ENVIRONMENTAL IMPACT ASSESSMENT PROJECT REPORT FOR THE PROPOSED INSTALLATION OF BULK LPG STORAGE AT BLUE NILE ROLLING MILLS LTD, ON, LR: 4953/2167,

Proponent:	*Report prepared and submitted by:*
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JUNE 2019

REPORT DETAILS

REPORT TITLE:

Environmental impact assessment project report for proposed installation of bulk LPG storage at blue Nile rolling mills ltd, on, LR: 4953/2167, Thika, Kiambu county

PROPONENT DETAILS:

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CERTIFICATION

The preparation of this Environmental Impact Assessment Report was commissioned by the management of Blue Nile Rolling Mills Limited in fulfillment of requirements of the EIA/EA Regulations, 2003, and Environmental Management and Coordination Act, 1999.

Blue Nile Rolling Mills Limited as the proponent in liaison with the EIA Expert and Contractor commits themselves to implementing the Environmental Management Plan as contained in the report to ensure sustainable implementation of the project.

Proponent: Blue Nile Rolling Mills Limited, Thika

Mr. Botu J Rao	**Director**
Name of Officer	Designation

Submitted by:

Firm of Experts: Diligence Consultants Limited ***Reg. No*. 9644**

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EXECUTIVE SUMMARY

Introduction

Diligence Consultants Ltd, a NEMA approved EIA/EA firm of Experts was commissioned by Blue Nile Rolling Mills, a part of The Blue Nile group to undertake the Environmental Impact Assessment (EIA) of the proposed installation of bulk LPG storage facility for use in the annealing and galvanizing plant at Blue Nile Rolling Mills Limited located in Thika Constituency, Kiambu County.

The group split from one of the country's largest producer of building materials to form a manufacturing outfit in 2006 which now comprises of 2 totally diverse industries. The company's main operating lines of businesses are steel manufacturing, real estate, trading, and export. In the last eleven years the manufacturing outfit has grown from strength to strength to become one of the leading Commercial business houses in Kenya.

Blue Nile Group is composed of:

Blue Nile Wire Products Limited – Wire products manufacturing factory.

Blue Nile Rolling Mills Limited – Steel product manufacturing factory.

The Blue Nile group is a well-known success story among the steel manufacturing sector in the country.

The company believes in installing state of the art technology and keeps upgrading its machinery in due time. This helps us to produce high quality steel and helps maintain the safety standards.

The Management of Blue Nile Rolling Mills Limited, hereafter referred to as Proponent proposes to install bulk LPG storage facility for use in the annealing and galvanizing plant at Blue Nile Rolling Mills Limited located in Thika Constituency, Kiambu County.

The firm of experts has undertaken this EIA in compliance with section 58 of the Environmental Management and Coordination Act (EMCA) No. 8 of 1999 and Environment Impact Assessment and Audit regulations (2003).

This project report presents the findings of Environmental Impact Assessment of Proposed installation of bulk LPG storage facility for use in Annealing and galvanizing plant at Blue Nile Rolling Mills Limited, Thika. The report provides description of the project, existing baseline environmental conditions, legal and regulatory frame work associated with the project,

description of the project alternatives, assess both the positive and negative potential impacts of the proposed project at its various cycles. In addition, it provides recommended mitigation Measures and environmental management plan for the adverse potential impacts of the project. The proposed project site will be at the existing plant sited on approximately 3.0Ha piece of land with reference no L.R. NO. 4953/2167 in Thika.

An Environmental Impact Assessment is a tool for environmental protection & conservation and has been identified as a key component in new project implementation. According to section 58 of the Environmental Management and Coordination Act (EMCA) No.8 of 1999 second schedule 9 (1), and Environmental (Impact Assessment and Audit) Regulation, 2003, such projects as the proposed project must be subjected to an EIA process . The report of the same must be submitted to National Environment Management Authority (NEMA) for approval and issuance of EIA License.

Methodology

This EIA was conducted in accordance with the Environment Management and Coordination Act (EMCA), 1999, EIA/EA regulations of 2003. The approach used in carrying out the EIA included; site visit, review of relevant documentation, assessment of relevant baseline information of the project area, assessment of anticipated environment and social impacts and development of appropriate mitigation measures necessary for incorporation into the project implementation, as well as an environmental management plan.

In order to address the various environmental concerns, the study team adopted a participatory approach where the Proponent and the immediate interested and affected surrounding communities were consulted in addition to reviews and references to sources of information including legal statutes, design and relevant project documents.

Anticipated impacts

Both positive and minimal negative impacts are anticipated to be associated with the proposed project development during the installation phase, operation phase and decommissioning phase. The EIA established the following significant Impacts:

- Creation of direct and indirect employment opportunities during all project phases;
- Increased revenue to the Proponent, National and County governments amongst others;
- Creation of market supply for building materials;
- Reduced cost of production by producing raw material internally instead of importing;

Optimal land use.

However, there are some adverse impacts to the environment and the communities living in the area that will require to be addressed during the construction period as well as upon commissioning of the project. These include:

- ✓ Increased Waste generation;
- ✓ Dust and exhaust emissions;
- ✓ Loss of livelihood and economic loss
- ✓ Noise and vibration
- ✓ Air pollution from dust and exhaust emission
- ✓ Health and safety risks
- ✓ Generation of solid and liquid waste

Socio-economic Impacts

The proposed project will have positive impacts both at a local and within the company. The project will create job opportunities (skilled and unskilled labor) during equipment installation and operation phases.

Waste Generation:

Limited waste streams are anticipated to be generated during the project cycle. The waste to be generated will include construction rubble; scrap, descaling waste; effluent water; packing materials and general waste produced by site personnel including wrapping from food, bottles and cans. Descaling waste and scrap materials will be used as raw materials in furnaces. The domestic wastewater will be channeled to the Sewage Treatment Plant. There is potential for waste to cause environmental pollution if not managed adequately. The Proponent however, intends to manage all wastes in accordance with Legal Notice No. 121 of 2006.

Occupational Health impacts:

Dust related respiratory problems, noise, heat stress, burns and mechanical injury are the main occupational health problems anticipated in the plant. The proponent has a resident clinician who attends to all cases at the clinic. Any cases which cannot be addressed by the clinician are referred to Thika Level 5 Hospital or St Mulumba Mission Hospital. The occupier conducts annual medical examinations through approved DHPs which include Lung function tests, audiometric tests, and the general medical examinations. The proponent should undertake pre-employment and annual checks as per law.

Health and safety impacts

The Proposed project is anticipated to pose health and safety risks related to the project activities. The potential H&S risks workers are likely to get exposed to during project phases include: mechanical Injuries resulting from operation of machinery, equipment, and tools, Fire, electrical shocks are the main hazard identified in the project. Necessary firefighting measures are in place. Hazards due to mechanical injury and electrical hazard shall be minimized by use of standard equipment, standard design and operating procedures. Personnel protective devices like face shields, ear plugs/muffs, nose masks, aprons, safety gloves, boots, belts and goggles shall be provided to the workers. Emergency response plan shall be strengthened to take care of the additional units. The proponent intends to undertake all the regulatory compliance.

Impacts on air quality

Vehicles used during all the phases are also anticipated to generate minimal air emissions. Dust pollution is anticipated from demolition works and welding activities during equipment installation and operation.

The emissions during operation would likely not be significant to impact local air quality. There will be little increase in CO_2 and negligible increment in PM emission. The proposed technology adopted by the proponent has incorporated anti-pollution system. Acid fumes will be sealed inside the chamber by water channel along the sides and double layer water curtains at the entry and exit.

Noise Impacts

The project will have very minimal impact on the ambient noise quality of the site throughout its cycle. Temporary noise pollution during equipment installation would be from delivery vehicles and welding operations during installation. These activities would increase the ambient noise levels at the site. However, it should be controlled by proper maintenance and installation of equipment. Equipment installation works will be completed in a short period of time as the proponent will engage the services of qualified machine manufacturer's engineers.

