safety</b>	To ensure good health of the employees	<ol style="list-style-type: none"> <li>1. The installation of LPG storage Tanks and associate infrastructures such as pipes, must conform with the necessary ISOs and regulatory guidelines of the LPG industry,</li> </ol>	<p>Health complaints from employees</p> <p>Employees fitness certificates</p>	<p>Site Manager</p>

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
		<ol style="list-style-type: none"> <li>2. Avoid at all times any source of ignition material on the premises</li> <li>3. Develop a <b>fire safety policy</b> with clear procedures and guidelines on how to react to LP gas fire</li> <li>4. Staff must be properly trained on how to react and handle fire</li> <li>5. There must be an automatic fire alarm system installed at the site</li> <li>6. Firefighting equipment must be on site 24hours and regularly inspected to ensure that they are functional</li> <li>7. Emergency response numbers must be on clear and visible space</li> <li>8. There must be clear hazard signage reading “NO OPEN FIRE” “NO SMOKING” and “SWITCH ENGINE OFF”</li> <li>9. There must be drills to test staff for their firefighting readiness</li> <li>10. The site must be fenced off by a boundary wall (in case there is bush/veld fire outbreaks)</li> </ol>	<p>No signs of live fire (ashes) No source of ignition</p> <p>Fire policy in place Automatic fire detecting system</p> <p>Firefighting equipment</p> <p>Clear warning site Training minutes</p> <p>Drill reports PPE for fire fighting</p>	

<b>Environmental / Social Impact</b>	<b>Objectives</b>	<b>Proposed Mitigation Measures</b>	<b>Monitoring Indicator</b>	<b>Party Responsible</b>
		11. Provide personnel with full protective clothing such as full-face air supplied or self-contained breathing apparatus, overalls, thermal insulated gloves, splash-proof goggles and non-sparking boots.		

### 7.2.2. Biological Environment

<b>Environmental / Social Impact</b>	<b>Objectives</b>	<b>Proposed Mitigation Measures</b>	<b>Monitoring Indicator</b>	<b>Party Responsible</b>
<b>Flora</b>	To preserve a good landscape	<ol style="list-style-type: none"> <li>1. Ensure good landscaping by trimming remaining trees</li> <li>2. Water the remaining trees</li> </ol>		
<b>Fauna</b>	To prevent harming / killing of animals	<ol style="list-style-type: none"> <li>1. No killing of any type of animal is allowed unless such animal pose danger to human health (e.g. snake)</li> </ol>		



## **8. Closure / Decommissioning Plan**

Decommissioning is normally the reverse of construction and all installed materials must be removed. It is likely that during the time the project is to be decommissioned, the environment has changed hence a decommissioning and rehabilitation plan must be developed and approved by the competent authority.

Nonetheless, during decommissioning, LPG tanks must be removed, the piping system shall be re-installed, concrete foundation must be dismantled resulting in the production of a huge volume of waste. During this stage, it is important to develop a decommissioning waste management strategy which shall ensure the appropriate handling of different types of waste and disposal as per the national and international laws. It is important to ensure that all tanks are empty, this can be done by flushing tanks with air or water. After the removal of all material, the site must be rehabilitated through levelling and compactions. Since it is a town land with potential to accommodate another developmental project, re-vegetation is not recommended.

The following is a systematic decommissioning plan

1. Prior to decommissioning, the proponent must inform the office of the Environmental Commissioner;
2. All work must be supervised by qualified and competent engineers;
3. It is recommended that an environmental specialist must monitor any possible contamination during decommissioning;
4. There must be clear signs to the public about the closure of the project;
5. The contractor must use the right tools and equipment;
6. Workers must be provided with all necessary PPE;
7. All wasted generated must be disposed of at approved sites.

## **9. Conclusions and Recommendations**

### **9.1. Conclusion**

All over the world, the LPG industry has grown extensively therefore making it an alternative source of clean and affordable energy for household use. The industry has developed standard guidelines for the operation of LPG activities, ranging from cylinder and storage tanks manufacturing to plant operations. The guideline mainly focuses on health and safety measures.

The possible environmental threats such as land degradation, exhaust emission, biodiversity loss, oil leakages, employment, health and safety issues during the construction and operational phases are adequately addressed. The impact analysis of these environmental threats to physical environment, biological and human environment were low with the proposed mitigation measures. The information was analyzed with a high degree of certainty due to the availability of adequate literature and a wide operation of LPG plants worldwide. The analysis further showed that the project is expected to positively contribute to the socio-economic development of Katima Mulilo Town Council as well as at national level through employment creation and contribution to the GDP.

Analysis of the no project alternative showed that, the adverse impacts will be negative especially on the socio-economic aspects. It is important that the proponent adequately implement the EMP to ensure social and environmental sustainability.

Exploration activities are not known to cause harm to the environment due to their non-physical nature. In Namibia, farms are heavily encroached with thick bushes, hence access roads to generated targets are in a way advantageous to the farmers as long as the line cutting avoids mature and protected trees. It is important for the proponent to establish good relation with farm owner to ensure environmental protection. Should this exploration yield into the potential of establishing a mine, a comprehensive EIA must be undertaken which shall include all necessary specialist studies.

## **9.2. Recommendations**

It is recommended to the approving authority that Horizon Fuel and Logistics be granted an Environmental Clearance Certificate for the proposed construction and operation of an LPG depot subject to the following conditions,

- Proper implementation of the Environmental Management Plan to ensure environmental protection,
- Obtain all necessary permits and certifications from relevant authority,
- Undertake bi-annual environmental audits.
- Consult KMTC before the subdivision of land portion 3 of Katima Townland and,
- Together with KMTC, consult community members about project implementation.

## 10. References

1. International Association of Oil & Gas Producers, “OGP Risk Assessment Data Directory; Storage Incident Frequencies”, Report No. 434-3, March 2010.
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