ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT
FOR
THE PROPOSED CONSTRUCTION OF A BULK LPG STORAGE TERMINAL IN MBARAKI, GANJONI DIVISION, MOMBASA COUNTY BY MOMBASA GAS TERMINAL LTD

PREPARED BY
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Designation: _____

Signed: _____

Date: _____

I, the undersigned, confirm that the contents of this report are a true representation of the Environmental and Social Impact Assessment Study Report of the proposed Bulk LPG Storage Terminal in Mbaraki, Ganjoni Division, Mombasa County by Mombasa Gas Terminal Ltd.

Prof. Norbert Opiyo-Akech
(Team Leader and Lead Expert – Reg No: 146)
Sign: _____
Date: _____

NON-TECHNICAL SUMMARY

Introduction

This Environmental and Social Impact Assessment (ESIA) Study Report has been prepared for Mombasa Gas Terminal Ltd. (hereinafter referred to as MGT) for the proposed construction of an LPG Import Terminal in Ganjoni Location, Mvita Constituency in Mombasa County, Kenya. MGT is a subsidiary of Milio Group, a Fuel Investment and Trading Firm with supporting activities across the Oil and Gas spectrum, including upstream, midstream and downstream fuel operations and infrastructure. The group provides term and spot crude and product distribution and supply services to commercial entities, government agencies and NGOs. The company's unrivalled reputation is based on consistently delivering large volumes safely, securely and on time, often in the most logistically challenging and complex environments in the world. Milio has been involved in terminal investments, management and operations in multiple locations across the globe since 1999. This report has been prepared by Earthview Geoconsultants Ltd.

Project Description

The project land is situated in an ideal location at the African Marine (AMOG) site for the construction of the LPG terminal. The site is close to mouth of port thereby avoiding congestion around new container terminal, there is a private berth as part of the facility. In addition, the site is located in the centre of industrial area of Mombasa with direct access to main road. The proposed site is located a couple of kilometres from Kilindini marshalling yard for Rift Valley Railway (RVR) as well as significant infrastructure already on-site including buildings and lifting cranes.

The proposed project activities will entail: construction, earthmoving and renovation works.

ESIA Process

A detailed field-based environmental and social impact assessment preceded by extensive desk study was undertaken from 22nd to 30th September, 2017. The ESIA process is used to assess the potential environmental and social impacts (both positive and negative) of the proposed construction of the LPG import Terminal; facilitate management and control of the potential environmental and social impacts associated with the construction works; assess compliance with relevant statutory and regulatory requirements and raise awareness of and commitment to environmental and social policies by project staff, the host community and other concerned parties through public meetings. The environmental parameters assessed during this ESIA study include:

- Physiography
- Geology
- Soils

- Oceanography
- Surface and ground water resources
- Climate and air quality
- Flora, fauna and avi-fauna
- Land resources
- Noise and vibrations
- Visual aesthetics
- Liquid and Solid wastes
- Social, economic & cultural setting and health and safety issues

Earthview conducted public awareness through extensive public consultation meetings. This included both formal and informal interviews with the residents of Ganjoni and Likoni areas and other key stakeholders. Household questionnaires were administered in households and key informant interviews conducted. The information gathered provides details of the current environmental and socio-economic baseline situation and is critical for development of the Environmental and Social Management and Monitoring Plan (ESMP).

Regulations, guidelines and standards

The policy and legislative framework upon which this ESIA survey for the proposed project was based on and includes Kenyan and international legislation and Milio Group Policies but was not limited to the National Energy Policy (2012); Environment and Development Policy; Land Policy; Kenya Health policy; Environmental Management & Coordination Act (EMCA) 2015; Devolved Government Legislation, International Standards and procedures including: World Bank Group Environmental, Health and Safety (EHS) Guidelines (2007) and International Finance Corporation (IFC) Sustainability Performance Standards (2012) and Guidelines (2007) and Milio Group Policies and Procedures.

Baseline Overview

Mombasa County is located at the heart of the Coastal strip of Kenya. It covers an area of 229.9 sq. km and 65 sq. km of land and water masses. It is situated between Longitudes 39^{o} 34' and 39^{o} 46' east and between Latitudes 3^{o} 56' and 4^{o} 10' south. The county borders Kilifi to the north, the Indian Ocean to the east, Kwale County to the south and Kilifi and Kwale counties to the west.

The study area lies in Agro-climatic zones III and IV classified as semi-humid and semi-humid to semi-arid with an average annual rainfall of 800-1400mm and 600-1100 mm respectively. The climate and weather variations on the Kenyan coast are dominated by the large-scale pressure systems of the western Indian Ocean and the two distinct monsoon periods. This produces a bimodal rainfall pattern with the long rains in March to June with a peak in May and the short rains in October to December/January with a peak in November.

There are four oceanic currents influencing the Kenyan coast. They include the Equatorial Counter Current (ECC), the South Equatorial Current (SEC), the East African Coastal Current (EACC), and the Somali Current (SC).

Mombasa town is the second largest in Kenya after Nairobi and is famed for its tourist attractions such as the Fort Jesus, Haller Park and Mamba Village among others. Mombasa is also a transport hub holding the port that serves the East African region.

The reticulated water supply system in the county is owned and managed by Mombasa Water and Sewerage Company. This water comes from Mzima Springs in Taita Taveta County, Marere and Sabaki/Baricho in Kilifi County and Tiwi Boreholes in Kwale County.

The vegetation of the study area is influenced primarily by landform (coastal plain) and associated soil types, climate, man and animals. There is minimal vegetation on and around the project site since it lies within the industrial zone of Mombasa. On site, there are a number of grass species growing due to long term non-use, and a few trees on site. The species observed include *Azadirachta indica, Casuarina equisetifolia,Cieba pentandra, Ricinus communis, Plumeria rubra Mangifera indica,Cocos nucifera,thevetia peruviana, Leucaena leucocephala, Terminalia sp*, and *Acacia melifra* and Grass species include *Eragrosti, Cenchru, Cymbopogon spp, Bothriochloa spp. and Heteropogon sp.*

The Vervet Monkey is widespread and often abundant. However, it is very patchily distributed over its extensive geographic range, linked to the availability of appropriate sleeping trees and drinking water. Also, few "*Cercopithecus pygerythrus*", or African green monkeys, were observed within the proposed project site. In Mombasa Island there are no large scale livestock keeping and none was spotted near the site due to industrial activities however, on the peri-urban places like Likoni few sheep, goats and cattle were spotted.

There are a total of 257.17 kilometres of bitumen surface roads, 127 kilometres of gravel surface roads and 91.29 kilometres of earth surface roads in the county. Main classified roads include Mombasa - Nairobi Highway (A109), Mombasa - Malindi Road (B8) and Likoni – Lunga Lunga Road A(14) connecting Kenya and Tanzania. Others include; Airport road (C110), Mbaraki - Shimanzi road (C114) and Mtongwe road (C109). While the major roads are in a fair condition, access roads within the residential and industrial areas are in deplorable state.

The formal sector in Mombasa County provides majority of employment. Major employers include the hotel industry, shipping industry, the government of Kenya, and various private institutions and businesses. In the financial sector, the county boasts of over thirty eight (38) banks and a host of microfinance institutions operating in various parts of the county.

Stakeholder Consultation

Consultations were conducted with various groups in Mombasa County. During this ESIA study, public meetings, interviews and discussions were held with the residents of Ganjoni and Likoni, the leaders, government agencies and interested parties.

A summary of concerns raised are as follows:

- Road works and traffic flow likely to be interfered with in the absence of a traffic management plan developed in consultation with road agencies;

- The proposed site is at the channel of the Port thus likely to pose danger to the incoming and departing ships therefore appropriate measures must be put in place to avert such dangers;
- Project poses serious safety, security and environmental concerns at the proposed site therefore proper international port safety standards must be put in place;
- Project siting and design should be developed in tandem with the KPA's Master Plan including ongoing infrastructural developments e.g. the proposed Likoni bridge;
- Noise and air pollution likely to occur hence the need to prevent them as much as possible;
- Damage to the existing road is likely to occur due to the poor state of the roads;
- Being a residential area, pollution is a major concern especially the smell of gas to the residents therefore the need to prevent pollution;
- The project has a potential for serious marine pollution which must be prevented proper waste handling and management;
- Since the project site is very close to the channel and entrance to the port any serious incident may impact heavily on the vessel traffic thus appropriate measures must be put in place to avoid such incidences;
- All LPG terminals require locations that are secure from other activities such as dry docking, container operations and the like;
- The facility at African Marine (Dry-Dock) is a key critical infrastructure to the Kenyan Maritime industry – especially ship maintenance consequently the proponent must work closely with African Marine and other stakeholders to ensure safety of the dry-dock; and
- World over, best practice requires that oil/LPG facilities be constructed away from entrance to the port thus the proponent should implement the International Code for the Security of Ships and of Port Facilities.

