THE ENVIRONMENTAL AND COORDINATION ACT, 1999

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED PETROL SERVICE STATION ON L.R No. THIKA MUNICIPALITY BLOCK 8/181 ALONG THE GARISSA HIGHWAY

PROJECT REPORT No: NEMA/PR/5/2/10611

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Table of Content

Certification	3
Acknowledgement	4
List of Acronyms	5
List of Figures	6
List of Tables	6
Executive summary	7
1.0 Introduction	10
2.0 Terms of Reference	10
3.0 EIA Methodology	11
4.0 Project Objective	11
5.0 Project Description and Construction Activities	13
6.0 Analysis of Alternatives	17
7.0 Baseline Information	18
8.0 Policy, Institutional and Environmental Regulatory Framework	22
9.0 Public Involvement and Consultation	53
10.0 Potentially Affected Environment and Potential Environmental and Socio-Economic Impacts	56
11.0 Impact Mitigation and Environmental Management Plan	62
12.0 Limitations and Assumptions	67
13.0 Project Budget	67
14.0 Conclusion and Recommendations	68
15.0 References	69

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LIST OF ACRONYMS

BQ	Bill of Quantities
^{0}C	Degrees Celsius
EIA	Environmental Impact Assessment
EMCA	Environmental Management Coordination Act
EMP	Environmental Management Plan
ERC	Energy Regulatory Commission
GPS	Geographical Positioning System
KEBS	Kenya Bureau of Standards
KES	Kenya Shillings
KM	Kilometers
NEC	National Environment Council
NEMA	National Environment Management Authority
NGOs	Non Governmental Organizations
NPEP	National Poverty Eradication Plan
OSHA	Occupational Safety and Health Act
PIC	Public Involvement and Consultation
PIEA	Petroleum Institute of East Africa
ToR	Terms of Reference
UNEP	United Nations Environmental Programme

LIST OF FIGURES

Fig 1 Location of the proposed project 13
Fig 2 vegetation at the proposed project site 19

LIST OF TABLES

Table (1): Summary of environmental impacts and mitigation measures 8
Table (2): First Schedule (Maximum permissible Intrusive Noise Levels) 46
Table (3): Second Schedule (Maximum permissible Noise Levels for construction sites) 47
Table (4): Summary of stakeholders' comments and recommendations 54

Table (5): Environmental Management Plan (EMP) 63

EXECUTIVE SUMMARY

Section 58 (2) of the Environmental Management and Coordination Act of 1999 requires that all proposed projects likely to have negative impacts on the environment must be subjected to Environmental Impact Assessment and a report thereof submitted the National Environment Management Authority (NEMA) for issuance of EIA licence.

Regulation 4 (1) of the Environmental Impact Assessment and Audit Regulations of June 2003 issued under Legal Notice No. 101 states that no proponent shall implement a project likely to have a negative environmental impact, or for which an environmental impact assessment is required unless an EIA has been concluded and approved under these regulations.

In compliance with these regulations and in application for an EIA licence for the proposed petrol service station on L.R No Thika Municipality Block 8/181 along the Garissa highway, Mr. Vishal Shah Nemchand (the proponent) has engaged a NEMA registered Lead Expert to undertake an EIA for the proposed project on his behalf.

The proposed project involves the construction of a petrol service station on L.R. No. Thika Municipality Block 8/181 along the Garissa highway. Activities involve installation of six pumps, 4 underground tanks (2 petrol with 20,000 Litres capacity, 1 diesel with 10,000 Litres capacity and 1 kerosene with 5,000 Litres capacity). There is also going to be a car washing machine, a cafeteria, and a convenient store at the filling station.

The parcel of land on which the project is to be undertaken belongs to Mr. Vishal Shah Nemchand as per the title deed attached to this report. The proposed site is presently undeveloped. The immediate neighbour to the proposed project site is a petrol station around 500m from the proposed site. The plot is accessible from the Thika-Garissa highway.

In the preparation of this EIA (Project) report, the EIA experts have followed the guidelines specified in the Environmental (Impact Assessment and Audit) Regulations, 2003. The methodology used in the EIA and the subsequent preparation of this EIA project report was screening, scoping, baseline environmental study, literature and documentation review, physical site inspections, public and stakeholder consultation and involvement, data analysis and report preparation.

Fire risk and potential ground water pollution from oil leaks and spills have been identified as the two potential significant adverse project impacts.

The positive impacts identified were creation of employment, availability of fuel and station service facility for commuters along the Thika-Garissa highway and neighbours to the proposed project site, generation of revenue to the government and business opportunities.

The adverse environmental and socio-economic impacts of the proposed project at various project phases and their mitigation measures are summarized in the matrix below:

Table (1): <u>Summary of environmental impacts and mitigation measures</u>

Construction	Removal of vegetation cover	• Restriction of devegetation to project site only • Use of defined driving tracks • Planting of trees and landscaping
	Soil disturbance and potential erosion	• Soil protection measures (concrete barriers, landscaping and tree planting)
	Soil contamination (leaks & spills) at installation	• Careful installation of tanks • Tank leakage tests
	Health and safety risks (dust, noise, fire risk, pits, moving machinery, manual lifting and others	• Site health and safety management plan (by contractor and proponent)

	Solid waste generation	• Reuse of material where possible • Minimize wastes • Proper solid waste disposal
	Increased demand for water	• Careful use of available water (no wastage)
Operation and maintenance	Water pollution (effluent, leaks and spills)	• Routine leaks checks for tanks • Careful refilling • Concrete cover for station ground • Provision of an oil interceptor and channeling of all effluent into it • Provision of a conservancy tank for effluent • Obtain effluent discharge licence from NEMA
	Health and safety risks	• Establishment and implementation of a site health and safety management plan
	Increased demand for water and electricity	• Water and energy conservation measures
	Increased road traffic	• Regulation of traffic to and from fuel station (as per intended use)
	Generation of solid wastes (hazardous and non-hazardous)	• Provision of solid waste receptacles • Segregation of waste at source • Disposal of wastes as required under Legal Notice No. 121 • Engagement of a NEMA and Thika County Government - approved waste collector
Decommissioning	Soil disturbance (erosion)	• Back filling of dug out area and landscaping (soil protection measures)
	Soil contamination (oil leaks)	• Ensuring tanks are emptied before removal • Careful removal of underground tanks • Remediation of any contaminated soil
	Health and safety impacts (open pits, fire, accidents, noise and other potential safety risks)	• Standby firefighting equipment • Careful handling of machinery • Isolation (demarcation) and signage of working area • Health and safety awareness among staff
	No fuel within that stretch of the Thika-Garissa highway	• Use of alternative (nearby) fuel stations
	Solid waste generation	• Proper waste disposal

1.0 INTRODUCTION

Mr. Shah Vishal Nemchand of P.O. Box 138 Thika intends to construct a fuel station on his parcel no Thika Municipality Block 8/181 along the Thika-Garissa highway. Activities involve installation of six pumps, 4 underground tanks (2 petrol with 20,000 Litres capacity, 1 diesel with 10,000 Litres capacity and 1 kerosene with 5,000 Litres capacity). There is also going to be a car washing machine, a cafeteria, and a convenient store at the filling station.

From experience and literature review, fuel stations have potential adverse impacts on various components of the environment. By its nature, fuel is flammable and poses a significant fire risk. Spilt fuel can contaminate the soil and cause water pollution. Against this background, proposed fuel stations must be subjected to environmental impact assessment and mitigation measures put in place during implementation for the protection of the environment and for sustenance of public health and safety. In the Second Schedule, the Environmental Management and Coordination Act of 1999 has listed projects to undergo EIA. The management of hydrocarbons including storage of natural gas and combustible or explosive fuels is among projects that must undergo EIA.

2.0 TERMS OF REFERENCE

The following were the ToR for conducting EIA of the proposed petrol service station on L.R. No. Thika Municipality Block 8/181 along the Thika-Garissa highway.

a) giving a detailed description of the nature of the proposed project;
b) description of the location of the proposed project including the physical area that may be affected by the project activities;
c) description of the design of the proposed project;
d) description of the activities that will be undertaken during the project construction, operation and decommissioning phases;
e) listing of the materials to be used, products and by products, including waste to be generated by the project and the methods of disposal;

f) identification of the potential environmental impacts of the proposed project and the mitigation measures to be taken during and after implementation of the project;

g) establishment of an action plan for the prevention and management of possible accidents during the project cycle;

h) establishment of a plan to ensure the health and safety of the workers and neighbouring communities;

i) Identification of the economic and socio-cultural impacts of the proposed project to the local community and the nation in general;

j) Avail the bill of quantities for the proposed project; and

k) giving any other information that NEMA may require.

3.0 OBJECTIVE OF THE PROJECT

The objective of the proposed project is to provide fuel for commuters along the Thika-Garissa highway as well as generate income for the proponent.

4.0 EIA METHODOLOGY

The following general methodology was used in this EIA of the proposed petrol service station on Thika Municipality Block 8/181 along the Thika-Garissa highway.

a) Screening

This involved determination of the need for EIA. The project was determined as one that must be subjected to EIA in accordance with the EMCA (1999) Second Schedule.

b) Scoping

This process involved identification of the main issues and impacts to be analysed in the EIA. At the scoping stage, the terms of the reference for the EIA were established.

c) Establishment of the environmental baseline

This involved study and description of the existing characteristics of the environment on which the proposed project is to be implemented. It involved the study of the area soil, biology, topography, animal species, water resources, climate and the local socio-economic environment.

d) Review of alternatives

This entailed a review of the alternatives to the proposed project. This was aimed at determining better ways of avoiding or minimizing environmental impacts while still realizing the project goals. The review of alternatives provided opportunities for environmental enhancement. The alternatives reviewed were alternative sites, alternative implementation technology, alternative designs, alternative fuel sources and the no project alternative.

e) Impact analysis

This was the main stage and involved a detailed identification, prediction and evaluation of the potential environmental and social impacts of the proposed project. The impacts of the project were analysed for the construction, operation and maintenance and the decommissioning phases.

f) **Impacts mitigation**

This involved identification of mitigation measures to be undertaken for the identified negative impacts at all stages of the project cycle. An EMP was made as framework for mitigation of impacts and monitoring environmental performance.

g) Public consultation and involvement (PIC)

PIC was done at all main stages of the EIA right from scoping, analysis of alternatives, environmental baseline survey, and impact analysis and even at the preparation of the project EMP. Key stakeholders including immediate project neighbours, government officers and other interested and affected parties were consulted and involved in the EIA.

h) Preparation of the report

This report was prepared in accordance with the EIA terms of reference and in line with the guidelines specified in the Environmental (Impact Assessment and Audit) Regulations of 2003 for preparation of EIA reports.