Ambient noise levels were monitored at five locations. The noise levels are well within the National Standards prescribed for industrial area. Minimal noise pollution is expected during operation

Environmental Management and Impact Mitigation

Section 8 of this report presents an environmental management plan which covers the measures for mitigating the adverse potential environmental impacts of the proposed project. The EMP includes measures for addressing the potential adverse environmental impacts of the proposed project.

Environmental Monitoring Plan: The firm of experts has developed an Environmental Management and Monitoring Plan (EMMP) to guide the project team in eliminating or reducing the project impacts to acceptable minimum/ standards. The EMMP is based on good environmental practices of project implementation and safety of the operations. The proposed EMMP can be improved through continuous monitoring and audits during project implementation

Regular monitoring of –

- ✓ Ambient air quality monitoring at locations outside the project;
- ✓ Recirculating water quantity and quality and;
- ✓ Noise monitoring at plant boundary and work environment;

Public Consultation

Public stakeholder consultation was undertaken in order to obtain the views and concerns of the stakeholders regarding the proposed project. They observed that the proposed project will generate employment opportunities and improve the work rate while some of the respondents commented on the Environmental, health and safety risks since it's a very dangerous.

Conclusion and Recommendation

Conclusion

The proposed project will generate socio-economic benefits which would not be realized if there is no development option pursued.

The potential adverse impacts associated with the proposed project are possible to mitigate successfully. The impacts before implementation of mitigation measures are assessed as negligible to medium low and the ratings are expected to improve further with the implementation of the proposed mitigation measures.

Recommendation

The firm of Experts feels that every effort has been made by Proponent to accommodate the mitigation measures recommended during the EIA process to the extent that is practically possible, without compromising the economic viability of the proposed project. The implementation of the mitigation measures detailed in this report will provide a basis for ensuring

that the potential positive and negative impacts associated with the establishment of the proposed project are enhanced and mitigated to a level which is deemed adequate.

Firm of experts finds no reason why the proposed project should not be authorized contingent that the mitigations and monitoring for potential environmental and social impacts as outlined in this report are implemented.

ACRONYMS/ABBREVIATION

DOHSS	Directorate of Occupational Health and Safety Services
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
HSE	Health, Safety, Security and Environment
LPG	Liquefied Petroleum Gas
MT	Metric Tons.
NEMA	National Environment Management Authority
OSHA	Occupation Safety and Health Act
PPE	Personal Protective Equipment
PVC	polyvinyl chloride
S&H	Safety and Health

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CHAPTER ONE

INTRODUCTION

1.1 Project Background

Blue Nile Rolling Mills Limited, hereinafter referred to as the Proponent, is proposing to install bulk LPG storage facility for use in the annealing and galvanizing plant at Blue Nile Rolling Mills Limited located in Thika Constituency, Kiambu County.

The Legal Notice No. 101 of 2003 (EIA/EA Regulations, 2003) requires the Proponent to prepare project report for approval by National Environment Management Authority (NEMA) prior to commencement of a new development. As such, Blue Nile Rolling Mills Limited engaged firm of Experts to undertake environmental impact assessment for the proposed project.

1.2 Project Objectives

The objective of the proposed project is to install bulk LPG storage for meeting the company's production requirements of annealing and galvanizing plant towards being one of the leading Manufacturers & Suppliers of Hot Dip Galvanized Wires in East Africa.

1.3 Objective of EIA

The objectives of this study are;

i. To establish the existing environmental condition at the project site;
ii. To identify significant potential impacts of the project to environment and social aspects;
iii. To seek neighbors and project affected persons views and concerns on the proposed project;
iv. Formulate recommendations to mitigate against adverse environmental and social impacts through all phases of the project;
v. Establish a comprehensive environmental management plan covering the
vi. construction, operation and decommissioning phase of the project.

The report was undertaken in full compliance with the Environmental Management and Coordination Act, 1999 and its 2015 amendment and also the EIA Regulations, 2003.

1.4 SCOPE OF EIA

The scope of the study covers the following aspects:

I. Baseline Conditions:

- ✓ Environmental setting (climate, topography, geology, hydrology, ecology, water resources, endangered species, sensitive areas, etc.),
- ✓ Socio-economic activities in the surrounding areas (land use, economic activities, institutional aspects, water demand and use, health and safety, public amenities, etc.),
- ✓ Infrastructural issues (roads, water supplies, drainage systems, power supplies, etc.).

ii. Legal and policy framework mainly focusing on the national environmental laws, regulations and by-laws.

iii. Participatory approach was adopted for the immediate neighborhood in discussing relevant issues including among others:

- ✓ Land use aspects,
- ✓ Neighborhood issues,
- ✓ Safety issues,
- ✓ Adequacy of public amenities,
- ✓ Environmental authorities,
- ✓ Environmental impacts:
- ✓ Physical impacts,
- ✓ Biological impacts,

1.5 Data Collection

The firm of experts employed various approaches in collecting data and information for assessing the impacts of the proposed projects. The following techniques were used:

1.5.1 Review of secondary data

A wide range of environmental and socio-economic data were sought to describe the baseline conditions at the project area. These included socio-economic, physical and environmental data and reports from published and unpublished literature and from environmental monitoring at the project area.

1.5.2 Interviews

Interviews were conducted during public stakeholder consultation in order to obtain the views and concerns of the interested parties with regard to the proposed projects. A semi structured interview checklist was used to capture the responses of the stakeholders.

1.5.3 Assessing significance of Impacts

The first stage of impact assessment is identification of environmental activities, aspects and impacts. The criteria used to determine significance are summarized in Table 1. Once an assessment is made of the magnitude and likelihood, the impact significance is rated through a matrix process as shown in Table 1.

Table 1: Impact Magnitude

Magnitude	
Extent	**On-site** – impacts that are limited to the boundaries of the site. **Local** – impacts that affect an area in a radius of 20km around the development site. **Regional** – impacts that affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries, habitat type/ecosystem. **National** – impacts that affect nationally important environmental resources or affect an area that is nationally important/ or have macro-economic consequences.
Duration	**Temporary** – impacts are predicted to be of short duration and intermittent/occasional. **Short-term** – impacts that last only for the duration of the construction period. **Long-term** – impacts that will continue for the life of the Project, but ceases when the Project stops operating. **Permanent** – impacts that cause a permanent change in the affected receptor or resource (e.g. removal or destruction of ecological habitat) that endures substantially beyond the Project lifetime.

	For biophysical environment, intensity is assessed in terms of sensitivity of the receptor: **Negligible** – the impact on the environment is not detectable. **Low** – the impact affects the environment in such a way that natural functions and processes are not affected. **Medium** – where the affected environment is altered but natural functions and processes continue, albeit in a modified way. **High** – where natural functions or processes are altered to the extent that it will temporarily or permanently cease. For socio-economic environment, intensity is assessed in terms of ability of project affected persons to adapt or cope with the changes caused by the project.

Table 2: Impact Significance

Significance				
		Likelihood		
		unlikely	likely	Definite
Magnitude	Negligible	Negligible	Negligible	Minor
	Low			
	Medium			
	High			

1.6 Purpose of this Report

This report addresses the requirement for preparation of project report in accordance with EIA/EA Regulations, 2003.

The report presents an overview of the proposed project and the environmental regulatory framework from which it operates. It identifies and assesses the significance of the impacts of the project as well as mitigation measures necessary to reduce or prevent impacts from occurring.

CHAPTER TWO

DESCRIPTION OF THE PROJECT

2.1 Description of Proposed Project Site

The proposed project will be undertaken in existing plant at Blue Nile Rolling Mills situated approximately 100m off Thika-Garissa highway, in Thika, Kiambu County. Geographically, the site is located on Longitudes 37˚5‟28.734” East and Latitudes 1˚3‟32.378” South at an elevation of 4882ft above the sea level. The area is designated as an industrial area.