Impacts assessment

Aspects of the proposed and unplanned activities that are likely to affect the baseline conditions in the project area include:

- the project footprint;
- the area within which dust may settle;
- the area in which air quality may be degraded as a result of gas leakages and other foul smells;
- the area within which noise may be audible;
- communities close to the project site;
- soils which may be degraded due to compaction and uncontained spillage; and
- the road network where construction traffic may result in a noticeable increase in traffic levels.

Project operations will affect air quality on micro-scale, and in a transient manner, through exhaust emissions from trucks as well as fugitive emissions (leakages).

The Environmental and Social Management Plan (ESMP)

Before construction starts, MGT must ensure that all the necessary permits have been obtained and that engagement with key stakeholders has been initiated. Again, MGT will be responsible for the overall implementation, monitoring and quality assurance/quality control of the ESMP. It will be responsible for ensuring that the policies, management plans and action plans are implemented to avoid, reduce, mitigate, or compensate for adverse environmental and social impacts are adhered to.

It is a requirement by law that any project activity being undertaken be audited annually. The proposed LPG bulk storage terminal will be subjected to annual environmental audits for the period it will be operational. The auditing to be undertaken annually is to ensure that the project adheres to the ESMP as outlined in the report and that corrective measures are put in place in cases where impacts will be identified.

Conclusion and recommendation

The proposed project will have both positive and negative impacts. The assessment of the environmental and social impacts and review of MGT policies and management plans has found that MGT has committed to implement mitigation measures that are effective in reducing the anticipated negative impacts while maximising on the positive ones. The ESMP developed in this report should be adhered to in order to ensure that the project remains environmentally and technically friendly throughout its course.

ACRONYMS

AMOG	African Marine
API	American Petroleum Institute
APPEA	Australian Petroleum and Exploration Association Limited
BSI	British Standards Institution
CDC	Commonwealth Development Corporation
CSR	Corporate Social Responsibility
DFI	Development Finance Institution
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management Coordination Act
EMS	Environmental Management System
EP	Equator Principles
EPE	Environmental Performance Evaluation
EPFI	Equator Principles Financial Institution
ERS	Economic Recovery Strategy
ESH	Environmental, Sanitation and Health
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
GDP	Gross Domestic Product
GHG	greenhouse gases
HGV	Heavy Goods Vehicle
HSE	Health, Safety and Environment
IEC	International Electro-Technical Commission
IFC	International Finance Corporation
ISO	International Organization for Standardization
KENHA	Kenya National Highways Authority
KeRRA	Kenya Rural Roads Authority
KFS	Kenya Ferry Services
KMA	Kenya Maritime Authority
KPA	Kenya Ports Authority
KURA	Kenya Urban Roads Authority
LPG	Liquefied Petroleum Gas
MGT	Mombasa Gas Terminal
NEMA	National Environment Management Authority
NGOs	Non-governmental Organizations
OGP	Oil and Gas Producers
RVR	Rift Valley Railways
SGR	Standard Gauge Railway
UNEP	United Nations Environmental Programme

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1. INTRODUCTION

This ESIA has been prepared by Earthview Geoconsultants (K) Ltd. for Mombasa Gas Terminal (K) Limited (MGT), the project proponent. The report identifies the anticipated environmental and socio-economic impacts (both beneficial and adverse) of the proposed construction of a Liquefied Petroleum Gas (LPG) import and storage terminal in Mombasa, Kenya and proposes practical preventive and mitigation measures during project planning, construction and implementation phases to ensure a clean and healthy environment as enshrined in Kenya's legislation.

The project land is situated in an ideal location at the African Marine (AMOG) site for the construction of the LPG terminal as the site is close to mouth of port thereby avoiding congestion around new container terminal, there is a private berth as part of the facility, it is located in the centre of industrial area of Mombasa, direct access to main road, the facility is located 0.5km from Kilindini marshalling yard for Rift Valley Railway (RVR) as well as significant infrastructure already on-site including buildings and lifting cranes.

1.1. Project Location

Figure 1: Source: Development Master Plan of the port of Mombasa, Kenya; Milio analysis.

1.2. Developer Identification

Mombasa Gas Terminal Ltd. is a subsidiary of Milio Group, a Fuel Investment and Trading Firm with supporting activities across the Oil and Gas spectrum, including upstream, midstream and downstream fuel operations and infrastructure. Milio Group provides term and spot crude and product distribution and supply services to commercial entities, government agencies and Non-Governmental Organisations (NGOs). The company's unrivalled reputation is based on consistently delivering large volumes safely, securely and on time, as well as managing and operating fuel storage facilities often in the most logistically challenging and complex environments in the world. Milio Group builds long-term relationships with clients, suppliers, governments, partners and local communities to deliver long lasting and shared values hence their current partnership with Mombasa Gas Terminal Ltd. to construct an LPG import terminal in the port of Mombasa which will supply the region through the period of growth in the LPG market.

1.3. Development partners

MGT has been working closely with a number of development institutions since 2014 to help ensure the long-term success of the project. Most notably, the project is supported through financing from the International Finance Corporation ('IFC'), part of the World Bank Group, as well as by the Commonwealth Development Corporation ('CDC'), which is the British Government DFI.

1.4. Project Objectives and Justification

MGT plans to construct and operate an LPG storage terminal in Mombasa with the aim of supplying the Country–Kenya and the entire East African region in the near future. This is caused by the current LPG market in Kenya which is about 175,000MT per year and is expected to reach over 250,000MT by 2020. A similar growth trend is predicted across the entire East Africa region hence the company's decision to establish an LPG plant in Mombasa. This move will help remove infrastructural constraints and LPG will become a more affordable fuel to a wider and more aware population in the region. The project proponent will make use of an existing 9-acre site, within the African Marine (AMOG) project site-Port of Mombasa, with immediate access to major highway and standard-gauge railway for national and regional distribution.

This project, if successful will play a major role in enabling the country to reduce the problems associated with stock-out costs as well as benefit from oil and gas exportation to neighbouring countries; Rwanda, Uganda; thus increasing the per capita income and the Gross Domestic Product (GDP) from foreign exchange. It will also help to match the rising demand for LPG products locally and regionally.

The proposed LPG storage terminal will address the capacity constraints, and optimize the use of the existing facilities. The same will also address issues of supply and infrastructure into the Port of Mombasa in order to support the LPG Master plan for Kenya. Other possible spin-offs would include job creation and increased economic activity in the area.

The project is also in line with National Energy Policy (improving access to affordable energy services, enhancing security of supply, promoting development of indigenous energy resources; promoting energy efficiency and conservation; and promoting prudent environmental, health and safety practices), the Economic Recovery for Wealth and Employment Creation Strategy (expanding and improving infrastructures, and safeguarding environment and natural resources), and Kenya Vision, 2030 (enhanced equity and wealth creation for the poor).

1.5. Purpose of the ESIA

This study was carried out to evaluate the potential and foreseeable impacts on the environment resulting from the proposed development. The scope was limited to the proposed project site and the immediate environment and community that may be affected by or may affect the proposed project. The report addresses the requirement for preparation of ESIA Study Report in accordance with EIA/EA Regulations, 2003 and Environmental Management and Coordination Act Cap 387.

The report presents an overview of the proposed project and the environmental regulatory framework from which it operates. It identifies and assesses the significance of the impacts of the project as well as mitigation measures necessary to reduce or prevent impacts from occurring. The ESIA aims to provide information that will help the authority make an informed decision when awarding the license to Mombasa Gas Terminal.