5.0 PROJECT DESCRIPTION AND CONSTRUCTION ACTIVITIES

5.1 Location and land ownership

The proposed project involves the construction of a petrol service station on Thika Municipality Block 8/181 along the Thika-Garissa highway. Activities involve installation of four pumps (2 petrol, 1 diesel and 1 kerosene), 4 underground tanks (2 petrol with 20,000 Litres capacity, 1 diesel with 10,000 Litres capacity and 1 kerosene with 5,000 Litres capacity). There is also going to be a car washing bay and a convenient store (small shopping outfit). A copy of the land title deed of the proposed project site is appended to this report. Approval of change of user from agricultural to commercial development and approval of the plans is also appended at the end of this report.

The diagram below shows the location of the proposed project.

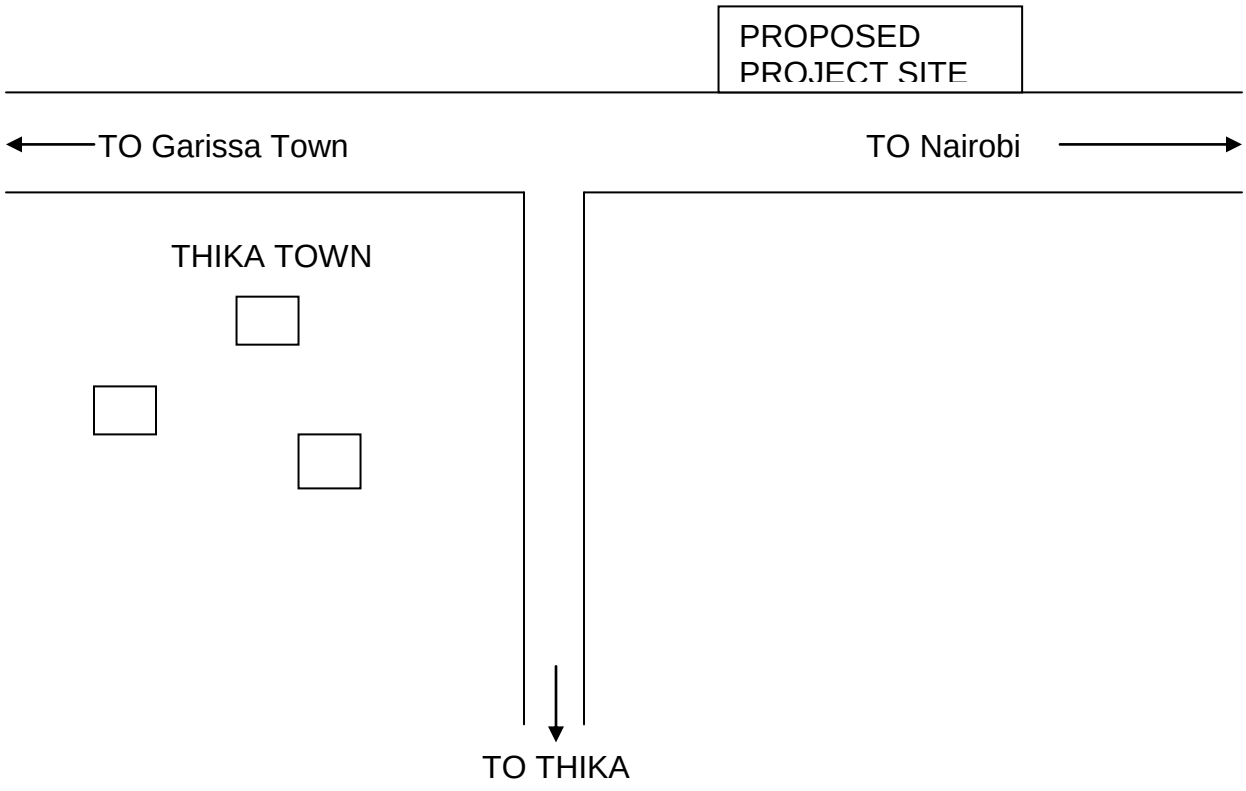

Fig 1. Location of the proposed project

5.2 Proposed project details

The following are the components of the proposed project:

a) Four underground fuel storage tanks as follows:-
   - (i) Two 20,000-litre capacity underground fuel storage tanks for petrol
   - (ii) One 10,000-litre capacity underground fuel storage tank for diesel
   - (iii) One 5,000- litre capacity underground fuel storage tank for kerosene

b) Three pumps

c) A car washing area

d) A convenient store (small shopping area)

e) Wash rooms

f) Necessary plumbing as detailed in the project BQ

g) Fire protection equipment as per project BQ

h) Necessary fittings and other works as per the project BQ

5.3 Project activities

5.3.1 Activities during the Construction Phase

a) Site Office

The contractor shall construct a temporary site office to run and manage all activities at this phase.

b) Site clearance and fencing (hoarding)

This will involve clearance of the little vegetation that is currently found at the proposed site. The site will then be isolated for public safety and for the security of construction material and equipment.

c) Excavation

This will involve excavation of the ground for installation of the tanks and other substructures as per the engineer's detail. This will use appropriate excavation equipment. This process will generate waste in form of spoil soil and rock particles.

d) Installation of tanks, erection of pumps and backfilling

The underground fuel storage tanks and fuel pumps will then be installed as per the project design. The pits will then be backfilled with hard core and compacted soil.

e) Construction of superstructures

This will entail construction of superstructures including the convenient store which will comprise of toilets, a mini mart, display shop, office and other proposed elements.

f) Plumbing

Necessary plumbing for connection of fuel tanks and dispensers and for water supply to the project site will be done.

g) Installation of fire protection equipment

The appropriate fire fighting equipment (carbon dioxide, dry powder, foam and bucket of sand) will then be installed.

h) Other fittings (builders works)

These will include reinforced concrete beams, fuel dispenser shed, site lighting and other necessary fittings.

i) Work testing and project commissioning

The installed equipment will then be tested for functionality and commissioned to the satisfaction of the presiding engineer.

j) Development of support infrastructure

The proponent will also have to develop the necessary support infrastructure including creating a motorable access road to the station, water supply, toilet facilities (must ensure they are within reach), wastewater disposal facilities and necessary connections.

5.3.2 Activities during the operation and maintenance phase

The activities here will include fuel restocking (tanks refilling) and fuel dispensing. Maintenance activities will include facility cleaning, underground tanks and dispensers routine checks and other necessary repairs. There will also be car washing, wheel balancing services and shopping at the convenient store.

5.3.3 Activities at the decommissioning phase

The activities at the decommissioning phase of the fuel station include; isolating (cordoning off) the site and the necessary communication, demolition of superstructures, careful removal of the fuel dispensers, careful excavation and removal of the underground fuel storage tanks after emptying the fuel therein, appropriate treatment of any contaminated soil as necessary**,** backfilling of the excavations with suitable material such as pebbles or construction dug out soil, proper disposal of decommissioned facilities and other wastes using a licenced waste collector and landscaping at the project site – planting of grass and trees (or shrubs). The major emphasis here will be restoration of the affected environment, proper disposal of dismantled material and protection of public health and safety.

6.0 ANALYSIS OF ALTERNATIVES

6.1 Introduction

Alternatives to the project are different ways to achieve the same purpose and need. Some of the alternatives to the proposed apartment's development include; alternative sites, alternative layouts/designs and the "no project" alternative as briefly described below.

6.2 Alternative sites (locations)

The proponent has the option of undertaking the proposed development in a different location other than the chosen site. This could also entail acquiring land elsewhere to carry out the development. The following reasons justify the use of the proposed site for the development: -

(a) The land is owned by the proponent

(b) The site is suitable for development of a petrol service station (there is no other petrol station nearby and proponent intends to take up this opportunity).

(c) It eliminates the cost implications of seeking to develop elsewhere

(d) There is adequate space for the proposed development on the land.

6.3 Alternative Layouts and Designs

This involves looking at various possible alternative project designs and layouts. However, the proponent has consulted widely with the project architect and the project manager and the proposed design and layout is the one that optimizes the intended project objective

6.4 The "No Project" Alternative

The "No Project" alternative implies that no development is undertaken on the land and thus retains the original environment. Without the project the land would not be put into optimum use.

Although the "no project" alternative would not have adverse impacts on the environment, it does not make economic sense not to undertake the development.

7.0 BASELINE INFORMATION

7.1 Physical Environment

7.1.1 Climate

This region is in Kajiado County and can be described as relatively dry. The average annual rainfall is around 900mm but varies between 500 and 1,250mm. There are two wet seasons, the ‘short rains’ between October and December and the ‘long rains’ between March and May. Temperatures vary with altitude and season. The highest temperature recorded is about 34 ºC while the lowest minimum is 10 ºC .The coolest period is between July and August while the hottest months are from January to March.

7.1.2 Soil Conditions

The soil type at the site is black cotton soil. Kajiado County consists of three geological regions; Quaternary volcanic, Pleistocene and Basement rocks soils.

There is a close relationship between the geological formation, topography and soils. Quaternary Volcanic: are found in the Rift Valley floor around Loitoktok and Sultan Hamud, Basement System Rocks which comprise of various gneisses, schists, quartzite and crystalline limestone, are found mainly along the river valleys and some parts of the plains, Pleistocene are found in the inland drainage lake system around Lake Magadi, Lake Natron and Lake Amboseli.

The geological formation gives rise to minerals of economic importance such as gypsum, limestone, soda ash, salt, quartile and meerschaum. Gypsum is mined at Isinya while limestone is available in big quantities in Kibini, Toroka and Ngatataek areas.

There are large deposits of soda ash in Magadi. Quarrying of building stones is scattered all over the county but the major areas are Ngong, Ongata Rongai and Kitengela.

7.1.2 Topography

The land at the proposed project site is relatively flat.

7.1.3 Vegetation

The site is in a semi-arid area and is dominated by grass and a few acacia species.