The site is located approximately 3 Ha piece of land with land reference no L.R. No. 4953/2167 belonging to Blue Nile Rolling Mills. *Copy of lease agreement is appended at the end of this report (Appendix 1).*

The immediate neighbors of the Site are, Bindip Limited, Jubilee Feeds, Capwell Industries Limited, Kings Commodities, open field and other commercial shops/businesses.

The project will be set up in existing open field. The plant manufactures and markets a wide range of wire products including wire rods, wire mesh, BRC, nails, chain link, round wire, barbed wire and binding wire for the construction and fabrication industry. Blue Nile Rolling Mills Ltd. has a number of Automatic, Semi-Automatic & Manual Chain-link fence making machines along with a number of Barbed Wire making machines & a PVC wire coating machine, the raw material for which is Low Carbon, Low UTS, and M.S. HOTDIP Galvanized wire with commercial coating, ranging from 50-100 GSM.

Figure 1: Satellite Image showing the location of the Project site: Source Google Earth

Source Google Earth

2.2 Design of the proposed project

Liquefied petroleum gas or liquid petroleum gas (LPG or LP gas), also referred to as simply propane or butane, are flammable mixtures of hydrocarbon gases used as fuel in heating appliances, cooking equipment, and vehicles. The Proponent proposes to install 2 x 22.5 MT LPG tanks for Wire Annealing & Galvanizing wire and its auxiliary equipment for the heating and production of commercial coating range Galvanized wires. The heated Galvanized Wire will be used for the production of Chain-link fences, Barbed Wires, Gabion boxes, to serve as a Raw material for Wire PVC coating line, etc.

The calculations of the intended wall thickness of the pressure parts intended to resist the internal pressure in the gas cylinder shall be related to the yield stress of the material. For calculations purposes, the value of the yield stress R.O is limited to the maximum of 0.85Rg. The location of all openings shall be restricted to one dished end of the cylinder where each opening shall be reinforced either by the valve boss or pad of wieldable and compatible steel and there must be adequate strength to result in no harmful stress concentration. The design of the cylinder shall provide protection for the valves against damage in order to avoid release of contents in the installation of the LPG storage tank.

2.3 Description of the project's Construction and Installation activities

23.1 Location

The bulk LP Gas bulk tanks are anticipated to be located in the open with adequate ventilation and be easily accessible for operation, maintenance and fire-fighting. LP Gas tanks will be sited according to the required separation distances. The ground underneath or adjacent to connections into LP Gas tanks or LP Gas ancillary equipment shall be concreted or compacted and free from depressions, pits, culverts or drains.

Care will be taken to avoid siting tanks in locations where the surrounding ground slopes towards vulnerable features e.g., buildings, houses, drains etc., especially where there is an ignition risk, even though these will be outside normal separation distances. No part of the LP Gas tank shall be located underneath a structure of the premises or any extensions from it e.g. roof eaves, car port etc. nor beneath overhanging tree branches.

The location shall be provide a clear line of sight between the receiving tank and delivery vehicle for the person in control of the product transfer operation for easier refilling of the tanks.

2.3.2 Installation of the bulk LPG tanks

- ✓ The machinery and equipment shall be installed as per the specifications" of the manufacturer and in regard to the structural engineers" details. Several aspects including ergonomics, emergency/fire evacuation routes shall be considered prior to installation of machinery. Tank fittings used shall be made of materials compatible with LP Gas and designed to suit the range of pressures and temperatures that will occur in service.

Every tank is proposed to have at least one each of the following:

- ✓ A pressure relief valve directly connected to the vapor space.
- ✓ A maximum liquid level indicator or maximum level fill stop valve and preferably a contents gauge. Where both devices will be installed and they will be independent of each other to provide a separate means to prevent overfilling.
- ✓ A service outlet connection(s) for vapor and/or liquid duty shall be put if necessary.
- ✓ A vacuum prevention measure where excessive vacuum can occur i.e. storage of butane in low temperatures.

2.3.2 Operation Phase

2.3.2.1 Waste

a) *Waste water*

Little waste water (from cleaning activities) is expected to be generated from the facility. The waste water will be channelled to the effluent treatment plant prior to being recycled to the process.

b) Redundant equipment

Anticipated redundant waste will include faulty fuses, sockets, and machine parts. Some of them will be disposed at NEMA approved landfill and others sold to third parties for recycling while others will be recycled onsite.

2.3.2.2 Product, By-products

- **Products and By-products**

  By-products will be generated which include during the construction and installation period:

  Metal rods or parts generated during the construction of perimeter wall;

  Concrete boulders;

  Any excess construction materials brought to the project site by the contractor which can be reused later.

- **Dust**

  Vehicle movement will generate some dust and other particulates that will be released into the atmosphere.

- **Exhaust Emissions**

  The vehicles used to transport LPG are expected to generate exhaust emissions. The concentration levels of emissions will depend on the maintenance levels of the vehicles.

2.4 Project Cost

The total cost of the proposed project is estimated to Hundred Million Kenya Shillings (Ksh.20 000,000). This amount will be distributed to various project activities that include; builders work, electrical services installations, mechanical service installations, external works, site installations, preliminaries and contingencies.

2.5 Marking

Each LPG cylinder shall be permanently and legibly marked on a nameplate or other appropriate permanently attached non pressure parts, in accordance with ISO 13769, with the additional marks as detailed. Any limitation on the LPG, will be put into the cylinder it shall be permanently marked.

2.6 Certification

Each batch of the LPG cylinder shall be covered by a certificate to the effect that the cylinder/ tank meets the requirements of the international standards, in all respects.

2.7 Vent Pipes

Vent pipes will be fitted on pressure relief valves to prevent ignited LP Gas flames from impinging on the tank, pipework, equipment or nearby tanks. They shall be used on above-ground tanks over 1,500mm internal diameter and greater than 5,000 liter water capacity. In fitting vent pipes, the following shall be considered: Vent pipes should be adequately supported, with outlets at least 1.8 meters above the tank to which they are fitted.

Vent pipes will be carefully designed to avoid the risk of mechanical damage to the relief valve(s). Vent pipes will be protected against corrosion and be fitted with loose-fit rain caps, with provision for water drainage.

2.8 Pipework and Regulators

2.8.1 Pipework Design

Pipework and fittings of the LPGs will comply with the relevant standards and be of a material suitable for LP Gas and the extreme service conditions likely to be encountered.

Pipework will be welded where possible and flanges should as much as possible never be orientated in a position where the failure of a gasket could result in an ignited leakage causing a jet flame to impinge on an LP Gas tank or other pressurized equipment.

2.8.2 Supports and Anchors

Pipework supports and anchors will be located and designed to ensure that pipework stresses and deflections due to predictable loads are within acceptable limits. If necessary this will include flexibility to accommodate any unavoidable movement.

Vibration, surge pressures and valve operating torque shall be considered in the design of pipework and supports incorporating mechanical equipment such as pumps and valves.

Since it will be laid on a trench, pipework be supported above the bottom. The trench dimensions and pipe supporting arrangements will be such as to facilitate visual inspection and maintenance e.g. wire brushing, repainting of the pipe and supports. Therefore Trenches will not enter buildings.

Protection will be provided in the form of load-bearing slabs for those sections over which traffic passes or on which other loads may be superimposed.

Regulators should comply with a recognized standard. The design, materials and construction should be suitable for the full range of operating conditions. Additional safety controls such as pressure relief valves and high/low pressure cut-offs may be specified depending on the application.

2.9 Fire Precautions

Minimizing major fire risks (including escalation) will be done through installation design, layout and resourcing that both comply with all relevant local legislation and codes of practice.

The most effective form of fire protection to be highly considered is for there to be no release of LP Gas or if a release occurs, to detect it immediately and shut it down. The use of gas and fire detection and shutdown systems shall therefore be installed. Fire monitors and CO2 fire extinguishers will too be installed. Regular inspection and services of the same will be done experts.

CHAPTER THREE

BASELINE INFORMATION

The baseline environmental condition of the proposed project is described in terms of the existing physical, biological, and social-economic aspects.