1.6. Regulatory Framework

The implementation of major projects in Kenya is preceded by an Environmental and Social Impact Assessment (ESIA) report. The National Environment Management Authority (NEMA) requires the proponent to undertake an Environmental and Social Impact Assessment (ESIA) and thereafter annual Environmental Audit Assessment studies as stated in the Environmental Management and Coordination Act (EMCA) of 1999, and the Amendment 2015 and as stipulated in the Environmental (Impact Assessment and Audit) Regulations 2003, Legal Notice No. 101. The current proposed project for the construction of an LPG import terminal facility in Mombasa is regarded as a high impact project and thus subjected to a rigorous ESIA process. This led Earthview in undertaking a preliminary data gathering exercise though scoping the ESIA study was conducted.

A project/Scoping report is defined, in the preliminary section of the EMCA (1999) and the interpretation section of the Environmental (Impact Assessment and Audit) Regulations (2003), as a summarized statement of the likely environmental effects of a proposed development referred to in section 58 of the EMCA, 2015. Section 58 requires that a proponent intending to carry out any undertaking listed in the Second Schedule to the Act must submit a study report to the National Environment Management Authority ('the Authority') in the prescribed form. Section 18 of the regulation gives information to be captured in the Environmental Impact Assessment report.

Cap 515, Local Government Act, Cap 265, Local Government Act, Cap 265, Penal Code, Cap 63, Regulation No.7 of the Environmental (Impact Assessment and Audit) Regulations, 2003 lays down the specific issues that the study report must address, which in summary are: the nature, location, activities, and design of the project; the materials that are to be used; the potential environmental, economic and socio-cultural impacts and mitigation measures; plans for the prevention and management of accidents and for ensuring the health and safety of workers and neighbouring communities; and the project budget. These issues are to further address, as outlined in the Second Schedule of the Environmental (Impact Assessment and Audit) Regulations (2003): ecological considerations; sustainable use; ecosystem maintenance; social considerations; landscape and land uses; and water. Within this framework, the collection of relevant baseline data, and consultations with stakeholders and the public are important, and ought also to be included in the report.

Other Acts do have a bearing on the rules and regulations that touch on energy exploitation and use include but not limited to: Public Health Act, Cap 242, Water Act 2002, Factories Act, Energy Act, 2006 and Electric Power Act, 1997 etc.

1.7. The Mandate of NEMA

NEMA-Kenya is the institution in the country that was established under the principal Environmental Management and Coordination Act (EMCA) of 1999 in order to deal with matters pertaining to the environment, with the objective and purpose of exercising general supervision and coordination over all matters relating to the environment, and to act as the principal instrument of government in the implementation of all policies relating to the environment.

Some of its mandates that are relevant to ESIAs are to:

- Coordinate the various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plans, programmes and projects with a view to ensuring the proper management and rational utilisation of environmental resources on a sustainable yield basis for the improvement of the quality of human life in Kenya;
- Carry out surveys which should aid in the proper management and conservation of the environment;
- Undertake and coordinate research, investigation and surveys in the field of environment and collect, collate and disseminate information about the findings of such research investigation or survey;
- Identify projects and programmes or types of projects and programmes, plans and policies for which environmental audit or environmental monitoring must be conducted under the Act;
- Monitor and assess activities, including activities being carried out by relevant lead agencies in order to ensure that the environment is not degraded by such activities, environmental management objectives are adhered to and adequate early warning on impending environmental emergencies is given;

- Undertake, in co-operation with relevant lead agencies, programmes intended to enhance environmental education and public awareness about the need for sound environmental management as well as for enlisting public support and encouraging the effort made by other entities in that regard;
- Publish and disseminate manuals, codes or guidelines relating to environmental management and prevention or abatement of environmental degradation; and
- Render advice and technical support, where possible, to entities engaged in natural resources management and environmental protection so as to enable them carry out their responsibility satisfactorily.

1.8. ESIA Scope and preparation

Mombasa Gas Terminal Limited commissioned Earthview Geoconsultants Limited. to carry out an ESIA for the proposed construction of the LPG import and storage terminal in Mombasa, Kenya in accordance with all applicable Kenyan legislation, IFC and World Bank Group Environmental and Social Management Policies and other international policies and best practices that are relevant to Oil and Gas Industry. This is what informed this ESIA study as the second phase of the process after a scoping exercise had earlier on been undertaken.

The scope of this ESIA Study report can be summarised as:

- Review of relevant data and ground-truthing;
- Utilising existing baseline data (biophysical, social and health) for the description of the project area;
- Stakeholder engagement and public participation;
- Prediction and evaluation of potential impacts;
- Determination of appropriate mitigation measures that can eliminate, reduce/minimise the impacts;
- Development of an Environmental and Social Management Plan (ESMP); and
- ESIA Report preparation.

Table 1:1 Composition of ESIA Team

Name	Role	Qualifications	Experience (years)
Prof. Norbert Opiyo-Akech	Overall coordination/ Geological issues	PhD. Geochemistry	32
Prof. Daniel Olago	Coordination/Biophysical and Socio-economic issues	PhD. Physical Geography and Quaternary Geology	22
Mr. Stanley Chasia	GIS Expert	MSc. Geographic Information Systems	10
Ms. Sheena Ogutu	Environmental Expert	MSc. Bio-systems and Environmental Engineering	8
Mr. Erick Ojungo	Socioeconomic and socio-cultural issues	BA. Anthropology	8
Ms. Mariela Makotsi	Environmental Expert	MSc. Waste Management	8
Mr. Julius Kuya	Environmental Expert	MA. Environmental	7

Name	Role	Qualifications	Experience (years)
		Management and Planning	
Mr. Robinson Ododa	Environmental Expert	BSc. Plant Ecology and Environmental Science	6
Mr. Elly Orwe	Environmental Expert	BSc. Environmental Science	6

1.9. Structure of the ESIA Report

The structure of the report is based on that proposed in the NEMA EIA Guidelines (2002), and is indicated in Table 1.2 below.

Table 1:2 Structure of the ESIA Report

Chapter	Title	Contents
1	Introduction	Introduction to the project area; identification and activities of the project proponent in other regions; project background, objectives and justification; purpose of the ESIA and objectives of the report; the ESIA team; TOR for the report.
2	Project Description	The technology and processes to be used in the implementation of the project; workforce requirements; the materials to be used in the construction and implementation of the project; the products, by-products and waste generated by the project.
3	Methodology	Methods used in carrying out the assessment; identification of gaps in knowledge and uncertainties, which were encountered in compiling the information.
4	Legal and Regulatory Framework	A concise description of the national environmental, legislative and regulatory framework, and international best practices.
5	Baseline Environmental Parameters of the project area	Description of the potentially affected environment within the framework of the proposed ESIA; assessment of existing (pre-project) impacts and potential (project and residual) impacts.
6	Stakeholder consultation and Public Participation	Information obtained during consultations with stakeholders and interested parties.
7	Alternatives	Alternative technologies, processes available, and reasons for preferring the chosen technology and processes.
8	Identification of Impacts and mitigation measures	Environmental effects of the project including the social, economic and cultural effects and the direct, indirect, cumulative irreversible, short-term and long-term effects anticipated. Identification of mitigation measures for all

		identified impacts and determination of impact significance.
9	Cumulative Impacts	Assessment of past and on-going projects in the project area that may have cumulative impacts on the project
10	Environmental Management Plan	Environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the time frame and responsibility to implement the measures; provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the course of carrying out activities or major industrial and other development projects; measures to prevent health hazards and to ensure security in the working environment for the employees and for the management of emergencies.
11	Conclusions and Recommendations	Summary of the conclusions and key recommendations from the ESIA.
12	References	List of references and websites referred to in the text.
13	Appendices 1. Minutes of meetings	Minutes of meetings held with communities, community leaders and other stakeholders in the project area.
	2. Copies of laboratory results	Laboratory results for samples collected in the field (water quality).
	3. Certificates	NEMA Firm's and Consultants Licences.
	4. KRA Pin Number and Pin Certificate	KRA Pin certificate of the proponent.
	5. Land documents	Proponents land documentation for the proposed site
	6. Other relevant documents	Certificates of registration.

1.10. Time requirements

The assignment started with a scoping exercise from 4th – 8th May, 2017 followed by an ESIA study exercise held from 22nd – 30th September 2017 and a further key stakeholder meeting held on 14th December 2017.