Fig (2) Vegetation at the site

7.1.4 Drainage

The drainage of the area is controlled by the pre-volcanic high ground and the high ground along the edge of the Rift Valley. The headwaters of the Kajiado River lie north-west of Kajiado, while their western watershed is formed by the Kapiti Phonolite and the Ol Doinyo Narok plateau. The upland Athi-Kapiti Plains are mainly open, rolling land. The plains drain towards the Athi River basin in the east. The Athi drainage basin is the second largest drainage basin in Kenya after the Ewaso Nyiro.

It occupies a total land area of 132 000 km^2 representing about 23.7%of the total land area of the country.

The few permanent natural sources of surface water in Kajiado County include the Uaso Nyiro River in the Rift Valley, two streams in the northern part of the Athi-Kapiti Plains, the Kiboko River which drains much of the Central Hills and the northern part of the Amboseli ecozone, and several springs in the southern part of the Amboseli zone.

The primary sources of water for the main Athi River originate from the Ondiri springs, the Tigoni falls, the Kikuyu escarpment and the Kabete and Karura forests.

Hydrologically, the upper Athi catchment area is drained by the main Athi River with the Koma, Ndaragu, Ruiru, Ruaraka, Mathare, Motoine, Mbagathi, Ngong and Nairobi tributaries joining downstream to form the main Athi upstream of its confluence with the Thwake River. The latter include the Tsavo, Tiva and Sabaki rivers which all discharge to the Indian Ocean.

The nearest hydrological feature to the proposed site is the Isinya stream, about 1 kilometre from the proposed project site.

7.2 Social Economic Environment

7.2.1 Economic Activity

Isinya Rongai town is in Kajiado County and is situated along the Kiserian- Namanga highway. The town can be described as a self sufficient residential town with a bustling business district. It has seen significant growth in the past 5 years and is poised for higher economic growth in the next few years.

A major factor which has seen the growth of Isinya is the expansion of horticulture farming in the area which has led to insatiable need for housing, commercial and industrial zones and thus the march of economic activities as developers, government and citizens search for habitable areas. The proposed site is approximately two kilometres off the Kiserian-Namanga highway. Some notable businesses and uses of land in the area include large scale horticulture farming, banking, hotel and entertainment, filling services, transport, chain stores, residential housing, educational institutions and health services among other uses. Most of the land parcels in the area are undeveloped and are used for grazing livestock.

7.2.2 Infrastructure

a) Road

The proposed site is served by Kiserian - Isinya highway.

b) Sewerage

The area is not served with sewerage connection. A conservancy tank (in place of septic tank) will be constructed to serve this purpose.

c) Water

The proposed project area will be served by a borehole located 1 Km away. The water will be piped to the project site.

d) Electricity

The area is served by the national KPLC mains grid.

e) Communication

The area has good network coverage by all the major mobile telephone service providers.

f) Health services

The major health facility in the area is the Isinya Health Centre.

g) Security

Residential developments surrounding the plot are guarded by Private Security guards.

7.2.3 Demography

Kajiado County is located at the southern tip of the former Rift Valley Province. Kajiado County constitutes 3 constituencies (Kajiado Central, Kajiado North and Kajiado South). According to the Kenya National Housing and Population census report of 2009 Kajiado County has a total of 687,312 inhabitants. The indigenous peoples of the area are the Maasai but there is an increasing influx of people from other tribal groups.

8.0 NATIONAL POLICY, INSTITUTIONAL AND REGULATORY FRAMEWORK

8.2 Introduction

Many forms of development activities cause damage to the environment. Development activities have the potential to damage the natural resources upon which the economies are based. Environmental Impact Assessment has been developed as a tool for protection of the environment from the negative effects of developmental activities. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound.

Kenya has had a poor Environmental Legislation background. The law was fragmented into sectional laws (up to 77 statutes) resulting to poor management of the environment and hence its deterioration. In the year 1999, Environmental Management and Coordination Act (EMCA) 1999 was enacted in parliament. The Act aimed to provide for the establishment of an appropriate legal and institutional framework for the management of the environment. According to Sections 58 and 138 of the Environmental Management and Coordination Act (EMCA) No. 8 of 1999 and Section 3 of the Environmental (Impact Assessment and Audit) Regulations 2003 (Legal No. 101), an Environmental Impact Assessment project/study report should be prepared and submitted to the National Environment Management Authority (NEMA) for review and eventual Licensing before the development commences. This is necessary as many forms of developmental activities cause damage to the environment and hence the greatest challenge today is to maintain sustainable development without interfering with the environment.

8.2 Policy Framework

8.2.1 National Energy Policy

The Sessional Paper on Energy recognizes that the success of socio-economic and environmental transformation strategies pursued by the Government at present and in

the future is to a large extent, dependent on the performance of the energy sector as an economic infrastructure. According to this policy, the petroleum industry is constrained by limited supply facilities for fuels including LPG, domestic production of motor fuels which do not meet international quality standards, inadequate distribution infrastructure in remote parts of the country which contribute to high product prices, price leadership which inhibits competition, and insufficient legal and regulatory framework to guide sub-sector operations in consonance with international best practices for liberalized markets, thus exposing the public to health, environmental and safety hazards. In addition and as a result of the inadequacies in the legal and regulatory framework, the sub-sector has witnessed proliferation of substandard fuel dispensing facilities, and under-dispensing of products including adulteration of motor fuels with kerosene and dumping of export fuels for illicit financial gains at the expense of both the consumer and Government revenue.

According to the energy policy, retail and wholesale dispensing sites that do not conform to any set standards sprung up following deregulation of petroleum prices in 1994 and have since continued to grow. Such fuel dispensing facilities are not only more vulnerable to accidents but also pose serious safety, health and environmental hazards associated with incidents of oil spills, fires and ground water contamination. Incidents of deliberate under-dispensing of fuel to consumers under the pretext of selling competitively- priced fuel by interfering with dispensing pumps have been on the increase. The challenge is to ensure that all fuel-dispensing facilities meet the minimum prescribed standards for environmental, health and safety, and pumps are properly calibrated for accurate fuel dispensation.

According to the energy policy, the challenge in energy production and consumption is to achieve the socio-economic transformation and development goals through sustainable energy use in a cost-effective and environmentally benign manner. This entails assessment of energy projects for their environmental, health and safety impacts in order to facilitate the establishment of mitigating measures and monitoring plans in parallel with energy development and consumption; keeping all the electric power lines and other utility corridors free of human settlement and development; environmental

rehabilitation on project completion or abandonment; and, continued implementation of sound environmental practices for all energy related activities including production and delivery systems.

According to this document, it is therefore Government policy to ensure provision of adequate supply and distribution of petroleum products in all parts of the country at least cost. Critical to the success of this policy is the availability of storage, distribution and fuel-dispensing facilities within close proximities, to guarantee access to fuel, while at the same time maintaining high quality standards of these facilities and products to protect consumer interests and the environment.

Consistent with this policy, the Government will pursue implementation of the following measures:

i. development of retail network throughout the country and common user storage facilities where they do not exist;

ii. investments in the oil pipeline system at a pace in consonance with demand;

iii. construction of LPG import handling, storage and distribution facilities in the short term. Storage and filling facilities will also be constructed in Nairobi, Kisumu, Nakuru, Eldoret and Sagana and in other parts of the country in tandem with rising incomes and demand;

iv. removal of non-tariff barriers to market entry by abolishing requirements for minimum crude oil processing and contribution to pipeline line fill by 2006;

v. provision of incentives to investors in new petroleum oil refining;

vi. introduction of quality petroleum fuels consistent with international standards;

vii. introduction of a new energy legislation embracing both petroleum, electricity and other forms of energy to enhance incentives to the private sector and ensure prudential regulation of the energy sector;

viii. re-introduction of power alcohol as a motor fuel in its long-term policy to enhance security of supply and redress the trade imbalance arising from petroleum imports;

ix. review of the viability of production, marketing and use of bio-diesel in the long term;

x. ensuring that economic operators in the petroleum industry who adulterate motor fuels and divert exports for illicit financial gain will not be allowed to continue hurting unsuspecting motorists and deny Government of its revenue. Such operators will not only be prosecuted but will also have their licences cancelled;

xi. ensuring strict conformity to minimum construction standards before licensing of dispensing sites and undertaking of more frequent calibration of dispensing pumps;

xii. promoting wider use of both kerosene and LPG in households, as an alternative fuel to improve the quality of household energy and mitigate demand on woodfuel;

xiii. maintenance of strategic stocks equivalent to 90 days of national demand in the long term to guarantee security of supply under emergency, the cost of which will be shared equally between Government and the private sector; and

xiv. divestiture of state interests in oil refining and marketing, and eventually in the Kenya Pipeline Company.

The Energy Policy recommended the repeal of the Electric Power Act of 1997 and the Petroleum Act, Cap 116 to enact an umbrella Energy Act with specific provisions to transform the Electricity Regulatory Board (ERB) into the Energy Regulatory Commission (ERC) with an elaborate regulatory mandate for the entire energy sector. The Energy Act would also make the ERC a one-stop office for facilitating permitting and licensing by different Governmental authorities.

8.2.2 National Environmental Action Plan (NEAP)

NEAP laid down very clear strategies in order to integrate environmental issues in development programs and projects. NEAP also outlines strategies that can be adopted to realize the objectives.

Some of the broad objectives of NEAP include:

a) facilitating the optimal use of national land and water resources in improving environmental quality;

b) promoting sustainable use of natural resources to meet the needs of present generations while preserving the ability of future generations to meet their needs;
c) treating environmental conservation and economic development as integral parts of the same process of sustainable development; and
d) generating income to meet national goals and international obligations by conserving biodiversity, reducing desertification and maintaining ecological balance of the earth.