3.1 Bio-Physical Aspects

3.1.1 Soils and geology

The geology of the project area mostly comprises volcanic rock Tertiary to Pleistocene, underlain by ancient (i.e. Pre-Cambrian) Basement rocks that are mostly gneisses. The soils of Thika area are stable and rich in organic matter. At the site are black cotton soils which are known to be poorly drained.

3.1.2 Hydrology

Thika area is endowed with both surface and groundwater resources. Most of the rivers flow from highlands in the west towards lowlands in the southeast of the area, where they join the River Tana and form part of the Tana and Athi river drainage system.

The main groundwater resource in the area occurs as shallow aquifers at the contact zones between the Tertiary volcanic sediments and the Basement rocks, with deeper aquifers possibly occurring along fault or fracture zones. The Proponent has a borehole at the project site which supplies water for industrial operations.

3.1.3 Climate

The area receives rainfall of between 500 to 1,500mm per year. The rain falls during two distinct seasons: the „long rains", driven by the south-easterly monsoon, usually between March and May; and the „short rains", driven by the north-easterly winds that predominate towards the end of the northern monsoon, typically occur from October to December. Average minimum and maximum temperatures are 11.5 and 28°C respectively.

3.1.4 Air Quality

The area is typically an industrial zone. Baseline air quality of the site was obtained from 2016/Env/0670 environmental monitoring report of the plant undertaken by Polucon, a NEMA accredited laboratory. The values of PM 2.5 and PM 10 monitored at different location were within the limits stipulated under Legal Notice no. 34.

The emissions during operation would likely not be significant to impact local air quality. There will be little increase in SO_2 and NOx and negligible increment in PM

emission due to this expansion unit. The proposed technology adopted by the proponent has incorporated anti-pollution system. Acid fumes will be sealed inside the chamber by water channel along the sides and double layer water curtains at the entry and exit.

3.1.5 Noise Quality

Ambient noise levels were monitored at five locations. The noise levels are well within the National Standards prescribed for industrial area.

3.1.6 Ecology

Thika area is characterized by woodland and shrub grassland, comprised of semi evergreen and deciduous bush lands. However, the Project area and its surroundings have been disturbed and significantly modified. The site is currently occupied by buildings, roads, and few exotic trees and grass.

3.2 Socio-economic Aspects

3.2.1 Population:

According to 2009 population census, Thika has an estimated population of 472, 334. Approximately 50% of the population is of working age (15-64), with 31% of people falling into the 15-30 age brackets. Women make up approximately 50% of the population. The total productive labour force in the area is approximately 267,000 people or 56% of the population; however an estimated 170,000 people (37%) live in absolute poverty.

3.2.2 Settlement pattern, and land use

Thika town is an industrial town and supports large and small-scale agriculture. The District is also highly urbanized.

3.2.3 Local economy:

The trade and industrial sectors provide an important source of employment; according to the Thika District Development Plan, a total of 31 agro-based industries, 16 chemical and 15 engineering industries are operating in the District, while commercial trading employs roughly 3,000 people.

3.2.4 Public social services:

The area has relatively poor infrastructure. Road coverage is considered fairly low, with 1,339 km of classified and 123 km of earth roads for the entire area. Poor access to road networks in the interior of the district makes it difficult for farmers to transport products to market, and contributes to higher poverty levels.

CHAPTER FOUR

POLICY, LEGAL AND INSTUTIONAL FRAMEWORK

This section of the report outlines Kenya's regulatory framework that set the context in which the Project will operate.

4.1 Policy

4.1.1 National Environment Policy

Kenya is in the process of developing a National Environment Policy. During this study Draft No. 5 of the National Policy was reviewed. The Policy will provide for a holistic framework to guide the management of the environment and natural resources in Kenya. It will also ensures that the linkage between the environment and poverty reduction is integrated in all government processes and institutions in order to facilitate and realize sustainable development at all levels in the context of green economy enhancing social inclusion, improving human welfare and creating opportunities for employment and maintaining the healthy functioning of ecosystem.

4.1.2 The Constitution

Kenya promulgated a new constitution in 2010. The new constitution is hailed as a green constitution as it embodies elaborate provisions with considerable implications for sustainable development. The provisions range from environmental principles and implications of multilateral environmental agreements (MEAs) to the right to clean and healthy environment enshrined in the Bill of Rights. Chapter V covers on land and environment. It also embodies a host of social and economic rights of an environmental character, such as the right to water, food and shelter – among others. Article 69 on obligations in respect of the environment requires the Proponent to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

4.2 Administrative Context

Kenya's new constitution (2010) has created 47 counties which are administered by the county governments headed by the governors. The Proposed project site is located in Thika Constituency which lies within Kiambu County.

The County Governments are in charge of, among other services: agriculture; health services; public amenities; trade development and regulations at county level; and planning and development.

4.3 Environmental Management in Kenya

Environmental management is currently spearheaded by the Ministry of Environment which is headed by a cabinet secretary. The Ministry is mandated to monitor, protect, conserve and manage the country's environment and natural resources. This is to be done through sustainable exploitation of natural resources for socio-economic development aimed at the eradication of poverty, improving living standards and ensuring that a clean environment is provided now and sustained in the future. Following the EMCA, the National Environmental Management Authority (NEMA) was set up under the MENR as the principle government authority for managing environmental issues across all sectors in Kenya.

4.4 Regulatory Framework

The proposed project will be undertaken in accordance with all applicable legislation, regulations, approvals and relevant guidelines. Table 5 below provides legislations that are applicable to the proposed project.

Table 3: Applicable legislation and regulations

Legalization	Responsible Institution/Lead Agency	Main Purpose	Relevance to the Proposed Project
The EMCA, 1999	NEMA	A framework legislation that addresses major issues concerning the environment. The purpose of the Act is to provide for sustainable management of the environment.	Requires the Proponent to: • Submit Project Report to NEMA before commencing any new project. • Engage NEMA approved expert/firm of experts in Conducting EIA studies**.**
Environment Impact Assessment /Environmental Audit Regulations, 2003	NEMA	Provides for the framework for carrying out environmental impact assessment in Kenya	Requires the Proponent to: • Prepare project report in accordance with the format specified in Regulation and pay attention to issues specified in the second schedule of the Regulations • Carry out corrective measures in the improvement order from NEMA • Carry out corrective measures in the improvement order from NEMA • Allow a NEMA inspector to enter the facility for the monitoring the effects of its activities on the environment • Mitigate trans-boundary impacts taking into account regional and international treaties

L.N. 11: Environmental Management and Coordination (Waste Management) Regulations, 2006	NEMA	Formulated managifor various kinds of was in Kenya	The Regulations requires the Proponent to: • To acquire valid EIA license from NEMA prior to engaging in an activity that can generate hazardous substance • Segregates their waste (Hazardous and non-hazardous) by type and then disposes the wastes in an environmentally acceptable manner. • Transport waste using a vehicle that has an approved "Waste Transportation License" issued by the NEMA • Dispose of waste in a licensed disposal facility • Labelling of hazardous wastes in accordance with the requirements provided in section18 of the Regulation.