2. PROJECT DESCRIPTION, DESIGN AND CONSTRUCTION

2.1 Project Background

Mombasa Gas Terminal Ltd., hereinafter referred to as the proponent is a subsidiary of Milio Group, a fuel investment and trading firm with supporting activities across the Oil and Gas spectrum including upstream, midstream and downstream fuel operation and infrastructure. Milio International is proposing to construct and operate a 22,000 Metric ton mounded storage LPG terminal in the Port of Mombasa and to commence an associated wholesale and distribution business in Kenya and the wider East Africa Community. The aim of the Project is to address issues of supply and infrastructure into the Port of Mombasa in order to support the LPG Master plan for Kenya.

Milio International is to undertake the Project through the incorporation of a company called **Mombasa Gas Terminal Ltd.** ("MGT"). MGT has obtained consent from the Government of Kenya to construct and operate a new LPG import terminal in Mombasa, together with accompanying wholesale operations in the rest of the country.

The Proponent has acquired a 9-acre site in a prime location in the Port of Mombasa giving the Project significant competitive advantage. The Project is now looking to proceed with the EPC contract, commence construction of the terminal and begin operation of the terminal and associated wholesale business. MGT expects the construction of the terminal to be complete and to commence the wholesale business within 20 months. Mombasa Gas Terminal intends to use a 20ft ISO certified LPG tanks to store and transport the gas to different part of The Republic and wider East African Community.

Figure: 2. 1: ISO Certified LPG Storage Tanks

2.2 Justification of the Proposed Project

The project is meant to stimulate economic and social development of our country through meeting the high demand of LGP products in the country and also to meet proponent's economic desires. The project area is located at the Port of Mombasa therefore suitable for such project hence there will be no land-use conflict. It is therefore hoped that once the project is implemented, The Mombasa Gas Terminal goal to stimulate economic and social development of our country and its own economic goals through meeting the high demand of gas products will be achieved

2.3 Ownership and Location of the Project

Mombasa Gas Terminal has acquired a 9-acre piece of prime land in Mbaraki creek through Africa Marine Oil and Gas at the port of Mombasa giving the project significant competitive advantage. All the project facilities and related infrastructure will be located within the site. The site is marked by **Latitude 4° 4'18.59"S** and longitude **39°39'38.47"E** and is located in the open with adequate ventilation and is easily accessible for operation, maintenance and fire-fighting as shown in the figure below.

Figure: 2. 2: Location of the Project site

2.4 Project Scope

The project will be developed on a land that the proponent already owns approximately 9 acres which will house/hold 22,000MT of LPG. The Architectural plans have been submitted for approval by all the statutory authorities. Building & civil works plans have been submitted to the City Council of Mombasa for approval.

2.5 Project Cost

Total cost for the project is anticipated to be US$80.6m as outlined below:

Capex	58,075
Land Deposit	8,000
Overfunding	12,000
Arrangement Fees	1,088
Deal Fees	1,425
Total Uses	80,588

The total Capex required to construct the terminal will be c.US$58m. This is to be allocated as per below:

Earthworks & Civils		6,000
Buildings		2,000
Quay Wall reinforcements		5,000
LPG Storage Tanks		25,000
ISO Tank Loading		1,500
Utilities		2,000
Plant (incl Pump Station, EPIC, etc.)		4,000
LPG Unloading Trailer		2,000
Permits & Licensing		3,000
Value Pre Contingency		50,500
Contingency	15.0%	7,575
Value Post Contingency		US$58,075

2.6 Objectives of the Project

- To provide a consistent, affordable and quality supply of LPG into the wholesale market in Kenya through the construction of the Mombasa Gas Terminal. This in turn well help to address the significant issues of illegal refilling and infrastructure inefficiencies that are the principal current barriers to LPG consumption growth in the country. The government has initiated support for the transition to greater LPG consumption through the removal of the taxes currently imposed on LPG, increased taxes on Kerosene (the main alternative to LPG) and by agreeing to aggressively prosecute purveyors of illegally filled LPG containers.
- To contribute to an increase in consumption of LPG to c. 380,000MT per annum in Kenya within 5 years. Mr Polycarp Igathe, Chairman of PIEA & Managing Director of

Vivo Energy, has stated that there exists capacity in the current market of 1m MT, given the current enabling environment[1].

- To revolutionise the current wholesale distribution network in Kenya by utilising the existing rail networks as the principal means of LPG transport instead of roads. This will not only address the issue of road congestion, but also help to further reduce prices. The Project will use a dedicated fleet of LPG ISO-containers to move bulk volumes by rail to Nairobi and other population centres in the country. Currently, Nairobi accounts for about 65% of total LPG consumption, but an improved transport and delivery network will make LPG accessible in other population centres in the country.

2.7 Project Impacts

- Creates consistent, quality supply of LPG into Kenya removing current bottlenecks in the supply chain.
- Reduces price of bulk supply of LPG into Kenya.
- Tackles issue of illegal refilling.
- Affordable and accessible supply of LPG helps to address current health crisis caused by indoor pollution, and environmental degradation through use of biomass.
- Employment creation

2.8 Project Description and Designs

The Project land is situated in an ideal location for the construction of the LPG terminal and is supported by the following infrastructure:

- Close to mouth of the port thereby avoiding congestion around new container terminal;
- Private berth as part of the facility;
- Positioned in the centre of the industrial area of Mombasa;
- Significant infrastructure already onsite including office buildings and lifting cranes;
- Direct access to main road;
- Facility located 1.5km from Kilindini marshalling yard for Rift Valley Railway (RVR).
- The Project land has industrial user titles.
- The land has received Kenya Port Authority (KPA) initial approval for the Project.
- The total size of the proposed Project site in Port Reitz is 9 acres. The plot is leased in the name of MGT.

2.9 Installation and Construction

The Project comprises design, installation and operation of an LPG terminal facility located in the Port of Mombasa, Mbaraki Creek, Kenya and an associated wholesale and distribution network throughout the country. The terminal facility will comprise:

- A private berth for unloading mid-size LPG carriers;

[1] *Interview with Polycarp Igathe, LPG Business Review June 2015, p.29*

- Onshore storage of 22,000 MT to be mounded and associated infrastructure including multiple loading gantries;
- Storage for dedicated LPG transport equipment.