Among others, strategies for realizing these objectives include:

a) the need to enhance the harmonization and implementation of laws concerning the sustainable use of resources;
b) the need to institutionalize EIA for monitoring and assessment of both public and public and private projects;
c) the need to enhance the involvement of local communities in natural resources management;
d) provision of strong environmental coordination and monitoring;
e) the need to formulate a comprehensive land use and settlement policy to regulate human activity and minimize negative effects;
f) the need to provide economic incentives and penalties to encourage the sustainable use of natural resources and to minimize pollution

8.2.3 Sessional Paper No 6 of 1999 on Environment and Development

According to this Sessional Paper, Kenya's fundamental principles with respect to environmental conservation include:

a) Environmental protection is an integral part of sustainable development.

b) The environment and its natural resources can meet the needs of present as well as those of future generations if used sustainably.

c) All the people have the right to benefit equally from the use of natural resources as well as an equal entitlement to a clean and healthy environment.

d) Poverty reduction is an indispensable requirement for sustainable development.

e) Sustainable development and higher quality of life can be achieved by reducing or eliminating unsustainable practices of production and consumption; and by promoting appropriate demographic policies.

f) Endogenous capacity building is essential for development, adaptation, diffusion, and transfer of technologies for sustainable development.

g) Indigenous/traditional knowledge and skills are vital in environmental management and sustainable development.

h) Effective public participation is enhanced by access to information concerning the environment and the opportunity to participate in decision-making processes.

i) Public participation including women and youths is essential in proper environmental management.

j) For sustainable management, the polluter pays principle should apply.

k) Access to judicial and administrative proceedings, including redress and remedy, is essential to environmental conservation and management.

l) Private sector participation in environmental management is essential for sustainable development.

m) Effective measures should be taken to prevent any threats of damage to the environment, notwithstanding lack of full scientific certainty.

n) Peace, security, development, and environmental protection are interdependent and indivisible.

o) International co-operation and collaboration is essential in the management of environmental resources shared by two or more states.

The overall goal of the Sessional paper was to integrate environmental concerns into the national planning and management processes and provide guidelines for environmentally sustainable development.

With regard to forestry, the government committed itself in the Sessional Paper to making EIA a requirement in all development projects and programmes affecting forests, including excisions. Regarding wildlife conservation, the government committed itself to reviewing the wildlife policy and legislation and to involvement of local

communities and other users in wildlife conservation. The government further committed itself to making EIA a requirement for all land use changes and activities in rangelands.

According to the Sessional paper, the government will endeavor to develop a comprehensive energy policy and legislation incorporating environmental concerns and make EIA a requirement for all energy project and programs especially for hydroelectric, thermal and geothermal activities as well as those requiring wood.

According to the Sessional paper, the Government will endeavor to:

a) Formulate comprehensive EIA guidelines, procedures, and legislation;
b) Strengthen and develop environmental standards;
c) Establish a system of EIA audits, monitoring, evaluation, and appeal;
d) Subject new and existing project and programmes to environmental monitoring and auditing;
e) Strengthen capacities in institutions and local communities with regard to EIA; and
g) Incorporate social and cultural values in EIA.

The Sessional paper on environment and development was thus the starting point in using EIA as a tool for appraising the suitability and sustainability of developments.

8.2.4 Environmental Policy

There has never been a national environmental policy in Kenya. However the government through the Ministry of Environment and Mineral Resources recently spearheaded the processes of formulating a new national environmental policy. The draft policy has however not been made public.

8.3 Institutional Framework

At present there are over twenty (20) institutions and departments which deal with environmental issues in Kenya. Some of the key institutions include the National

Environmental Council (NEC), National Environment Management Authority (NEMA), the Forestry Department, Kenya Wildlife Services (KWS) and others. In the energy sector, the Energy Regulatory Commission and the Kenya Bureau of Standards are key institutions in the regulation of energy sector in Kenya.

8.3.1 National Environment Management Authority (NEMA)

This is the government authority charged with the general supervision and coordination of all environmental matters in the Kenya. NEMA is the principal instrument of the government in the implementation of all policies relating to the environment. The authority is a creature of the Environmental Management and Coordination Act (EMCA) that came into effect on the 14th of January, year 2000.

Among others, the functions of NEMA are:

a) to coordinate various environmental management activities undertaken by lead agencies;
b) to promote the integration of environmental considerations into development actions with a view to ensuring proper management and rational utilization of environmental resources on a sustainable yield basis for the improvement of quality of life;
c) to advise the government on legislative and other measures for the management of the environment or the implementation of various international conventions, treaties and agreements in the field of environment;
d) to identify development actions for which environmental audit and monitoring must be conducted under the Act;
e) to assess and monitor activities to ensure that the environment is not degraded by such activities, that environmental management objectives are adhered to and adequate early warning on impending environmental emergencies is given;
f) to cooperate with relevant lead agencies on environmental education and enhancement of public awareness on environmental protection;
g) to prepare and issue an annual report on the state of the environment in Kenya

Under EMCA, NEMA may delegate any of its powers on the performance of any of its functions to Provincial and District Environment Committees; NEMA officers (such as

the District and Provincial Environment Officers); its employees or agents. NEMA is headed by a Director General (DG) who is appointed by the president. The proposed project is within the jurisdiction of Nairobi Province and in particular Nairobi West District.

8.3.2 The National Environment Tribunal (NET)

NET was established under section Part XII, Section 125 (1) of the Environmental Management and Coordination Act of 1999. According to Section 129 (1) of EMCA 1999, any person who is aggrieved by:-

(a) a refusal to grant a licence or to the transfer of his licence under this Act or regulations made thereunder;

(b) the imposition of any condition, limitation or restriction on his licence under this act or regulations made thereunder;

(c) the revocation, suspension or variation of his licence under this Act or regulations made thereunder;

(d) the amount of money which he is required to pay as a fee under this Act or regulations made thereunder;

(e) the imposition against him of an environmental restoration order or environmental improvement order by the Authority under this Act or regulations made thereunder;

may within sixty days after the occurrence of the event against which he is dissatisfied, appeal to the Tribunal in such manner as may be prescribed by the Tribunal.

According to Section 129 (4) of EMCA 1999, upon any appeal to the Tribunal under this section, the status quo of any matter or activity, which is the subject of the appeal, shall be maintained until the appeal is determined.

8.3.3 National Environment Council (NEC)

This body was established under Section 4 (1) of the Environmental Management and Coordination Act of 1999. The functions of NEC as specified under Section 5 of EMCA are:

a) policy formulation and directions for purposes of the EMCA;

(b) setting national goals and objectives and determining policies and priorities for the protection of the environment;

(c) promoting co-operation among public departments, local authorities, private sector, Non-Governmental Organisations and such other organisations engaged in environmental protection programmes; and

(d) performing such other functions as are assigned under this Act.

The members of NEC as specified under EMCA are:

a) the Minister for Environment as chairman;

(b) the Permanent Secretaries in the Ministries for the time being responsible for the matters specified in the First Schedule of EMCA 1999;

(c) two representatives of public universities in Kenya to be appointed by the Minister;

(d) two representatives of specified research institutions in Kenya to be appointed by the Minister;

(e) three representatives of the business community, to be appointed by the Minister, one of whom shall be a representative of oil marketing companies;

(f) two representatives of Non-Governmental Organisations active in the environmental field to be appointed by the Minister;

(g) the Director-General of NEMA as secretary; and

(h) such number of other members as may, from time, be co-opted by the Minister to be members of the Council.

8.3.4 The Energy Regulatory Commission (ERC)

The ERC was established by Part II, Section 4 (1) of the Energy Act of 2006. Under Section 5 of the Energy Act, the objects and functions of the Commission are to:

a) regulate the (i) importation, exportation, generation, transmission, distribution, supply and use of

electrical energy; (ii) importation, exportation, transportation, refining, storage and sale of petroleum and petroleum products; (iii) production, distribution, supply and use of renewable and other forms of energy;

b) protect the interests of consumer, investor and other stakeholder interests.
c) maintain a list of accredited energy auditors as may be prescribed;
d) monitor, ensure implementation of, and the observance of the principles of fair competition in the energy sector, in coordination with other statutory authorities;
e) provide such information and statistics to the Minister for Energy as he may from time to time require;
f) collect and maintain energy data;
g) prepare indicative national energy plan;
h) perform any other function that is incidental or consequential to its functions under Energy Act or any other written law.

The powers of the ERC are specified under Section 6 of the Energy Act, 2006 and include the power to:

a) issue, renew, modify, suspend or revoke licences and permits for all undertakings and activities in the energy sector;
b) make proposals to the Minister for Energy of regulations which may be necessary or expedient for the regulation of the energy sector or for carrying out the objects and purposes of this Act;
c) formulate, enforce and review environmental, health, safety and quality standards for the energy sector, in coordination with other statutory authorities;
d) enforce and review regulations, codes and standards for the energy sector;
e) prescribe the form and manner in which any application for a licence or permit or amendment thereof or objection thereto shall be made and the fees payable in respect of any such application;
f) prescribe the form and manner in which any application for any authority, consent or approval under this Act shall be made;
g) prescribe the conditions which may be attached to the grant of licences or permits under this Act;

h) make and enforce directions to ensure compliance with conditions of licenses or permits issued under this Act;
i) set, review and adjust electric power tariffs and tariff structures, and investigate tariff charges, whether or not a specific application has been made for a tariff adjustment;
j) approve electric power purchase and network service contracts for all persons engaging in electric power undertakings;
k) examine and approve meters used or intended to be used for ascertaining the quantity of energy;
l) investigate complaints or disputes between parties with grievances over any matter required to be regulated under this Act;
m) prescribe the requirements for accreditation of persons with appropriate skills to check accuracy of energy meters installed in residential, commercial or industrial premises;
n) prescribe the manner and intervals of time within which the energy audit shall be conducted; and
o) impose sanctions and penalties on persons who are in breach of any of the provisions of this Act or any regulations made thereunder.
p) grant licences, in coordination with other statutory authorities, for sustainable charcoal production upon submission of satisfactory development plans.

8.3.5 The Kenya Bureau of Standards (KEBS)

This is the statutory body responsible for standards, quality assurance and inspection of all goods used in Kenya including petroleum standards.

The functions of KEBS include:

- To promote standardization in industry and commerce.
- To make arrangements to provide facilities for the testing and calibration of precision instruments, gauges and scientific apparatus, for determination of their degree of accuracy by comparison with standards approved by the minister or on the recommendation of the council, or for the issue of certificates in regard thereto.

- To make arrangements or provide facilities for the examination and testing of commodities and any material or substance from or with which and the manner in which they may be manufactured, produced, processed or treated.
- To control, in accordance with the provisions of this act, the use of standardization marks and distinctive marks.
- To prepare, frame, modify or amend specifications and codes of practice.
- To encourage or undertake educational work in connection with standardization.
- To assist the government or any local authority or other public body or any other person in the preparation and framing of any specifications or codes of practice.
- To provide for co-operation with the government or the representatives of any industry or with any local authority or, other public body or any other person, with a view to securing the adoption and practical application of standards.
- To provide for testing on behalf of the government, of locally manufactured and imported goods at the ports of entry or country of origin with a view to determining whether such goods comply with the provision of this act or any other law dealing with standards of quality or description.
- To provide for testing of goods destined for export for purposes of export certification.
- Doing or performing all such other things or acts necessary for the proper performance of its functions under this act which may lawfully be done by a body corporate.