L.N. 120: Environmental Management and Coordination (Water Quality) Regulations, 2006	NEMA	Formulated for sustainable management of water used for various purposes in Kenya	The Regulation requires the Proponent to • Refrain from any activity which might cause water pollution. • Not to discharge any liquid, gaseous or solid into water resource as to cause pollution. • Acquire a valid effluent discharge license to discharge effluent into the environment. • Acquire EIA license prior to abstracting ground water or any activity that is likely to have any adverse impact on the quantity and quality of the water • Follow the monitoring guide set out in the Third Schedule to the regulation when discharging

Legalization	Responsible Institution/Lead Agency	Main Purpose	Relevance to the Proposed Project
			effluent into the environment
Legal Notice No.61 of 2009: The Environment Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations	NEMA	Promulgated for control of Noise and excessive vibration pollution	The regulations: • Prohibits the Proponent from making or causing to be made noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety or safety of others and the environment. During renovation and demolition phases of the proposed project, potential sources of noise include construction and demolition vehicles and machinery while during operation phase, the potential sources are standby generator and vehicles used in undertaking corrective and preventive maintenance. The Proponent will ensure that the noises from the above sources comply with the Regulations. • Prohibits the Proponent from making or causing to be made excessive vibration which annoy, disturb, injure or endanger the comfort, response, health or safety of others and the environment • Prohibits the Proponent from causing noise which exceeds any sound level as set out in the First Schedule to the Regulations • Requires the Proponent (if wishing) to operate or repair any machinery, motor vehicle, renovation equipment or other equipment, pump, fan air – conditioning apparatus or similar mechanical device or engage in any commercial or industrial activity which is likely to emit noise or excessive vibrations to do so within the

			relevant levels prescribed in the First Schedule of the Regulations. • Prohibits the Proponent from operating a motor vehicle which produces any loud and unusual sound and exceeds 85 dB (A) when accelerating.
			Prohibits the Proponent from operating construction equipment or perform any outside construction or repair work so as to emit noise in excess of the permissible levels as set out in the Second Schedule to the Regulations. • Requires the Proponent during EIA studies to: o Identify natural resources, land uses or activities which may be affected by noise or excessive vibrations from renovation or demolition; o Determine the measures which are needed in the plans and specifications to minimize or eliminate adverse renovation or demolition noise or vibration impacts o Incorporate the needed abatement measures in the plans and specifications. • Prohibits the Proponent from carrying out activities relating to demolitions without a valid permit issued by the Authority

Environmental Management and Coordination (Air Quality Standards) Regulations, 2008 - Draft	NEMA	Formulated to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air	These Regulations prohibit the Proponent from: • Acting in a way that directly or indirectly cause or may cause air pollution to exceed levels set out in the second Schedule to the Regulations • Allowing particulates emissions into the atmosphere from any source not listed in the six schedule of the Regulations • Causing ambient air quality in controlled areas (listed in Schedule Thirteen) to exceed those stipulated under second Schedule. • Allowing emission of particulate matter above the limits stipulated in second Schedule
Building Code	Ministry of Local Government	Formulated to provide rules, guidelines and standards to be observed during construction.	The Proponent is required to adhere to the rules, guidelines and standards stipulated in the Code during development of the proposed project
The Public Health Act Cap 242	Ministry of Public Health	The Act regulates activities detrimental to human and environmental health and safety	The Act prohibits the Proponent from engaging in activities that cause environmental nuisance or those that cause danger, discomfort or annoyance to inhabitants or is hazardous to human and environmental health and safety.
The Penal Code (Cap. 63)	Judiciary	Formulated to define the penal system in Kenya. It outlines criminal offences and prescribes penalties to them	The Code Prohibits the Proponent from: • Voluntarily corrupting or fouling water for public springs or reservoirs, rendering it less fit for its ordinary use • Making or vitiating the atmosphere in any place to make it noxious to health of persons/institution in dwellings or business premises in the neighborhood or those passing along public way.

The Occupier Liability Act (Cap 34)			The Act Requires the Proponent to ensure that visitors to his premises will be reasonably safe in using the premises for the purposes for which he is invited or permitted by the Proponent to be there
Occupational Health and Safety Act, 2007	DOHSSS	Enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith	It requires the Proponent to: • Undertaking S&H risk assessments, • provide notification of accidents, injuries and dangerous Occurrences, etc. • Provide first aid facilities at the workplace • provide PPEs to the employees

Legalization	**Responsible Institution/Lead Agency**	**Main Purpose**	**Relevance to the Proposed Project**
Legal Notice No. 25: Noise Prevention and Control Rules	DOHSS	Promulgated for work related noise exposures	It requires the Proponent to: • Comply with the following permissible noise levels : a. Workplace Noise- 90 Db (A) over an 8-hour TWA period over 24-hours; and 140 Db (A) peak sound level at any given time. b. Community noise level emanating from a workplace -50 Db (A) during the day; and 45 Db (A) at night. • Ensure that any equipment brought to a site in Kenya for use shall be designed or have built in noise reduction devices that do not exceed 90 Db(A). • Medically examine those employees that may be exposed to continuous noise levels of 85 Db (A) as indicated in Regulation

			16. If found unfit, the occupational hearing loss to the worker will be compensated as an occupational disease. It is expected that during equipment installation phase of the project, there may be plant and equipment that exceeds the threshold levels of noise stipulated under the Rules. It will therefore be incumbent on the selected contractor to ensure that their equipment is serviced properly and/or use equipment that complies with the threshold noise values given above.

4.4.1 EMCA 1999 INSTITUTIONS

The EMCA, 1999, make provisions for creation of environmental administrative structures under MENR. The institutions that have been created under the Act for environmental management in Kenya are:

- *NEMA* - the principal government authority established under MENR to exercise general supervision and coordination over all matters relating to the environment in Kenya.
- NEC- The apex body under the Act charged with the responsibility of developing the national environmental policy in Kenya as well as to set annual environmental goals and objectives.
- PCC - formed to investigate environmental complaints against any person, submit their findings/recommendations to the NEC and to submit periodic reports of its activities to the NEC.
- *SERC*- established to advise the NEMA on the criteria and procedures for the measurement of environmental quality in Kenya. Environmental quality relates to air quality, wastewater quality, waste quality, noise quality, land use quality, etc. Additionally the SERC is required to recommend to the NEMA minimum environmental quality standards for all environmental parameters for which subsidiary legislation is or has been promulgated.

CHAPTER FIVE

ENVIRONMENTAL IMPACT ASSESSMENT

Several environmental impacts (positive and negative) associated with the proposed project were identified through the use of experts" judgment method. The following section highlights the impacts anticipated throughout the lifecycle of the proposed project. The associated impact assessment tables for each impact will be categorized according to project phases, prior. Effects of activities are categorized as negative impact and or positive impact

5.1 Assessment of impacts

Section one of this report presents the methodology used in assessing the potential impacts of the proposed project. The key impacts identified for the proposed project are highlighted according to the relevant project phases.

The lead expert utilized precautionary principles to establish the significance of impacts and their management and mitigation.

5.2 Potential impacts of the proposed project

The proposed project is anticipated to generate the following impacts, however the significance of the impacts will range between low to moderate before mitigation and will further reduce with mitigation. The following impacts are anticipated from the proposed project:

5.2.1 Air quality Impacts

The potential impacts likely to arise during the phases of the proposed development project are summarized in Table 4, below. During construction phase, impacts on air quality is not anticipated as the activities undertaken, installing of the LPG will not generate any air contaminants however, and the emissions during operation would likely not be significant to impact local air quality. The proposed technology adopted by the proponent has incorporated anti-pollution system. Methane fumes will be sealed inside the chamber by water channel along the sides and double layer water curtains at the entry and exit.

Temporary, minor impacts to air quality may result during Operation from the operation of construction equipment and vehicles.

Impacts to ambient air quality are likely to arise from the following:

- dust generated during decommissioning phase when demolished materials is being catered away;
- exhaust emissions from vehicles during construction, operation and decommissioning phases;

Table 4: Air Quality Impact Characteristics

Project Phase	**Project Aspect/activity**	**Impact type**	**Stakeholder/Receptor Affected**
Construction phase	Installation of LPG storage	No air quality impacts anticipated	n/a
Operation phase	The proposed technology adopted by the proponent has incorporated antipollution system. Fumes will be sealed inside the chamber by water channel along the sides and double layer water curtains at the entry and exit.	No air quality impacts anticipated	n/a

Construction Phase Impacts

The ambient dust levels are not likely to be exceeded during construction phase as there are no activities that will generate a lot of dust. Minimal dust from cement could be generated from construction of foundation for mounting milling plant. Vehicles delivering construction materials and the LPG equipment are anticipated to generate emissions. However, the amount of emissions would likely not be sufficient to significantly impact on the local air quality. Therefore, impact of dust and air emissions generated during the construction phase is not considered any further. Therefore, impacts to local residents are not expected and the impact is considered to be **negligible**.