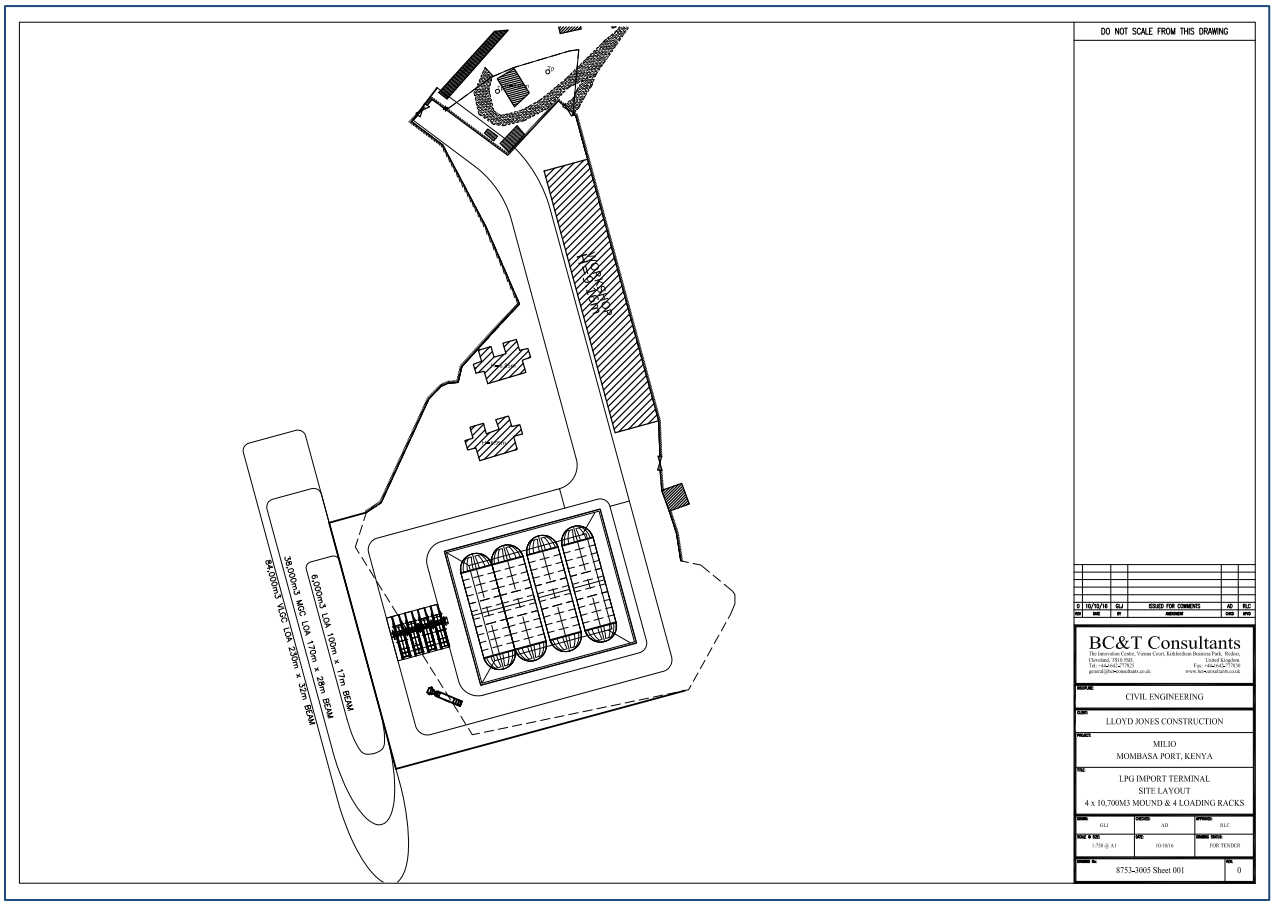


Figure: 2. 3: Terminal design layout

The relatively straightforward design and construction of the Project facilities should take 15-18 months. The project concept design and required capital expenditure has been verified and confirmed by BC&T Consultants (an international engineering firm that is partners of our EPIC contractors Lloyd Jones Construction) and Mott Macdonald International ("Mottmac"). MGT is currently in the process of drafting the EPIC contract with Mottmac.

MGT has signed a consultancy agreement with Mott Macdonald to carry out project planning, front end and detailed design, procurement support, project management and supervision. In addition Jim O'Driscoll and Jim Sherry have been appointed MGT's Project Engineers. With over 38 years of collective experience in LPG infrastructure projects, they have worked on 14 LPG infrastructure projects across the globe including, but not limited to:

- **LP Gas Terminal, Mauritius.** Client's engineer for 15,000 tonne LP Gas import & export terminal in Port Louis, Mauritius. This project includes the largest Mounded Storage vessels constructed to date. Project cost € 35m.

- **LP Gas Market Study, Kenya**. Provided technical and commercial input for LP gas market study for KPRL, Kenya. The study assessed potential market expansion, infrastructure requirements, including Mombasa Port.
- **LP Gas Storage & Bottling Facility, Doha, Qatar**. Feasibility and preliminary engineering for facility in Qatar, constructed via EPIC.
- **LP Gas Storage Depot, Madurai, India**. Provided specialist back-up consultancy to Indian Oil Company. Reviewed design and monitored construction. Provided 'technology transfer' training to IOCL engineers for mounded storage design.
- **LP Gas Import and Storage Terminal, Port Qasim, Pakistan**. Feasibility, preliminary engineering, also reviewed EPIC design and construction.

2.10 Construction Methodology

Construction techniques will involve;

- Driving of piles into the ground extending to the basalt formation. Methods may include driven, percussive or auger installed piling techniques.

2.11 Auger Installed Piling Techniques

Auger cast piles are a type of drilled foundation in which the pile is drilled to the final depth in one continuous process using a continuous flight auger. This technique shall be used to drill mound base foundation for the LPG storage facilities. It is assumed that all potable / fresh water requirements during the construction stage will be met through bowsers provided by Coast Water Services Board (CWSB), or a temporary CWSB connection to feed the site compound.

2.12 Accessibility of the Project Site

2.12.1 Road Link

The proposed project site is well linked by tarmac road which the proponent intend to use to transport bulk LPG using ISO certified containers to RVR yard and SGR located in port Reitz and Miritini respectively for wider circulation in the entire country.

Figure 2: Route to RVR Yard and Route to SGR Yard

The project proposes to move LPG using three routes:

- ISO transported by truck to RVR yard in Kilindini and loaded onto flat wagons for transport to Nairobi and beyond
- ISO transported by truck to SGR yard in Port Reitz and loaded onto flat wagon for transport to Nairobi and beyond

- LPG loaded into LPG bullet trucks and transported around Mombasa.

2.13 Logistics and Distribution Plan

The Project aims to achieve strong and consistent growth in the LPG market by not only constructing the terminal at the MGT site, but also by developing a sophisticated and efficient distribution network across Kenya utilising a dedicated leased fleet of 20ft LPG ISO-containers. The wholesale business will focus its energy on satisfying growing demand through 5 separate mechanisms:

- Sales at the MGT terminal
- Sales in Mombasa area
- Sales in Nairobi area
- Sales to other East Africa Community EAC member states

2.14 Other Subsidiary Infrastructure

2.14.1 Offices

Support services will include general office space, fire fighting facilities, and back-up power supply (generator), waste management facilities, potable water supply, waiting and loading bays among others.

2.14.2 Waste Management Facilities

Waste generated will be transported, handled and treated by qualified waste management contractor. The contractor will ensure that the necessary waste management facilities required to properly treat and dispose of project related waste are complaint with relevant county by-laws, national laws and international legislation.

2.14.3 Power Generator

A set of diesel generators will be used to provide power to the project site during the construction phase and for back-up during operation phase of the project.

A set up transformer will also be constructed and electricity distributed across the site to the various operations by KPLC.

3. APPROACH AND METHODOLOGY

3.1 Introduction

This Chapter sets out the ESIA process adopted for the Mombasa Gas Terminal (MGT) LPG bulk storage facility and the methodology used to assess impact significance.

3.2 ESIA Process

The ESIA process constitutes a systematic approach to the evaluation of a project and its associated activities throughout the project lifecycle.

The aim of this ESIA Report is to examine both the positive and negative effects that the proposed LPG storage facility is likely to have on both the physical and the socioeconomic environment. Early identification of possible impacts promotes environmental sustainability in that; anthropogenic factors do not interfere with natural environment but fusions with it creating harmony.

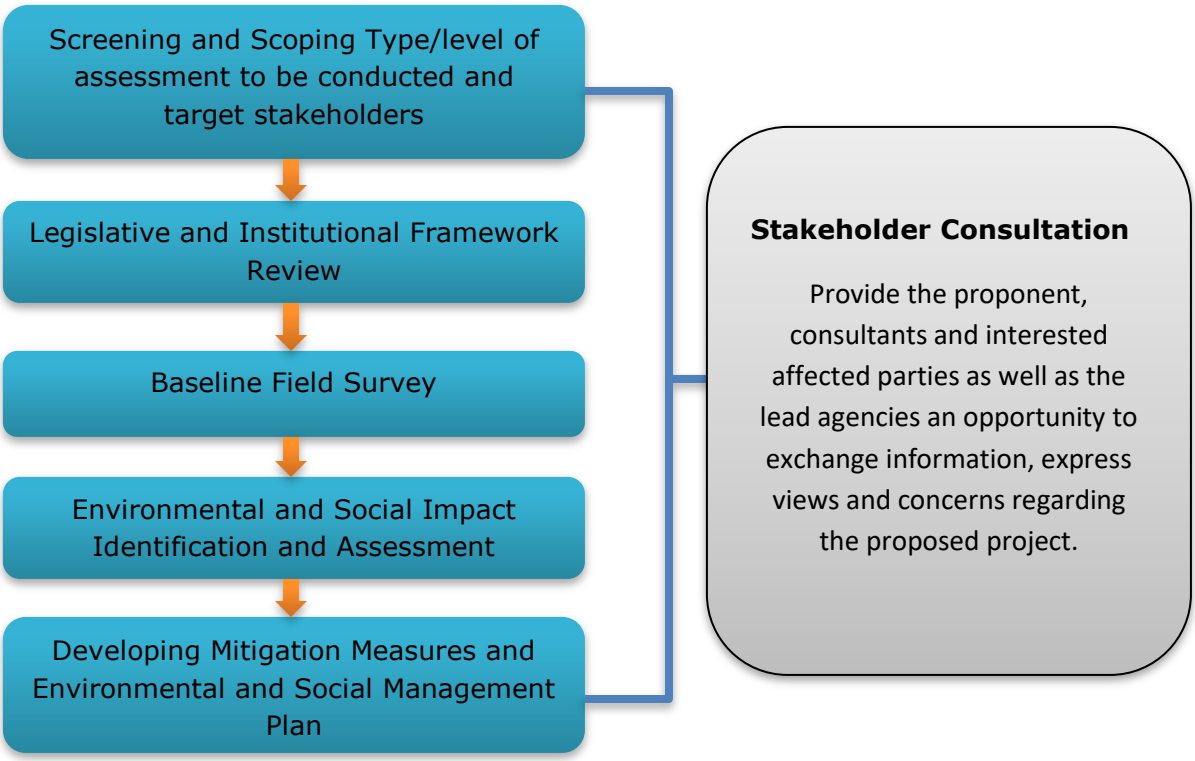
The ESIA study covered the following Aspects:

Establishing the existing environment (Environmental, socio-economic and health baseline) where the project falls;

- Defining the legal, institutional and policy framework of the proposed project;
- Analysing the potential impacts of the proposed project;
- Analysing the alternatives to the proposed project;
- Developing accurate and practical mitigation measures for the significant negative impacts;
- Developing an Environmental and Social Management Plan (ESMP) for the significant negative impact; and
- Identifying, consulting and involving all stakeholders to facilitate all study objectives.

To achieve these objectives, the study collected baseline data firstly through desktop studies on a national level; regional, and then finally scoping down to the study area and its immediate environs. This is done using detailed study, information from previous similar studies, developed checklist, and professional knowledge. The checklist focused on information gained from the scoping process and other cross-sectorial issues such as: health and safety, biodiversity, air pollution, noise among others.

Several methods and processes were undertaken to enable the achievement of the study's objectives as shown below:



3.3 Scoping

Scoping is a high level assessment of anticipated interactions between project activities and environmental and socio-economic receptors. Its purpose was to focus the assessment on key issues and to eliminate certain activities from the full impact assessment process based on their limited potential to result in discernible impacts.

A field trip to the Project site and area of influence was undertaken from 4th to 8th May, 2017 in order to:

- Conduct an inventory of the potential stakeholders' list and their contacts to be engaged during the detailed Environmental and Social Impact Assessment (ESIA);
- Carry out a preliminary environmental baseline survey and potential impacts of the project and verify baseline information on the area that was obtained from the desktop reviews;
- Identify the project alternatives;
- Discuss with opinion leaders in the proposed project area and get an overview of some of the key issues of interest or concern about the construction of an import terminal for an LPG plant;
- Liaise with the local administration to facilitate the holding of public *barazas* (meetings with the communities) and key informant interviews during the upcoming detailed ESIA study;
- Determine the logistics for the detailed Environmental Impact Assessment study, including, for example, security, availability and conditions of infrastructure such as

roads, power and water supplies, health centres and services, information technology (telephony, etc.), food supplies, accommodation facilities in the town etc.

3.4 Public Consultation

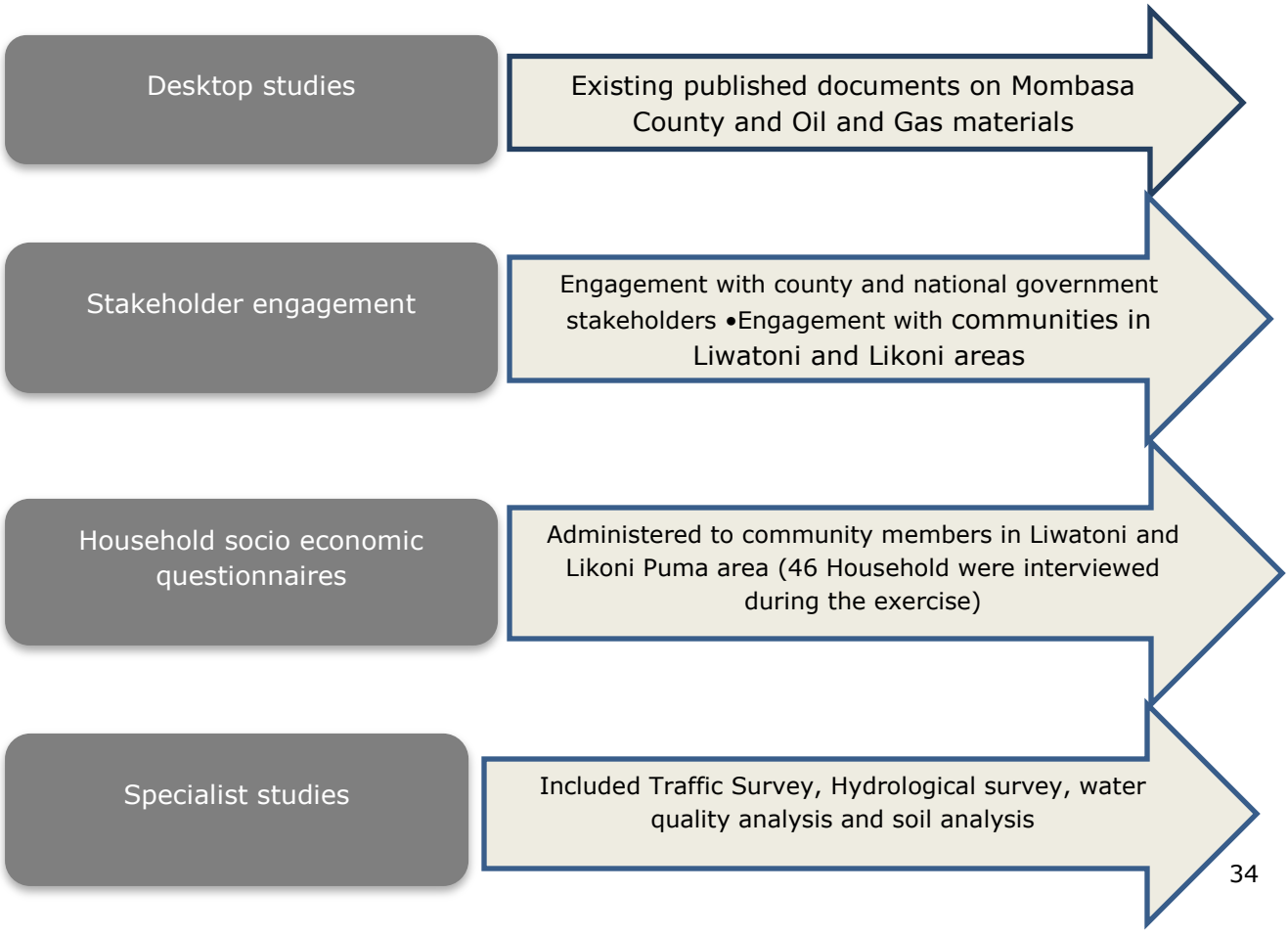
As required by regulations, stakeholders were identified and engaged as part of this ESIA Study. The groups are those generally considered to be most likely to be impacted by the proposed Project. Public consultation and participation ensures that the views of the affected and interested parties are incorporated as early as possible in the project development: at planning, implementation and operation phase and thereby minimizing the potential for unexpected opposition of the proposed development and potential for adverse effects to the environment. It is also very beneficial in incorporating the views of the public into the design process for the adoption of the best workable models and systems.

Stakeholders identified were grouped into two categories:

Primary Stakeholders - Those directly affected by the project such as members of the public and various surrounding institutions

Secondary Stakeholders – Those indirectly affected by the project but who influence development as part of its project implementation. These include the responsible agencies of both the County and National Government and civil organisations.

Socio-Economic Methodology



3.5 Household Survey

For this line of the study, a face-to-face quantitative survey was conducted using randomly selected respondents at the household level. Inquiry centred on issues of water, sanitation, solid waste, health, livelihoods, land-use, energy use, and community participation. The sample was stratified by geographical location. Sub-Location and villages were adopted for sample selection.