The KEBS has a number of standards for petroleum including:

a) KS 1938-1: 2005 - Handling, storage and distribution of liquefied petroleum gas in domestic, commercial and industrial installations - Code of practice - Part 1: Liquefied petroleum gas installations involving gas storage containers of individual water capacity not exceeding 500 L and a combined water capacity not exceeding 3 000 L per installation. This standard gives requirements for the materials, the methods of

construction and the installation of equipment used in liquefied petroleum gas applications for domestic and commercial installations that involve gas storage containers of individual water capacity not exceeding 500 L and of a combined water capacity not exceeding 3 000 L.

b) KS 1938-2: 2005 - Handling, storage and distribution of liquefied petroleum gas in domestic, commercial and industrial installations - Code of practice - Part 2: Transportation of LPG in bulk by road. Contains recommendations for the design, construction, inspection, fittings and filling ratio of tanks used in the transportation of LPG in bulk by road

c) KS OIML R 118: 1995: - Testing procedures and test report format for pattern evaluation of fuel dispensers for motor vehicles. Concerns the metrological controls to which fuel dispensers for motor vehicles shall be submitted in order to verify that their characteristics comply with the requirements.

8.3.7 The Petroleum Institute of East Africa (PIEA)

PIEA is a private membership institute comprised of individuals and corporates in the petroleum industry. The mission of PIEA is to provide a forum for expertise and excellence in the oil industry in the East African region with the aim of promoting professionalism and free enterprise in petroleum business supported by the highest business operating standards, and adherence to Environment, Health and Safety ideals.

8.3.6 The National Construction Authority (NCA)

This Authority was created by the National Construction Authority Act of 2011. The functions of the NCA as specified in section 5 (2) of the Act are to:

a) promote and stimulate development, improvement and expansion of the construction industry;
b) advise and make recommendations to the Minister for Public Works on matters affecting or connected with the construction industry;

c) undertake or commission research into any matter relating to construction industry;
d) prescribe the qualifications or other attributes required for registration as a contractor under this Act;
e) assist in the exportation of construction services connected to the construction industry; provide consultancy and advisory services with respect to the construction industry;
f) promote and ensure quality assurance in the construction industry;
g) encourage the standardization and improvement of construction techniques and materials;
h) initiate and maintain a construction information system;
i) provide, promote, review and coordinate training programmes organized by public and private accredited training centers for skilled construction workers and construction site employers;
j) accredit and register contractors and regulate their professional undertakings;
k) develop and publish a code of conduct for the construction industry; and
l) Do all other things that may be necessary for the better carrying out of its functions under the Act.

8.4 Regulatory Framework

A number of legislations and regulations address the environment and energy sectors in Kenya. These among others include:

8.4.1 The Environmental Management and Coordination Act (EMCA), 1999

EMCA is an Act of parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment. EMCA provides every person in Kenya with the right to a clean and healthy environment. The Act states that every person has the responsibility to protect and manage the environment.

EMCA defines the role of Environmental Impact Assessment (EIA) as a tool to maintain environmental integrity. Under the Act, projects likely to impact negatively on the

environment must be subjected to EIA. Section 58 (1) of the Act states that "*Notwithstanding any approval, permit or licence granted under this Act or any other law in force in Kenya, any person, being a proponent of the project, shall, before financing, commencing, proceeding with, carrying out, executing or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the second schedule to this Act, submit a project report to the Authority [NEMA) in the prescribed form, giving the prescribed information and which shall be accompanied by the prescribed fee".*

Part (2) of section 58 states *"the proponent of a project shall undertake or cause to be undertaken at his own expense an Environmental Impact Assessment study and prepare a report thereof where the authority, being satisfied after studying the project report submitted under subsection (1) that the intended project is likely to have or will have a significant impact on the environment, so directs".*

The second schedule of the Act details the types of projects for which an EIA must be carried out. Item

10 on the list in the Second Schedule has included the Management of hydrocarbons including the storage of natural gas and combustible or explosive fuels.

A detailed list of activities in the Second Schedule is appended to this report.

8.4.2 The Environmental (Impact Assessment and Audit) Regulations 2003

These regulations were made by the Minister for Environment and Natural Resources in June 2003 in exercise of the powers conferred by section 147 of the Environmental Management and Coordination Act. The regulations apply to all policies, plans, programmes, projects and activities in Part IV, V and the Second Schedule of the Act. According to section 4 (1) of these regulations, no proponent shall implement a project likely to have a negative environmental impact or for which an Environmental Impact Assessment is required under the Act or under these Regulations unless an EIA has been concluded and approved in accordance with these regulations. According to

these regulations, no licensing authority under any law in force in Kenya shall issue a trading, commercial or development permit or licence for any project for which an environmental impact assessment is required under the Act unless the applicant produces to the licensing authority a licence of environmental impact assessment issued by the Authority (NEMA) under these regulations.

Section 6 of these regulations state that an application for an EIA license shall be in the form of a project report in Form 1 set out in the First Schedule to these regulations, and the applicant shall submit the application together with the prescribed fee to the Authority or the Authority's appointed agent in the District where the project is to be undertaken.

Section 7 (2) states that in preparing a project report under this regulation, the proponent shall pay particular attention to the issues specified in the Second schedule to these regulations. Section (11) states that an environmental Impact Assessment study shall be conducted in accordance with the terms of reference developed during the scoping exercise by the proponent and approved by the Authority (NEMA). Section 13 requires that an environmental impact assessment shall be carried out by a lead expert qualified in accordance with the criteria of listing experts specified in the second schedule of the Act.

Section 17 (1) of the regulations state that during the process of conducting an environmental impact assessment study under these regulations, the proponent shall, in consultation with the Authority, seek views of persons who may be affected by the project. According to section 23 of these regulations, NEMA shall give its decision on an EIA study report within three months of receiving the report. Section (24) follows that where the Authority approves an EIA study report under regulation (23), it shall issue an EIA licence in Form 3 set out in the First schedule to these regulations on such terms and conditions as it may deem necessary.

Regulation (31) states that an environmental audit shall be undertaken for the following development activities which are likely to have adverse environmental impacts:

(a) ongoing projects commenced prior to coming into force of these regulations; or
(b) new projects undertaken after completion of an environmental impact assessment study report

Section 2 of regulation 31 states that an environmental audit shall, unless if it is a self auditing study under regulation 34, be conducted by a qualified and authorized environmental auditor or environmental inspector who shall be an expert or a firm of experts registered in accordance with regulation 14.

8.4.3 The Environmental Management and Coordination (Waste Management) Regulations, 2006

These regulations were made by the Minister for Environment and Natural Resources on the 4th of September 2006 in exercise of the powers conferred by sections 92 and 147 of the Environmental Management and Coordination Act of 1999, and in consultation with relevant lead agencies.

Under Regulation 4 (1), no person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated public receptacle.

Under Regulation 6, a waste generator shall segregate waste by separating hazardous waste from non-hazardous waste and shall dispose of such wastes in such facility as shall be provided by the relevant local authority.

Under Regulation 14 (1), every trade or industrial undertaking shall install at its premises anti pollution equipment for the treatment of waste emanating from such trade or industrial undertaking.

Under Regulation 18, every generator of hazardous waste shall ensure that every container or package for storing such waste is labelled in easily legible characters, written in both English and Kiswahili. The label shall contain the following information:

a) the identity of hazardous waste;

b) the name and address of the generator of waste;
c) the net contents;
d) the normal storage stability and methods of storage;
e) the name and percentage of weight of active ingredients or half-life of radio active material;
f) warning of or caution statements which may include any of the following as appropriate –
(i) the words “WARNING” or “CAUTION”;
(ii) the word “POISON” (marked indelibly in red on a contrasting background); and
(iii) the words “DANGER! KEEP AWAY FROM UNAUTHORIZED PERSONS”; and
(iv) a pictogram of a skull and crossbones
g) a statement of first aid measures, including the antidote when waste is inhaled, ingested or dermal contact and a direction that a physician must be contacted immediately;

The 4th schedule of these regulations lists categories of wastes that are considered hazardous.

The 3rd schedule gives the standard for the treatment and disposal of wastes including classification for incinerators and the standards, guidelines, criteria and procedure for installing and operating incinerators.

Under Regulation (5) (1), a waste generator shall minimize waste generated by adopting the following cleaner production methods:
a) improvement of the production processes through;
(i) conserving raw materials and energy;
(ii) eliminating the use of toxic raw materials; and
(iii) reducing toxic emissions and wastes
b) monitoring the product cycle from beginning to the end by:
(i) identifying and eliminating potential negative impacts of the product;
(ii) enabling the recovery and re-use of the product where possible; and

(iii) reclamation and recycling; and

c) Incorporating environmental concerns into the design and disposal of the product.

8.4.4 The Environmental Management and Coordination (Water Quality) Regulations, 2006

These regulations were made by the Minister for Environment and Natural Resources on the 4th of September 2006 in exercise of the powers conferred by section 147 of the Environmental Management and Coordination Act of 1999, on the recommendation of NEMA and upon consultation with relevant lead agencies.

These regulations apply to drinking water, water used for industrial purposes, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife and water used for any other purpose.

Under Regulation 4 (1), every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and shall be immaterial whether or not the water resource was polluted before the enactment of these Regulations.

Regulation 4 (2) states that no person shall throw or cause to flow into or near a resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as tom cause pollution.

In Regulation (5), all sources of domestic water shall comply with the standards set out in the First schedule to these Regulations.

According to Regulation (6), no person shall -

a) discharge any effluent from sewage treatment works industry or any other point sources without a valid effluent discharge licence issued in accordance with the provisions of this Act;

b) abstract ground water or carry out any activity near any lakes, rivers, streams, springs and wells that is likely to have any adverse impact on the quantity and quality of the water, without an EIA licence issued in accordance with the provisions of this Act; or
c) cultivate or undertake any development activity within full width of a river or a stream to a minimum of 6 meters and a maximum of 30 metres on either side based on the highest recorded flood level.