Operational Phase Impacts

The LPG storage equipment and machinery will be installed by professional engineers and will be fitted with a complete anti-pollution system hence air emissions from the equipment are expected to be minimal.

Table 5: Operation Phase Impact: Air Emissions

Nature	The process will generate minimal particulates, acid fumes
Impact – Magnitude Low	• **Extent**: The extent of the impact is site specific. • **Duration**: The duration would be long-term- throughout operational life of the Plant. • **Intensity:** since the equipment will be fitted with a complete antipollution system the intensity can be considered low.
Likelihood	There is a **definite** likelihood of particulate generation, acid fumes during the operation phase

Mitigation Measures

Inherent to the management of construction activities and to best practice in construction, typical dust mitigation measures will be put in place and are listed below:

Operation phase

- Machines are to be kept in good working order and serviced regularly to minimize emissions;
- The employees will be provided with overalls and boots, as well as items such as dust masks for those emptying the scaling boxes;
- The Proponent will ensure employees undergo trainings.

5.2.2 Waste generation

The project will lead to the generation of limited waste streams. The origin of waste and effluent associated with the project phases and the stakeholders or receptors likely to be affected are identified in the table 6 below:

Table6: Impact Characteristics: Waste

Project Phase	Project Aspect/activity	Impact type	Stakeholder/Receptor Affected
Construction phase	Waste generated from construction activities: construction waste from construction works	negative	Surrounding areas
Operation phase	Effluent generated from the LPG operations processes Packaging waste Scaling and scrap	Negative positive	Surrounding areas

Construction phase impacts

The proposed projects will generate few waste streams during construction phase such as construction rubble and packaging materials, general waste and sanitary waste. Construction rubble will be generated throughout construction phase from activities such as partitioning of office cabin and construction of foundation for mounting the machines.

Packaging material will be accumulated from unpacking of cement, ballast and other construction materials. General waste will be produced by site personnel including wrapping from food, bottles and cans. Sanitary waste will be generated by construction workers. The facility has existing sanitary facilities which will be used by construction workers and also operation phase staff.

It is anticipated that solid waste will be temporarily stored on site before it is removed by a NEMA approved waste handler and others recycled.

Table *7: Construction Impact: Waste Generation*

Nature	Construction activities that produce wastes that are likely to result in a **negative direct** impact on the site.
Impact – Magnitude Low	• **Extent**: The extent of the impact is site specific. • **Duration**: The duration would be short-term as the impacts will not persist after construction phase. • **Intensity:** the intensity can be considered **low** as construction is temporary**.**
Likelihood	There is a **definite** likelihood of waste generation from construction work.

3

Operation phase

Several waste streams are similarly anticipated during the operation phase of the Project. The wastes anticipated include general waste, such as office waste, effluent from onsite to be taken care off by the existing sewer networks. Hazardous waste from the laboratory will be disposed offsite through licensed waste handlers.

The domestic wastewater will be channelled to the public sewer. The other wastes will be managed in accordance with Legal Notice No. 121 of 2006. Waste produced during the operation phase of the project will be minimal.

Table 8: Impact of Waste Generation during operation phase

Nature	Operation activities mainly installation of bulk LPG plant will produce waste that can have **negative direct** impacts.
Impact Magnitude Low	• **Extent**: The extent of the impact is onsite as impact will be limited to the site. • **Duration**: The duration would be long-term as the impacts will last the entire operation period of the project which is indefinite. • **Intensity:** the intensity can be considered **low** as the waste will be properly managed
Likelihood	It is unlikely the waste will impact on the soil and ground water as they will be properly managed.

It is anticipated that solid waste will be temporarily stored on site before it is removed by a NEMA approved waste handler.

Mitigation Measures

The potential impacts associated with waste generation can be minimized through proper mitigation measure, as described below:

Construction

- The generation of waste materials will be avoided or minimized as far as practicable, where it is not practical to avoid generation, waste materials should be reused or recycled as far as practicable.
- All waste to be separated into respective streams for disposal by a licensed contractor.

5.2.3 Residual Impacts

If mitigation measures given above and listed in the EMP are implemented, the overall significance will remain negligible during the project cycle.

5.2.4 Health and Safety Impacts

The various activities of the project can potentially pose health and safety risks. The health and safety risks associated with the proposed project are identified in the table 12 below.

Table 9: Impact Characteristics: Health and Safety

Project Phase	Project Aspect/activity	Impact type	Stakeholder/Receptor Affected
Construction phase	Construction activities	negative	• Construction personnel • Onsite personnel
Operation phase	Operation activities	negative	□ Onsite personnel

Installation Phase

Installation activities will include; construction of foundation, the perimeter wall and assembling the LPG tank. These activities can pose safety risks if not managed appropriately.

Table 10: Health and Safety during Construction Phase

Nature	Health and safety impacts associated with the proposed projects will be direct **negative impact**.
Impact – Magnitude Low	• **Extent**: The health and safety risks associated with construction activities will be site specific and others will be activity specific. • **Duration**: The duration would be short-term as the impacts will not persist after construction activities. • **Intensity:** the intensity can be considered **low** as those affected will mostly adapt.
Likelihood	It is **unlikely** that accidents will occur on site during the construction phase as potential accidents can be mitigated through implementation of a health and safety plan. The proponent will also engage qualified professionals.

Operation Phase Impact

Potential health and safety impacts during operation phase will be associated with activities such as operating the machines and preventive and corrective maintenance; and handling of raw materials, products and wastes.

Operation of machines and preventive and corrective maintenance may results in non-fatal accidents such as minor injuries to hands and in the worst case, fatal accidents through electrocution. Similarly machine failure might result in injuries which can also be fatal or non-fatal.

Table 11: Health and Safety Impact during Operation Phase

Nature	Health and safety impacts associated with operating the machines and wastes will be direct **negative impact**.
Impact – Magnitude Low	• **Extent**: The health and safety risks associated with operation activities will be site specific and others will be activity specific. • **Duration**: The duration would be long-term as the impacts will persist through out operation phase. • **Intensity:** the intensity can be considered **low** as the employees will be trained.
Likelihood	It is **likely** that minor injuries such as bruises will occur during the operation phase. However, the proponent will provide all the appropriate PPEs

Mitigation Measures

The objective of mitigation is to manage proposed project so that impacts on health and safety risks to contractors, employees and other receptors are reduced.

Construction

- The Proponent will develop health and safety plan prior to the commencement of installation to identify and avoid work related accidents. This plan must be adhered to by the appointed contractors and meet Occupational Health and Safety Act (OSHA), of 2007, requirements.
- Appropriate Personal Protection Equipment (PPE) must be worn by all project personnel.

Operation phase

- Regular maintenance of processing machines and all other infrastructure must be undertaken to ensure optimal functioning and reducing the chance of failure.
- Training of new and old employees on health and safety;
- Appropriate Personal Protection Equipment (PPE) must be worn by all operation personnel.

5.2.5 Socio-economic impacts

The proposed project is anticipated to generate positive socio-economic impacts. The project will create short term job opportunities (skilled and unskilled labour) during the entire project phases. The proponent will hire employees on permanent basis during operation phase of the project contract. Other impacts are associated with procurement of materials.

Table 12: Impact Characteristics: Socio-economic

Project Phase	Project Aspect/activity	Impact type	Stakeholder/Receptor Affected
Construction phase	Employment of Procurement and materials machinery	Direct, indirect induced positive impacts	• Construction personnel and engineers • Local and international suppliers
Operation phase	Employment Procurement materials operating e.g. processing and material	Direct, indirect induced positive impacts	• Operation personnel • Local and international suppliers

Construction Phase

The capital investment required for project is at approximately Kenya Shillings 20 million which would be spent in construction and acquisition of machinery. During the construction phase the civil, and building construction sectors would benefit the most. Local procurement would primarily benefit the civil and construction industry. Most machinery and technical components associated with it will be obtained from international suppliers.