3.6 Desktop Reviews

An important component of the Scoping Stage is the definition of existing baseline conditions (i.e. the prevailing environmental and social characteristics against which the potential impacts of the Project can be assessed). Baseline conditions were defined during the Scoping Stage through a review of existing environmental and social information. In addition to Project-specific information, scientific journals and reports by government agencies and by other groups were reviewed for relevant baseline information.

- Desktop reviews of the literature were undertaken in relation to the following topics:
- Baseline information of the project area and the entire Mombasa County;
- Environmental Management and Coordination Act, 2015 and associated proclamations;
- IFC standards and EHS guidelines, World Bank EHS guidelines and other Oil and Gas related legislations;
- Pertinent Government constitutional conventions and protocols; and
- Study area detail including climate, geology and soils, vegetation, land use, infrastructure, communication, socio-economic and cultural setting, etc.

Based on the findings of the review and data gathering, the ESIA Team identified potential project related environmental and socioeconomic impacts based on likely interactions between LPG storage activities and environmental/socio-economic receptors.

3.7 Observations

Observations were made through site visits and transect walks. Site visits were more structured in that it was planned to include visits to project site locations and its environs. The transect walks were accomplished through walks in various locations to make unstructured evaluation of the projects and other activities.

3.8 Receptors Identification

Receptors are environmental components, people and cultural heritage assets that may be affected, adversely or beneficially, by the Project. Potential receptors were identified through both desk- and field-based studies, taking into consideration likely Project impacts. Based on the review of existing information, four high-level categories of Project receptors were identified:

- Physical (i.e. non-living environmental components, including air quality, water bodies, landscapes, terrestrial soils, marine sediments and geology);
- Marine ecology (i.e. marine habitat, flora and fauna);
- Terrestrial ecology (i.e. terrestrial habitat, flora and fauna); and
- Human (i.e. landowners and residents of local communities, local economy, marine users, cultural heritage)

3.9 Impact Significance Assessment Methodology

An impact, as defined by the international standard ISO14001:2015 is:

> *"Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's environmental aspects".*

Whereas environmental aspect is defined as:

> *"Element of an organization's activities or products or services that can interact with the environment"* supported by clause 6 of IFC Standards.

An impact is defined where an interaction occurs between a project activity and an environmental receptor. The ESIA process ranks impacts according to their significance determined by considering project activity event magnitude and receptor sensitivity. Determining event magnitude requires the identification and quantification (as far as practical) of the sources of potential environmental and socio-economic effects from routine and non-routine project activities. Determining receptor sensitivity requires an understanding of the biophysical and human environment.

Impact magnitude and receptor sensitivity were used to assess impact significance according to the impact assessment matrix. The matrix and significance definitions below have been used to assess adverse impacts of the Project. Although beneficial impacts of the Project are identified within this ESIA, beneficial impacts have not been assessed in terms of receptor sensitivity or impact magnitude. Rather, beneficial impacts have been described in qualitative terms. (Source ISO 14001 2015 Guidance Document published by DNV.GL)

Method for Determining Event Magnitude

Event magnitude is determined based on the following parameters, which are equally weighted and are each assigned a rating of "1", "2", or "3":

Extent / Scale: Events range from those affecting an area:

1 – Up to 500m from the source or an area less than 50 hectares; to
2 – Greater than 500m and up to 1km from the source or an area between 50-100 hectares; to
3 – Greater than 1km from the source or an area greater than 100 hectares.

Frequency: Events range from those occurring:

1 - Once; to
2 - Up to 50 times; to
3 - More than 50 times or continuously.

Duration: Events range from those occurring for:

1 – Up to one week; to
2 - More than one week and up to one month; to
3 - Periods longer than one month to permanent.

Intensity: Concentration of an emission or discharge with respect to standards of acceptability that include applicable legislation and international guidance, its toxicity or potential for bioaccumulation, and its likely persistence in the environment. Degree/permanence of disturbance or physical impact (e.g. disturbance to species, loss of habitat or damage to cultural heritage). Ranges from:

1 - A low intensity event; to
2 - A moderate intensity event; to
3 - A high intensity event.

Method for Determining Receptor Sensitivity

Receptor sensitivity is determined based on the following parameters, which are equally weighted and are each assigned a rating of**"1","2", or"3":**

Biological/Ecological Receptors:

Presence: Ranges from:

3 - Routine, regular or reliably predictable presence of any species which is, in Reverse order, a unique, threatened or protected species; to
2 - Regionally rare or largely confined to the Project area or sensitive to Industry emissions /disturbances; to
1 - A species which is none of the above and is therefore assessed at the community level only.

Resilience (to the identified stressor): Ranges from:

1 - Species or community unaffected or marginally affected; to

2 - Species undergoing moderate but sustainable change which stabilises under constant presence of impact source, with ecological functionality maintained; to

3 - Substantial loss of ecological functionality (e.g. loss of species in key groups, substantially lower abundance and diversity).

Human Receptor:

Presence: Ranges from:

3 - People being permanently present (e.g. residential property) in the geographical area of anticipated impact; to

2 - People being present some of the time (e.g. commercial property); to

1 - People being uncommon in the geographical area of anticipated impact.

Resilience (to the identified stressor): Ranges from:

1 - People being least vulnerable to change or disturbance (i.e. ambient conditions (air quality, noise) are well below applicable legislation and international guidance); to

2 - People being vulnerable to change or disturbance (i.e. ambient conditions (air quality, noise) are below adopted standards); to

3 - Most vulnerable groups (i.e. ambient conditions (air quality, noise) are at or above adopted standards).

Physical Receptor/Feature:

Presence (to the identified stressor): Ranges from:

3 - Presence of feature any species which has, in reverse order, national or international value (e.g. state protected monument); to

2 – Feature with local or regional value and is sensitive to disturbance; to

1 - Feature which is none of the above.

Resilience (to the identified stressor): Ranges from:

1 – Feature/receptor is unaffected or marginally affected i.e. resilient to change;

2 – Undergoes moderate but sustainable change which stabilises under constant presence of impact source, with physical integrity maintained; and

3 – Highly vulnerable i.e. potential for substantial damage or loss of physical integrity.

Soil, Ground Water and Surface Water

Presence: Ranges from:

3 – Receptor is highly valued e.g. used extensively for agriculture, used as a public water supply; to

2 – Receptor has moderate value e.g. moderate/occasional use for agriculture purposes; to

1 – Receptor has limited or no value.

Resilience (to the identified stressor): Ranges from:

1 – No or low levels of existing contamination (well below accepted standards) and receptor is unaffected or marginally affected i.e. resilient to change; to

2 – Moderate levels of mobile contamination present which are vulnerable to physical disturbance; to

3 – High levels of mobile contamination present which are highly sensitive to physical disturbance.

Source: (www.bp.com/)

Receptor Sensitivity Rankings

Overall receptor sensitivity is then scored on a spectrum from low (1) to high (6) by adding the individual parameter scores:

Receptor Sensitivity	Score (Summed Parameter Rankings)
Not Significant	0
Low	2
Medium	3-4
High	5-6

Event Magnitude Ranking

Overall event magnitude is scored from low (1) to high (12) by adding the individual parameter scores:

Event Magnitude	Score (Summed Parameter Rankings)
Not Significant	1-2
Low	4
Medium	5-8
High	9-12

Impact Significance Matrix

		Receptor Sensitivity (vulnerability and value)			
		Negligible	Low	Moderate	High
Event Magnitude	Negligible	Not Significant	Not Significant	Not Significant	Not Significant
	Low	Not significant	Low	Low/moderate	Moderate
	Moderate	Not significant	Low/moderate	Moderate	High
	High	Low	Moderate	High	High

Impact Significance Definitions

Adverse Impact	**High**	**Significant**. Impacts with a "high" significance are likely to disrupt the function and value of the resource/receptor, and may have broader systemic consequences (e.g. ecosystem or social well-being). These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.
	Moderate	**Significant**. Impacts with a "moderate" significance are likely to be noticeable and result in lasting changes to baseline conditions, which may cause hardship to or degradation of the resource/receptor, although the overall function and value of the resource/receptor is not disrupted. These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.
	Low	**Detectable but not significant.** Impacts with a "low" significance are expected to be noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause hardship, degradation, or impair the function and value of the resource/receptor. However, these impacts warrant the attention of decision-makers, and should be avoided or mitigated where practicable.
	Not significant	**Not Significant.** Any impacts are expected to be indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not a concern of the decision-making process

3.10 Socioeconomic Impacts

The socioeconomic impact assessment was done using a semi-qualitative assessment approach to describe and evaluate impacts. Factors taken into account to establish impact significance included probability, spatial extent, duration and magnitude of the impacts in addition to the sensitivity of receptors (e.g. the groups of people or populations most likely to be affected and, in particular, whether impacts are likely to be disproportionately experienced by vulnerable groups). An indirect socio-economic impact (i.e. induced effects) was also assessed using the same approach.