Under Regulation (11), no person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive waste or other pollutants or permit any person to dump or discharge such matter into the aquatic environment unless such discharge, poison, toxic, noxious or obstructing matter, radioactive waste or pollutant complies with the standards set out in the Third Schedule to these Regulations.

Under Regulation 24, no person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive wastes or other pollutants or permit any person to dump or discharge any such matter into water meant for fisheries, wildlife, recreational purposes or any other uses.

According to Regulations 25, no person shall use or allow to be used any natural water body for recreational purposes unless the water body meets the quality standards for recreational standards set out in the 10th Schedule to these regulations.

According to Regulation 27, any person who contravenes any of these Regulations commits an offence and shall be liable to a fine not exceeding five hundred thousand shillings.

The 1st Schedule of the Water Quality Regulations gives the quality standards for domestic water while the 3rd Schedule gives the standards for effluent discharge into the environment. The 5th Schedule gives the standards for effluent discharge into public sewers. The 9th and 10th Schedules give the quality standards for irrigation and recreation waters respectively.

8.4.5 The Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations

According to Regulation 3.(1), except as otherwise provided in these Regulations, no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.

According to regulation 3 (2), in determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered: -

(a) time of the day;

(b) proximity to residential area;

(c) whether the noise is recurrent, intermittent or constant;

(d) the level and intensity of the noise;

(e) whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and,

(f) whether the noise can be controlled without much effort or expense to the person making the noise.

Under Regulation 4.(1) except as otherwise provided in these Regulations, no person shall-

(a) make or cause to be made excessive vibrations that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment;

(b) cause to be made excessive vibrations that exceed 0.5 centimetres per second beyond any source, property boundary or 30 metres from any moving source.

Under Regulation (5), no person shall make, continue or cause to be made or continued any noise in excess of the noise levels set in the First Schedule to these regulations, unless such noise is reasonably necessary to the preservation of life, health, safety or property.

According to Regulation 8 (1) No person shall use or operate any radio or receiving set, musical instrument, phonograph, television set, any other machine or device for the producing or reproducing of sound or any other sound-amplifying equipment in a loud, annoying or offensive manner such that, noise from the device-

(a) interferes with the comfort, repose, health or safety of members of the public;

(b) creates a risk thereof, within any building or, outside of a building, at a distance of 30 meters or more from the source of such sound; or

(c) interferes with the conversation of members of the public who are 30 meters or more from the source of such sound.

In accordance with Regulation 9 (1), any person in charge of a party or other social event that occurs on any private or public property shall ensure that the party or event does not produce noise in a loud, annoying or offensive manner such that noise from the party interferes with the comfort, repose, health or safety of members of the public within any building or, outside of a building, or recklessly creates the risk thereof, at a distance of 30 meters or more from the source of such sound.

According to Regulation 10 (1) No person shall:-

(a) preach, tout, advertise, promote or sell anything; or

(b) engage in any commercial activity; in any manner so as to emit noise by shouting within a Central Business District of any town, a residential area, a silent zone, or any other area declared as a silent zone by NEMA;

In line with Regulation 11 (1) any person wishing to-

(a) operate or repair any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical device; or (b) engage in any commercial or industrial activity, that is likely to emit noise or excessive vibrations shall carry out the activity or activities within the relevant levels prescribed in the First Schedule to these Regulations.

In accordance with Regulation 12 (1) no person shall operate a motor vehicle that (a) produces any loud and unusual sound; and (b) exceeds 84 dB (A) when accelerating. In addition, sub-Regulation (2) states that no person shall at any time sound the horn or other warning of a vehicle except when necessary to prevent an accident or an incident.

Under Regulation 13 (1) except for the purposes specified in sub-Regulation (2) thereunder, during night time hours, no person shall operate construction equipment (including but not limited to any pile driver, steam shovel, pneumatic hammer, derrick or steam or electric hoist) 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 these Regulations.

According to Regulation 16. (1) where a sound source is planned, installed or intended to be installed or modified by any person in a manner that such source will create or is likely to emit noise, or excessive vibrations, or otherwise fail to comply with the provisions of these Regulations, such person shall apply for a license to the Authority. In accordance with Regulation 19 (1).no person shall carry out activities such as fireworks, demolitions, firing ranges and specific heavy industry without a valid permit issued by the Authority.

Under Regulation (26), where there is continuous emission of noise or excessive vibration after the Environmental Inspector has issued an improvement notice, the Environmental Inspector may, with the approval of the Director General, and in consultation with the relevant lead agency, order the closure of an establishment or undertaking emitting such noise or excessive vibrations. According to Regulation (28), any person who contravenes any of the provisions of these Regulations, for which no penalty is stipulated, commits an offence and is liable, upon conviction, to a fine of not more than three hundred and fifty thousand shillings or to imprisonment for a term of not more than eighteen months or to both such fine and imprisonment.

The tables below show the maximum permissible noise limits for various areas.

Table (2): First Schedule (Maximum permissible Intrusive Noise Levels)

Zone		**Sound Level Limits dB(A) (Leq,14 h)**		**Noise Rating Level (NR) (Leq,14 h)**	
		Day	Night	Day	Night
A	Silent Zone	40	35	30	25
B	Places of worship	40	35	30	25
C	Residential (indoor)	45	35	35	25
	Residential (indoor)	50	35	40	25
D	Mixed residential (with some commercial and places of entertainment)	55	35	50	25
E	Commercial 60 35 55 25	60	35	55	25

<u>Time Frame:</u>

Day: 6.01 a.m. – 8.00 p.m. (Leq, 14 h)

Night**:** 8.01 p.m. – 6.00 a.m. (Leq, 10h) Source: www.nema.go.ke

Table (3): Second Schedule (Maximum permissible Noise Levels for construction sites)

Facility		**Maximum Noise Level Permitted (Leq) in dB(A)**	
		Day	Night
(i)	Health facilities, educational institutions, homes for disabled etc.	60	35
(ii)	Residential	60	35
(iii)	Areas other than those prescribed in (i) and (ii)	75	65

<u>Time Frame</u>:

Day: 6.01 a.m. – 6.00 p.m. (Leq, 14 h)

Night: 6.01 p.m. – 6.00 a.m. (Leq, 14 h)

Source: www.nema.go.ke

8.4.6 The Energy Act, 2006

This is an ACT of Parliament to amend and consolidate the law relating to energy, to provide for the establishment, powers and functions of the Energy Regulatory Commission and the Rural Electrification Authority, and for connected purposes.

According to the Energy Act (2006), "biomass" means non-fossilised and biodegradable organic material originating from plants, animals and micro-organism and includes bio-ethanol, bio-diesel, biogas, charcoal, fuelwood and agrowaste.

Under Section 3, the provisions of the Energy Act apply to every person or body of persons importing, exporting, generating, transmitting, distributing, supplying or using electrical energy; importing, exporting, transporting, refining, storing and selling petroleum or petroleum products; producing, transporting, distributing and supplying of any other form of energy, and to all works or apparatus for any or all of these purposes.

Section 4 of the Energy Act has established a regulatory body known as the Energy Regulatory Commission.
According to Section 80.(1) of the Act, a person shall not conduct a business of importation, refining, exportation, wholesale, retail, storage or transportation of petroleum, except under and in accordance with the terms and conditions of a valid licence.

Under Section 90.(1) Any person intending to construct a pipeline, refinery, bulk storage facility or retail dispensing site shall, before commencing such construction, apply in writing to the ERC for a permit to do so.

Under Section 103 (1), of the Energy Act (2006), the Minister for Energy shall promote the development and use of renewable energy technologies, including but not limited to biomass, biodiesel, bioethanol, charcoal, fuelwood, solar, wind, tidal waves, hydropower, biogas and municipal waste.

Under Section 103 (2) (e) of the Energy Act, 2006, the Minister for Energy shall promote the development of appropriate local capacity for the manufacture, installation, maintenance and operation of basic renewable technologies such as bio-digesters, solar systems and hydro turbines.

According to Section 105 (1), the ERC shall, in consultation with the Minister for Energy designate factories or buildings and electrical appliances by types, quantities of energy use, or methods of energy utilization for purposes of energy efficiency and conservation.

Under Section 106 (1), the owner of a building designated under section 105, shall conserve energy, audit and analyze energy consumption in his building in accordance with the standards, criteria, and procedures as prescribed by regulations.

8.4.7 The Building Code

This is a composition of Local Government Adoptive building by-laws that any municipal or county council may adopt. The Building Code is comprised of the Local Government (Adoptive By-Laws) (Building) Order of 1968 and the Local Government (Adoptive By-Laws) (Grade II Building) Order 1968. According to the Building Code, any person who intends to erect a building shall submit a written application to do so in such form as the Council may require, completing all details required therein in so far as they apply to the proposals. The application form shall be signed by the developer or by a person representing himself to be his duly authorized agent in which event it shall state the name of the person on whose behalf it has been submitted. The form shall be attached to any plans or documents submitted in accordance with by-law (5) of these By-laws.

According to section (5) of these By-Laws, a person who intends to erect a building or materially change the use of a building or part of a building shall furnish the council in the manner provided in part (A) of the First Schedule of these by-laws. Section (6) (1) of the Building Code states that when a person submits an application pursuant to these by-laws, a fee shall be paid to the council in accordance pursuant to these by-laws, a fee shall be paid to the council in accordance with the charges and conditions prescribed in te10th Schedule to these By-laws. In section 7 (1), within 30 days of receipt of a duly completed application form, together with such particulars as are required by these By-laws, the council shall notify the applicant in writing whether or not the application has been approved, provided that the council may within the said 30 days extend the period in the case of any particular application for a further 30 days.

The Building code generally gives guidelines and specifications for various buildings and constructions including farm buildings, temporary buildings, temporary latrines, space in front of buildings, boundary walls, access to buildings, drainage of building sites and specifications for foundations among others. In addition, the code gives general classification and bearing capacity of subsoils, wall foundations, dimensions for bricks and stones, fire resistance for various buildings and requirements for stairways. The code gives guidelines for ventilation, sewer and plumbing installations and load capacity of various building materials. The Building Code has 12 schedules that address various specific building requirements.

8.4.8 The Physical Planning Act (Cap 286)

The local authorities are empowered under section 29 of the Act to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. In addition, this section allows for prohibition or controls the use and development of land and buildings in the interest of proper and orderly development of an area.