It is intended that Proponent and its contractor would source the majority of the skilled and unskilled workers from the local area. In the local municipal context, this translates into a benefit to the local economy, even though these opportunities will only be for the short term i.e. for the duration of the construction phase.

Hiring of construction personnel will be at the discretion of the contractor. The construction work will create an opportunity for „on-the-job" training thus increasing general skills levels of the workforce, for skilled and unskilled personnel.

Table 13: Socio-economic impact during construction phase.

Nature	The benefit to the local economy will be **positive direct** through employment and procurement of services and **indirect** through spending in the local economy due to increase in wages.
Impact – Magnitude Low	• **Extent**: the project will create employment and procurement to the local, regional and international suppliers. • **Duration**: employment created will only last to the end of construction phase and thus is short-term. **Intensity:** The intensity will be **low** as a few jobs will be created locally with approximately 30 percent of the total investment being spent on goods and services obtained from the local area during the construction phase.
Likelihood	There is likelihood that the impact will occur

Operation Impact

The bulk LPG plant will generate opportunities for building and fabrication materials for local, regional suppliers and even international suppliers. The Proponent will install the bulk LPG storage to become self-sufficient for meeting the company's production requirements of Chain-links & Barbed Wires along with becoming one of the leading Manufacturers & Suppliers of Hot Dip Galvanized Wires in East Africa.

In terms of job opportunities, the project will generate few opportunities where people will be hired to operate the Bulk LPG plant. The above opportunities created by the project during operation phase are anticipated to generate other positive indirect effects on the local and regional economy and to the company.

Table 14: Socio-economic Impact during Operation Phase

Nature	The benefit to the local economy and the company will be **positive direct** through employment and procurement of raw materials and **indirect** through spending in the local economy due to increase in wages.
Impact – Magnitude Low	• **Extent**: the project will create employment and procurement to the local, regional and international suppliers. • **Duration**: employment created will last indefinite life time of the project and thus is long-term. **Intensity:** The intensity will be high as 45 N/MT / month Low UTS, Commercial coating range Galvanized wires will be developed to enable the plant to become self-sufficient for meeting the company's production requirements of Chain-links & Barbed Wires and jobs will be created.
Likelihood	There is high likelihood that the impact will occur

5.2.6 Noise impacts

The potential noise impacts associated with the construction and operational phases of the proposed projects are summarized in the table 18 below.

Table 15: Characteristics of Noise Impacts

Project Phase	Project Aspect/activity	Impact type	Stakeholder/Receptor Affected
Construction phase	Noise resulting from construction vehicles, equipment and activities such as drilling, welding, concrete mixing and steel works.	Direct	Equipment installation personnel and staff working at the existing plant
Operation phase	Noise from processing equipment	Direct	Operation personnel

Construction phase

The construction activities will be a source of noise during construction phase. Although, construction activities are temporary by nature, the noise they generate can cause disturbance or inconvenience to the neighbors. During construction the main sources of noise will be as a result of equipment installation, drilling activities and welding works. Noise emitted during construction activities would increase the ambient noise levels at the site. It is expected that the noise emitted during the construction phase has the potential to impact on onsite employees within the site boundary. It should be noted however, that there are no residential buildings within close proximity to the site. Increased noise during the construction phase would be short-term. Operations will be limited to day light hours.

Table 16: Noise Impacts during construction phase

Nature	Construction activities will result in negative noise impact
Impact – Magnitude Low	• **Extent**: The extent of the impact would be **site specific,** as it will likely extent beyond the premises • **Duration**: the impact will be short-term as it will only last the duration of construction • **Intensity:** The intensity of the impact will be **low** since ambient noise level are fairly low
Likelihood	There is likelihood that the impact will occur

CHAPTER SIX

PUBLIC STAKEHOLDER CONSULTATION

Public participation is an essential and legislative requirement for environmental authorization. The expert undertook the public stakeholder consultation (PSC) for the proposed project in accordance with the requirements for an EIA Study stipulated in the EMCA, 1999 and EIA/EA Regulations 2003.

6.1 Objective of Public Stakeholder Consultation

The objectives of public participation in an EIA are to provide sufficient and accessible information to Interested and Affected Parties (I&APs) in an objective manner to assist them to identify issues of concern, and provide suggestions for enhanced benefits and alternatives.

6.2 Approach used in carrying out the PSC

The Expert consulted the neighbors of the project site. The responses from the neighbors were captured using the public stakeholder checklist while others were recorded in the field note book.

6.3 Comments and Responses from the respondents.

Generally, the respondents consulted at the project site have no objection to the establishment of proposed project. They observed that the proposed project will generate employment opportunities and increase the production of products at Blue Nile Rolling mills. However one stakeholder noted that noise emission can cause discomfort and dust generation.

6.3.1 Analysis of questionnaires

Table 17: Analysis of social site assessment.

Name	Comments	Recommendation Approve/not approve
1. Kevin Maina	Increased production	Approve
2. Edwin Gathondu	Fire	Approve
3. Peter Chege	Job creation	Approve
4. Samuel Ng'ang'a Kamau	Increased production	Approve
5. Lydia Wanjiru	More wires to be produced	Approve
6. Julius Kamande	Energy conservation	Approve
7. George	Create employment	Approve
8. Damaris Akelio Otwelo	Environmental conservation	Approve
9. Mary Waithera	Job creation	Approve
10. Obadiah Gitiya	Risk of fire	Approve

CHAPTER SEVEN

ENVIRONMENTAL MANAGEMENT PLAN

The purpose of this EMP is to ensure that environmental impacts identified during environmental assessment process are effectively managed during the project phases. This EMP specifies the mitigation and management measures to which Proponent is committed, and shows how the Project will mobilize organizational capacity and resources to implement these measures. The EMP also shows how mitigation and management measures will be scheduled.

The key objectives of the EMP are to:

- Formalize and disclose the programme for environmental and social management; and provide a framework for the implementation of environmental and social management initiatives;
- Provide mitigation measures;
- Specify roles and responsibilities for implementing the EMP.

The EMP covers information on the management and/or mitigation measures that will be taken into consideration to address impacts in respect of:

- construction activities;
- Installation phase; and
- operation activities;

It is important to note that the EMP is a living document that must be periodically reviewed and updated.

7.1 Responsibility and Accountability

7.1.1 Environmental Management Structure

The Proponent will maintain general responsibility for the implementation of the EMP during project phases. The Proponent is accountable for ensuring that resources are made available to effectively implement the EMP and necessary environmental management measures arising from the project The environmental, health and safety management of the project will be the responsibility of the Health, Safety and Environment (HSE) Executive who will be supported by Safety Officer who will act as the focal point for all matters of health, Safety, Security and Environment (HSSE).

Environmental monitoring will be undertaken by the HSE Executive, and independent audits of environmental performance will be conducted from time to time by independent NEMA approved environmental expert.

Table 18: Functions of Staff in implementation of EMP

Position	Responsibility
Directors	• performing organizational role of installation of plant • overseeing Implementation of EMP
Contractor	• implementing measures in the EMP relevant to the contractor • supervising contractor staff to ensure they undertake the work in accordance with contract agreement, relevant legislation and EMP
Installation Manager	• Will act as the focal point for all matters of HSE • Preparation of environmental monitoring reporting and any permit applications (if any) • Running of day-to-day requirements for EMP implementation • Conducting monitoring and review of EMP implementation by contractors • inspect the renovated facilities after completion • Prepare, program and carry out regular inspections of all areas. • Develop a program for and carrying out in-house HSSE audits carried out with line management. • Report accidents /near misses to the plant directors. • Prepare daily inspection sheet for safety, file and make available for inspection by Proponent at all times.
NEMA Approved EIA/EA Expert	□ Periodically commissioned to undertake statutory environmental audits
	□ Guide the Proponent during implementation of the Environmental Management Plan

7.1.2 Management of Contractors

The Contractors will be responsible for implementation of some of the EMP commitments. However, the Proponent fully recognizes that it is not absolved from those management responsibilities. Ultimate responsibility for meeting all commitments lies with the Proponent. The Proponent will commit contractors to meeting the relevant responsibilities by means of specific conditions in the contracts of appointment. Where there is concern over the capacity of contractors to undertake specific activities according to the system stated here, the Proponent will provide additional training to improve the capacity of the contractors.