According to section 30, any person who carries out development without permission shall be required to restore the affected land to its original condition. However, by virtue of this provision, no other licencing authority shall grant a licence for commercial or industrial use or occupation of any building without a development permission granted by the respective local authority.

Consequently, section 36 provides that if in connection with a development application, local authority is of the opinion that the proposed development activity will have injurious impact on the environment, the applicant shall be required to submit together with the application a copy of the environmental impact assessment (EIA) report prepared and submitted to NEMA for review.

8.4.9 The Occupational Safety and Health Act, 2007

This is an Act of parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. According to Section 3 (1), this legislation shall apply to all workplaces where any person is employed, whether permanently or temporarily.

Under Section 3 (2), the purpose of this Act is to : -

a) secure the safety, health and welfare of persons at work; and

b) protect persons other than persons at work against risks to safety and health arising out of, or in connection with, the activities of persons at work.

Under Section 6 (1), every occupier shall ensure the safety, health and welfare at work of all persons working in his workplace. Under section 6 (3), every occupier shall carry out appropriate risk assessments in relation to the safety and health of persons employed, and on the basis of these results, adopt preventive and protective measures to ensure that under all conditions of their intended use, all chemicals, machinery, equipment, tools, and process under the control of the occupier are safe and without risk to health and comply with the requirements of the safety and health provisions in this Act. Under 6 (4), every occupier shall send a copy of a report of risk assessment carried out under this section to the area occupational safety and health officer.

According to Section 6 (6), it is the duty of every occupier to register his workplace unless such workplace is exempted from registration under this Act.

Under section 7 (1) except in such cases as may be prescribed, it is the duty of every occupier to: -

a) prepare and, as often as may be appropriate, revise a written statement of his general policy with respect to the safety and health at work of his employees and the organization and arrangements for the time being in force for carrying out that policy; and

b) to bring the statement and any revision of it to the notice of all his employees.

Under section 9 (1), every occupier shall establish a safety and health committee at the workplace in accordance with regulations prescribed by the minister if –

(a) there are twenty or more persons employed at the workplace; or

(b) the Director (of Occupational Safety and Health) directs the establishment of such committee at any other workplace.

Section 11 (1) states that the occupier of a workplace shall cause a thorough safety and health audit of his workplace to be carried out at least once in every period of 12 months by a safety and health advisor, who shall issue a report of such an audit containing the prescribed particulars to the occupier on payment of a prescribed fee and shall send a copy of the report to the Director of Occupational Safety and Health Services.

According to Section 13 (1) (c), every employee shall at all times wear or use any protective equipment or clothing provided by the employer for the purpose of preventing risks to his safety and health. Under Section 16 (1), no person shall engage in any improper activity or behaviour at the workplace which might create or constitute a hazard to that person or any other person.

In accordance with Section 21, an employer or self employed person shall notify the area occupational safety and health officer of any accident, dangerous occurrence or occupational poisoning which has occurred at the workplace. Where an accident in a workplace causes the death of a person therein, the employer or self employed person shall –

a) inform the area occupational safety and health officer within 24 hours of the occurrence of the accident; and

b) send a written notice of the accident in the prescribed form to the area occupational safety and health officer within 7 days of occurrence of the accident.

Under Section 22 (3), an occupier shall send a written notice of any disease specified in the second schedule of the Act occurring in the workplace to the Director.

Under Section 47 (1), every workplace shall be kept in a clean state, and free from effluvia arising from any drain, sanitary convenience or nuisance. In accordance with section 52 (1), sufficient and suitable sanitary conveniences for the persons employed in the workplace shall be provided, maintained and kept clean, and effective provision shall be made for lighting the conveniences; and where persons of both sexes are or are intended to be employed (except in the case of workplaces where the only persons employed are members of the same family dwelling there), such conveniences shall afford proper separate accommodation for persons of each sex.

Under section 78 (1), all stocks of highly inflammable substances shall be kept either in a fire resisting store or in a safe place outside any occupied building, provided that no such store shall be so situated as to endanger the means of escape from the workplace or from any other part thereof in the event of fire occurring in the store.

Under Section 81 (1), in every workplace or workroom, there shall be –

a) provided and maintained, and conspicuously displayed and free from any obstruction so as to be readily accessible, means for extinguishing fire, which shall be adequate and suitable having regard to the circumstances of each case; and
b) present, persons trained in the correct use of such means of extinguishing fire during all working hours.

Under 81 (2), every workplace shall be provided with adequate means of escape, in case of fire, for persons employed therein, having regard to the circumstances of each case. Under 82 (1), every occupier of a workplace shall design evacuation procedures to be used during any emergency and have the procedures tested at regular intervals.

Under Section 84 (3), every employer shall ensure the availability at the workplace of material safety data sheets for all chemicals and other hazardous substances in use at the premises of the employer, containing detailed essential information regarding the identity, supplier's classification of hazards, safety precautions and emergency procedures.

9.0 PUBLIC INVOLVEMENT AND CONSULTATION (PIC)

9.1 Stakeholders and consultation methods

In line with the standard EIA protocol, the EIA team involved and consulted relevant stakeholders, project neighbours and members of the public. This consultation was done at various stages including screening, scoping, analysis of alternatives, baseline survey, identification and analysis of impacts as well as in identification of mitigation measures for adverse impacts. PIC was done through informal meetings, scheduled appointments, open discussions and use of questionnaires. The key stakeholders consulted were the immediate project neighbours and local government officers.

9.2 Summary of stakeholders' comments and recommendations

The table below summarizes the issues raised by various stakeholders and a summary of recommendations and suggestions made.

Table (4): Summary of stakeholders' comments and recommendations

Stakeholder and address	Issues/comments	Recommendations
Jackson Konchella (Assistant chief) P.O. Box 40 Kajiado I.D 24278564	The service station will be very convenient since the other nearest is very away	Put up a good drainage system Ensure pump prices are standard Give priority for employment to the local community
Diana Benson 0717046006	Fuel (kerosene) brought closer	Employ locals.

Daniel Parantai Shukuru P.O. Box 144 Kajiado I.D 26044052 0725973118	More convenient and reliable fuel supply	Employ local youths Proper storage of fuel
Joyce Naisianoi Tuukuo P.O. Box 24 Kajiado I.D 12655744	Fuel products will be brought closer employment for locals Create	Avail a supermarket also Put safety standards into consideration
James P. Kitesho P.O. Box 423 Kajiado ID 22604049	Convenience for the local people since the other service station is very far	Ensure efficient drainage and refuse disposal Avail other related services Give employment priority to locals
Karino Steven P.O. Box 11, Kajiado 0720750562	It will address the issue of fuel shortage in the area It will create employment for the locals	Ensure they are always stocked
Hellen Lantei I.D 29924521 0716366370	It will generate employment It will improve infrastructure of the area	Ensure proper storage of the oil to avert accidents Secure the place
Anne Benson 0728450347	There will be ease in obtaining kerosene Create employment	Control dust during construction Prioritize locals during employment
Jason Karaisi P.O. Box 510, Kajiado I.D 0790852	Easier accessibility to fuel especially paraffin Create employment for the locals	Ensure proper drainage and waste disposal Adhere to the safety guidelines

Completed questionnaires are appended to this report.

10.0 POTENTIALLY AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

10.1 Introduction

This Section identifies the environment which is potentially affected by the proposed project as well as the potential positive and negative environmental and socio-economic impacts associated with the proposed project.

10.2 Potentially affected environment

a) Soil and top geology

Soil and top geology will be affected by the proposed project at various stages including, digging pits for storage tanks, digging of channels for water and effluent disposal and grading of access road to the site during the construction phase. Soil will also be potentially affected by accidental fuel leaks at the operation and decommissioning phases. Digging out of the underground fuel storage tanks at the decommissioning phase will also disturb the soil. Tankers supplying fuel and heavy trucks transporting construction materials will affect the soil through compaction. All these affects will affect the soil properties including erodability, drainage, aeration, chemistry and biology.

b) Water

There is no possibility of pollution of the river from activities of the proposed petrol service station at either construction, operation or decommissioning phases since there is river near the proposed petrol station.

c) Vegetation

There is a lot of grass at the proposed project site. These will be affected by clearance to pave way for construction and by trampling on trucks supplying construction material. Fuel spillage in bulk can also affect vegetation.

d) Fauna

There are no mega fauna at the proposed project site. However the soil has soil microorganisms which will be affected by the proposed site at the construction stage through soil disturbance. Leakage of fuel into the soil at the operation and maintenance or decommissioning phases can potentially affect soil micro-organisms.

e) Air

The proposed fuel station will be source of fossil fuels which after undergoing internal combustion in engines, generate exhaust emissions that are potential air pollutants. The proponent thus ought to consider supply of low Sulphur fuel and unleaded fuel. In case of fire at the fuel station, there will be generation of air pollutants. Air will also be affected by dust generation at the construction phase.

f) The socio-economic environment

The proposed project will affect the socio-economic environment both positively and negatively. There will be benefits such as availability of fuel within easy reach and creation of employment opportunities. There will also be adverse potential socio-economic impacts such as fire risk and occupational health and safety impacts.

10.3 Potential environmental and socio-economic impacts

10.3.1 Potential positive impacts

These include:

a) Availability of fuel within easy reach

The proposed project will ensure the availability of fuel within easy reach for the local community around the proposed project. Currently the residents trek for a long distance to acquire kerosene which is often unreliable

b) Employment opportunities

The proposed project will create employment opportunities at the construction and operation and maintenance phase. There will be job opportunities for the contractor, fuel suppliers, transporters and maintenance personnel.

c) Economic development

This project will contribute to the country's economic development. In particular, the proposed project will help in the achievement of strategies specified in the country's energy policy commitment of ensuring provision of adequate supply and distribution of petroleum products in all parts of the country at least cost. This is in appreciation of the fact that energy is a key economic driver.

d) Business opportunities

The proposed project will create business opportunities between the proponent and various suppliers and contractors.

10.3.2 Potential adverse impacts

10.3.2.2 Negative impacts during Construction phase

a) Removal of vegetation

It will be necessary to remove the existing vegetation at the proposed project site to create room for the construction.

b) Soil disturbance

Digging of underground pits and for other substructures will disturb the soil at the affected area and predispose it to agents of erosion such as wind and surface run off. Concreting of the station yard will create a water proof surface, which will have adverse effect on soil aeration and water infiltration.

d) Occupational health and safety impacts

There will be various health and safety impacts at the construction phase. These include exposure of construction workers and neighbours to noise, dust, vibrations, moving trucks and other machinery, dangerous depths (pits), handling of inflammable material and other potential health and safety impacts.

e) Increased demand for water

Water will be one of the inputs at the construction phase. The construction will thus increase demand for water in the area.

f) Generation of solid waste

The construction stage will generate waste in form of spoil soil, left over construction material and other possible sources of wastes. These wastes can cause further pollution if not well disposed.

10.3.2.3 Negative impacts during Operation and Maintenance Phase

a) Soil and ground water contamination (in case of underground tanks leakage)

If the underground tanks leak due to age or other reasons, the fuel therein will contaminate the soil around and may also find way into the underground water. This has adverse impacts on the soil organisms.

b) Generation of effluent

The proposed project will generate effluent (wastewater) at the operation and maintenance phase. This effluent will come from the car washing bay, floor washing; accidental spills and leaks and surface run off over the paved floor surface. This effluent can potentially contaminate land (or soil) if not well disposed of.

c) Fire risk

Due to the flammable nature of fuel, the station will pose fire risk to workers, vehicles ferrying fuel or coming for refuelling and the immediate environs.

d) Increased demand for water and electricity

The fuel station will require electricity for lighting and necessary pumping. Water will also be required for car washing, routine cleaning and for fire safety purpose. The station will thus add to increased demand for these utilities in the neighbourhood.

e) Occupational safety and health impacts

There will be some occupational safety and health aspects at the operation phase including fire risk, exhaust fumes and handling of fossil fuels among others. .

g) Air pollution (exhaust emissions)

This will be an indirect impact. The fuel provided to the vehicles will undergo internal combustion in engines and release exhaust emissions, which pollute the air.

h) Solid waste generation

At the operation and maintenance phase, the fuel station will generate assorted solid waste some of which will be contaminated with hydrocarbons (hazardous waste). This can pose environmental pollution if not well disposed of.

10.3.2.4 Adverse impacts at the decommissioning phase of the proposed station

a) Soil disturbance

Soil will be disturbed during digging out of the underground fuel storage tanks. Soil disturbance will loosen the soil, thus predisposing it to agents of erosion.

b) Soil contamination (potential leaks)

The process of removing the tanks may cause fuel leakage into the soil if the tanks are worn out or are not carefully handled. Any fuel leaks will contaminate the soil.

c) Fire risks

The process of decommissioning the station will have some fire risk since the fuel is flammable and running machinery are to be used.

d) Health and safety impacts

There will be some potentially adverse health and safety impacts during decommissioning of the fuel station. These among others include the open pit hazard, fire hazard, dust, handling chemicals (fuel) noise and vibrations and moving machinery among others.

e) Solid waste generation

During decommissioning phase, there will be generation of solid waste in form of spoil soil, old tanks and obsolete pumps.

f) No fuel at the service station

Once the fuel station is decommissioned, the vehicles plying the highway will have to be fuelled elsewhere; additionally the residents of the area will have to seek fuel (kerosene) elsewhere.

10.4 Significant Impacts

From the foregoing identification and analysis of impacts, the EIA team finds that the proposed project has two potentially significant adverse impacts. These are:

a) Fire risk

Fossils fuels (mainly petrol and kerosene) are known highly flammable material. These present fire risks which can have potentially devastating effects on people, property and the environment. The proponent must ensure that there are adequate fire prevention and fire fighting measures at the petrol station including adequate fire extinguishers, strictly ensure that the site is a no smoking area, operators are trained on fire fighting and general fire safety.

b) Pollution of the soil and ground water

There is significant potential for pollution of soil and ground water from surface run off, station effluent and accidental spills. There is thus the need to ensure that effluent is well managed and that any spillage at the fuel station is well contained. This calls for an effluent and spillage management plan including installation of an oil interceptor, approved channeling of effluent into appropriate receptacles (conservancy tank) and bunding to contain accidental spills.

The potential significant impacts are **however manageable** and do not constitute an impediment to the implementation of the project.

11.0 IMPACTS MITIGATION AND ENVIRONMENTAL MANAGEMENT PLAN

11.1 Introduction

The EIA of the proposed petrol service station on Thika Municipality Block 8/181 along the Thika-Garissa highway has identified a number of potential negative environmental impacts. In order to protect the environment and ensure public health and safety, mitigation measures for the adverse impacts must be incorporated in the project throughout the project cycle.

11.2 Mitigation Measures and Environmental Management Plan

The matrix below outlines the mitigation measures for the potential adverse impacts of the proposed project. The matrix further presents an Environmental Management Plan which provides a framework for implementation of the suggested mitigation measures. The EMP specifies responsibility for implementing mitigation measures, the appropriate timing in the project cycle, cost estimates as well as environmental monitoring measures.

Table (5): Environmental Management Plan (EMP)

Environmental, Health or Safety Impact	Suggested Mitigation Measures	Timing in Project Cycle	Responsibility	Cost Estimate (KES)	Monitoring Indicators
Soil disturbance leading to potential soil erosion	• Put in place soil protection measures such as vegetation planting, landscaping and installation of gabions • Backfilling of dug out areas	Construction, Operation and maintenance & decommissioning	• Project Proponent • Contractor	100,000	• Trees planted around new fuel station • Landscaping done around the new fuel station • Landscaping done at the decommissioned site
Removal of vegetation	• Clear vegetation only where necessary • Plant trees and carry out landscaping	Construction and decommission phase	• Project Proponent	In above budget	• Vegetation planted around the newly developed site and at the decommissioned site
Soil and ground water contamination	• Leakage tests prior to project commissioning • Ensuring tanks are emptied before removal • Inspection and maintenance programme for the tanks (routine leak tests) • Careful removal of underground tanks	Construction, operation, maintenance and decommissioning phase	• Project Proponent • Contractor	Site remediation and maintenance budget	• Soil test results • Maintenance (periodic leakage test) records

	• Remediation of any contaminated soil				
Ground water pollution	• Construct channels (drains) for drainage of effluent • Construct an oil interceptor (oil-water separator) and channel effluent into it • Construct a bund (low wall) at the off loading area for containment of any accidental spillage • Ensure that wastewater from the oil interceptor is channelled into a conservancy tank • Carry out routine sampling and analysis of effluent from the station • Apply for effluent discharge licence from NEMA • Soil protection measures • Proper disposal of wastes	Construction, operation and maintenance and decommissioning phases	Project proponent	500,000 for oil interceptor, licences and routine effluent analysis	• Oil interceptor and bund (low wall) constructed • Effluent discharge licences obtained • Effluent analysis results
Solid waste generation	• Reuse and recycling of material where possible such as dug out soil for backfilling • Provision of solid waste receptacles • Proper disposal of all wastes in provided bins • Engagement of a licenced waste collector for waste	Construction, operation, maintenance and decommissioning phases	• Project proponent • Contractor • Workers	15,000 per month	• Waste disposal records • Waste collection contract

	collection				
Increased demand for water and electricity	• Provision of adequate water storage facilities for use at the site • Water and electricity conservation (saving measures) • Installation of water and electricity meters and monthly readings • Provision of a standby generator • Maximizing on natural lighting • Rainwater harvesting • Water re-use	Construction and operation phases	Project proponent, building contractor and workers	Water and electricity bills Capital cost of storage tanks, meters and standby generator	Monthly water and electricity readings (trends)
Fire risk	• Installation of fire fighting equipment (fire extinguishers, hose reels and buckets of sand • Training station operators on fire fighting • Administrative controls including no smoking at all, no naked fires etc • Fire safety signage • Conducting fire safety audits	Construction, operation, maintenance and decommissioning phases	Project proponent Contractor Workers Visitors and neighbours	As per project budget	• No fire incidents • Records of fire safety training • Fire safety audit reports • Records of maintenance of fire fighting equipment
Occupational Health and safety impacts	• Provision of suitable personal protective equipment • Creation of health and safety awareness • Provision of a first aid kit manned by a trained first aider	Construction, operation, maintenance and decommissioning phases	Project proponent Contractor Workers	50,000	• Use of suitable protective equipment • Safety inspection reports

	• Formulation and implementation of an health and safety policy • Safety signage • Reporting and recording of any accidents occurring at site • Use of well maintained and suitable machines and equipment • Use of permits to work for hazardous operations & tasks				• First aid records • Health and safety awareness records • Accident records

12.0 LIMITATIONS AND ASSUMPTIONS

This Environmental Impact Assessment, just like any study or research, was faced by a number of limitations. Some respondents approached by the experts were sceptical about filling the questionnaires yet others expressed reservations about availing their personal information such as ID and telephone numbers.

The assumption in this EIA is that the information obtained from various sources is factual.

13.0 PROJECT BUDGET

The proposed project will cost **KES Twenty Million** only inclusive of VAT.

14.0 CONCLUSION AND RECOMMENDATIONS

The proposed petrol service station on L.R Thika Municipality Block 8/181 along the Thika-Garissa highway will have numerous positive impacts including creation of employment; business opportunities for suppliers and contractors; availability of fuel within easy reach by the local community and contribution to the country's economic development.

The identified and predicted potential negative impacts include removal of vegetation, soil disturbance, soil contamination, ground water pollution, fire risk, solid waste generation, increased demand for utilities and occupational safety and health impacts. Fire risk and potential ground water pollution have been identified as significant impacts associated with the proposed project. The impacts, including the significant ones are manageable and are not an impediment to the implementation of the proposed project.

The EIA experts recommend that the EMP contained in this report is implemented in full. The proponent and the contractor should obtain all necessary permits and licences from relevant government authorities and adhere to all the conditions and guidelines issued by the licencing authorities.

On the basis this EIA, the EIA experts recommend that the project is allowed to proceed, subject to full implementation of the EMP and all other conditions issued by relevant government authorities.

15.0 REFERENCES

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APPENDICES

1) Title Deeds for the land parcels
2) Architectural Drawings & Development Plan for the Proposed Project
3) Stakeholder consultation questionnaires
4) Notification of approval of Development permission
5) Planning Brief (proposed change of use from agricultural to petrol service station on Thika Municipality Block 8/181 along the Thika-Garissa highway