Activities of contractors will be overseen by the directors and staff as appropriate. The Proponent will put in place the following contractor arrangements to support EMP implementation:

- Contractor will have certain key environmental line functions included in their job descriptions and performance criteria. Critical among these is the Installation Manager.
- The Company directors will be accountable for environmental (including social) management during the construction. Specific responsibilities will include:
  - Effective implementation of the EMP
  - Regular performance reviews
  - Corrective and/or remedial action where this may be required.
- A code of practice for construction team will be prepared and implemented. This code will guide the management and behavior of construction workers. The code will include items relating to health safety and community relations.
- Information on the implications of construction work will be disseminated before construction starts
- Contracts will be key tools in managing many potential negative impacts such as transport related incidents. They will specify required environmental and social practices.

7.1.3 Training, Awareness and Capacity Building

The Proponent will ensure that all contractors‟ staff are inducted on health and safety, environmental and emergency response procedures. The Proponent will use written (posters/toolbox talks) and verbal (as part of routine briefings) communication methods to raise awareness on a range of health, safety and environmental issues. This will be done in both Kiswahili and English languages (as appropriate).

7.1.4 Monitoring and Compliance Assessment

During installation, the Proponent will monitor and inspect contractors‟ written records to demonstrate compliance with the EMP. This compliance monitoring will verify that the responsible parties are implementing the specifications contained in the EMP.

Compliance will mean that the contractor is fulfilling contractual obligations.

To determine the effectiveness of the EMP, the Proponent will use a series of internal inspections and audits:

- Internal environmental, health and safety inspections will be carried out once every week by Construction/equipment installation Manager;
- Minor non-conformances will be discussed during the inspection and recorded as a finding in the inspection report. Major non-conformances will be formally reported as an incident and will be subject to the Proponent's existing incident reporting and handling procedures
- The management will arrange for initial and subsequent environmental audits and will provide relevant information required by relevant authorities including NEMA. The audit will be carried out in accordance with EMCA, 1999 and its subsidiary legislation, EIA/EA Regulations, 2003. Any negative findings arising from the audits will be addressed accordingly.

7.1.5 Incident handling and Reporting

An incident can arise from the following:

- Significant non-conformance with the EMP identified during an internal inspection
- Any non-conformance identified by either the authorities or an external audit
- Accidents or releases resulting in potential or actual environmental harm
- Accidents or near misses that do or could result in injury to staff, visitors to site or the surrounding communities
- Significant complaints received from any source.

All incidents will be formally recorded and noted in the General Register in accordance with requirements of OSHA 2007.

7.1.6 Checking and corrective action

Checking and if necessary implementing corrective action, to ensure that required EMP management activities are being implemented and desired outcomes are achieved. As such this component includes four key activities namely:

- Monitoring selected environmental quality variables as defined in the objectives and targets;
- Ongoing inspections of the operational controls and general state of the operations;
- Internal audits to assess the robustness of the EMP or to focus on a particular performance issue; and
- External audits to provide independent verification of the efficacy of the EMP.

7.1.7 Corrective Action

There are several mechanisms for implementing corrective action, during the project cycle. The main mechanisms to address transgressions include verbal instruction (in the event of minor transgressions from established procedure, usually following a site inspection); written instruction (identifying source(s) of problems, usually following an audit) and contract notice (following possible breach of contract).

7.1.8 Reporting

The findings of all of the above will be structured into instructive reporting that provides information to all required parties on EHS performance, together with clearly defined corrective action where this is seen to be required. Both the monitoring and inspections are to be reported continuously.

7.1.9 Management review

The Proponent will organize for formal management review at defined intervals during the project phases. The purpose of the management review is for senior project management to review the environmental management performance during the preceding period and to propose measures for improving that performance in the spirit of continuous improvement.

7.1.10 Liaison

Throughout the project cycle, the Proponent will liaise with authorities especially NEMA to ensure ongoing feedback on the environment performance of the project.

7.2 Approach to environmental impact management

Table 22 below presents the range of approaches that will be used to manage potential impacts of the proposed project.

Table 19: Approaches for managing potential impacts of the proposed projects

Approach	Description
Avoidance	Avoiding activities that could result in adverse impacts and/ or resources or areas considered sensitive
Prevention	Preventing the occurrence of negative environmental impacts and/ or preventing such an occurrence having negative impacts.
Minimization	Limiting or reducing the degree, extent, magnitude or duration of adverse impacts through scaling down, relocating, redesigning and or realigning elements of the project.

Mitigation	Measures taken to minimize adverse impacts on the environment.
Enhancement	Magnifying and/ or improving the positive effects or benefits of a project
Rehabilitation	Repairing affected resources.
Restoration	Restoring affected resources to an earlier (possibly more stable and productive) state, typically “background or „Pristine‟ condition.

CHAPTER EIGHT

CONCLUSION AND RECOMMENDATION

8.1 CONCLUSION

The proposed project will generate socio-economic benefits which would not be realized if the no development of option is considered. The benefits will include: enabling the proponent to become self-sufficient in meeting the company's production requirements of Chain-links & Barbed Wires along with becoming one of the leading Manufacturers & Suppliers of Hot Dip Galvanized Wires in East Africa; creation of job opportunities (skilled and unskilled labour) and reducing operation cost thus increasing generation of revenue to the Proponent, contracted suppliers and government.

The negative impacts before implementation of mitigation measures are assessed as negligible to medium low and the ratings are expected to improve further with the implementation of the proposed mitigation measures: These impacts include:

- Impact on air quality due to methane gas;
- Impact on ambient noise quality due to use of vehicles and machinery during installation;
- potential health and safety risks to the workers; and
- impact of waste generation

The above potential adverse impacts associated with the proposed project are possible to mitigate successfully. The projects will be undertaken in accordance with local and international legislations and guidelines. Successful implementation of the proposed EMP will minimize or reduce the environment impacts to the acceptable levels.

8.2 RECOMMENDATION

The firm of experts feels that every effort has been made by Proponent to accommodate the mitigation measures recommended during the EIA process to the extent that is practically possible, without compromising the economic viability of the proposed project. The implementation of the mitigation measures detailed in this report will provide a basis for ensuring that the potential positive and negative impacts associated with the establishment of the proposed project are enhanced and mitigated to a level which is deemed adequate.

In summary, based on the findings of this assessment, the firm of experts finds no reason why the proposed project should not be authorized contingent that the mitigations and monitoring for potential environmental and social impacts as outlined in this report are implemented.

REFERENCE

A. Government of Kenya (1999): Environmental Management and Coordination Act .Government Printer

B. Government of Kenya (2003): EIA/EA Regulations. Government Printer

C. Government of Kenya (2005): Factories and Other Places of Work (Noise Prevention and Control) Rules, Legal Notice No.25. Government Printer

D. Government of Kenya (2007): Factories and Other Places of Work (Fire Risk Reduction) Rules, Legal Notice No.59. Government Printer

E. Government of Kenya (2007):The Occupational Safety and Health Act

F. Kenya National Bureau of Statistics (2009): Kenya Census 2009 G. Technical report; Abhishek Mukherjee.

ATTACHMENTS

The following attachments provide supplementary information used in the preparation of this Project Report.

Table 20: Description of Attachments.

Attachment No.	**Description**
1	Copy of Lease Agreement
2	Copies of Site Layout Plans
3	Copies of Public Stakeholder Consultation Checklists
4	Nema Licenses