3.11 Mitigation and Monitoring

The interactive and integrated nature of the ESIA and project planning processes means that the majority of proposed additional mitigation measures and strategies have been incorporated into the project design. Those additional mitigation and monitoring initiatives detailed in this document will be incorporated into the management plans that will be used during the construction and operational phases.

4. POLICY AND LEGISLATIVE FRAMEWORK

4.1 The Constitution of Kenya, 2010

The Constitution provides that every person has the right to a clean and healthy environment (Article 42). The State is obliged to ensure that the environment and natural resources are conserved and genetic resources and biological diversity are protected. In that regard it must eliminate any processes or activities that would be likely to endanger the environment. Everyone is expected to cooperate with the State organs and other people to protect and conserve the environment and ensure that the use and development of the natural resources are ecologically sustainable (Article 69). These environmental rights are enforceable in a court of law (Article 70). Land must be used in a sustainable manner, and in accordance with the principles of sound conservation and protection of ecologically sensitive areas. The State may regulate the use of any land or right over any land in the interest of land use planning (Article 66). The Constitution thus gives recognition to public, community and private land. Land use regulation goes beyond exploitation merely for economic purposes, and lays emphasis on conservation.

Article 174 of the Constitution sets out the objects of devolution of government, which include: (a) giving powers of self-governance to the people and enhancing their participation in the exercise of the powers of the State and in making decisions affecting them; (b) recognizing the right of communities to manage their own affairs and to further their development; (c) protecting and promoting the interests and rights of minorities and marginalized communities; (d) promoting social and economic development and the provision of proximate, easily accessible services throughout Kenya; (e) ensuring equitable sharing of national and local resources throughout Kenya; and (f) facilitating the de-centralization of State organs, their functions and services, from the capital of Kenya.

The Fourth Schedule of the Constitution sets out the functions devolved to the county governments, including agriculture; county health services; control of air and noise pollution; cultural activities; county transport; animal control and welfare; county planning and development; pre-primary education; implementation of specific national government policies on natural resources and environmental conservation; county public works and services and fire-fighting services and disaster management.

4.2 The Policy Framework

4.2.1 The National Environment Policy, 2013

The National Environment Policy aims to provide a holistic framework to guide environmental and natural resource management in Kenya. It also ensures that the link between the environment and poverty reduction is integrated into all government processes and institutions in order to facilitate and realize sustainable development at all levels in the context of a green economy, enhancing social inclusion, improving human welfare, creating employment opportunities and maintaining a healthy functioning of the ecosystem.

This policy presents the framework to deal with the ever-growing environmental issues and management challenges in Kenya, such as:

- The need to harmonize sectoral policy instruments with the Environmental Management and Coordination Act and the Constitution.
- Implementation of the Land Policy
- Valuation of environmental and natural resources
- Rehabilitation and restoration of environmentally degraded areas
- Loss of biodiversity
- Concessions and incentives
- Urbanization and waste management
- Pollution
- Energy
- Climate change and disaster management
- Conservation of shared natural resources
- Invasive and alien species
- Public participation, environmental education and awareness
- Data and information
- Poverty
- Weak enforcement
- Fragmentation

4.2.2 National Policy on Water Resources Management and Development (Sessional Paper No.1 of 1999)

The management of water resources in Kenya is guided by four specific policy objectives, namely to:

- Preserve, conserve and protect available water resources and allocate it in a sustainable, rational and economic way;
- Supply water of good quality in sufficient quantities to meet the various water needs, including poverty alleviation, while ensuring the safe disposal of wastewater and environmental protection;
- Establish an efficient and effective institutional framework to achieve a systematic development and management of the water sector; and
- Develop a sound and sustainable financing system for effective water resources management, water supply and sanitation development.

4.2.3 The Draft National Energy and Petroleum Policy 2015

The energy sector plays a vital role in the socio-economic development of a nation. In Kenya, petroleum and electricity as sources of energy are the main drivers of the economy, while biomass is mainly used in the rural areas. The sector currently relies solely on the import of all petroleum products. However, with the discovery of oil and gas deposits in the northern parts of Kenya, this will change. Policy direction in the energy sector was previously governed

by Sessional Paper No. 4 of 2004. The new draft policy has been prepared to bring on board emerging issues such as Vision 2030, and more importantly, the functions of county governments in the new Constitutional dispensation.

In view of the recent oil discovery in northern Kenya, it is necessary to develop petroleum production capacity and infrastructure to meet the increasing market needs at home and in the region. These developments might include building a new refinery, thereby making products more competitive, creating wealth and ensuring security of supply and stabilizing prices. Increased use of LPG will be encouraged to reduce dependence on biomass and eliminate the use of kerosene in homes. Natural gas may be used for power generation, transport and domestic purposes.

4.2.4 Petroleum Industry - Midstream Activities

The government recognizes that its infrastructure development has been slow and therefore unable to keep up with the market demand for petroleum products. It therefore considers that it is vital to develop adequate and efficient infrastructural systems in order to ensure sufficient, reliable and cost-effective supply of these products. The government intends to facilitate and support off-loading, storage, transportation and evacuation infrastructure with a view to achieving adequate supply and distribution of petroleum products in all parts of the country at the least cost possible.

4.2.5 Land, Environment, Health and Safety

Environmental management in the energy sector is crucial in ensuring sustainability. Energy production, transportation and use cause various dangers to human life and the environment. It is necessary to provide affordable, reliable and sustainable energy while also upholding people's rights to land, environment, health and safety. Upstream and midstream activities should therefore be conducted in a manner that protects the environment. Fire outbreaks and oil spills are major environment, health and safety concerns in the oil and gas industry. These can be addressed by adopting international best practices, and compliance and enforcement of the law and regulations.

4.2.6 Climate Change Strategy

The government intends to ensure that the energy sector is represented in international climate change negotiations to improve the investment climate for development projects and that research is undertaken in the clean energy technology areas. It will also invest in renewable technologies. Kenya has developed a National Strategy on Climate Change.

4.2.7 The Land Policy (Sessional Paper No. 3 of 2009)

The overall objective of the National Land Policy is to secure land rights and provide for sustainable growth, investment and the reduction of poverty in line with the Government's overall development objectives. Specifically, it seeks to develop a framework of policies and

laws designed to ensure the maintenance of a system of land administration and management that will provide all citizens with:

- The opportunity to access and beneficially occupy and use land;
- Economically, socially equitable and environmentally sustainable allocation and use of land;
- Effective and economical operation of the land market;
- Efficient use of land and land-based resources; and
- Efficient and transparent land dispute resolution mechanisms.

Inadequate environmental management and conflicts over land and land-based resources is one of the major issues the policy aims to resolve.

The need for land reforms in Kenya arose from the inadequacy of the old constitution to establish an efficient, accountable institutional framework for land ownership, administration and management. This resulted in:

- Centralisation of state responsibility over land matters, irresponsive to the citizens' needs;
- Lack of accountability by governments in land governance, leading to irregular allocations of public land;
- Constitutional protection of private property rights even when acquired illegitimately;
- Mass disinheritance of communities and individuals of their land;
- Inequitable access to land, particularly for women, children, minority groups and persons with disabilities; and
- Ineffective regulation of private property rights, as a result of which unplanned settlements and environmental degradation were commonplace.

With the passing of the Kenya Constitution 2010, these issues have been addressed. The previously existing land laws have been repealed and the law consolidated into three statutes, namely the Land Act 2012, the Land Registration Act 2012 and the National Land Commission Act 2012. Read together with the Constitution (Land and Environment, Chapter 5) these statutes now govern all land issues including security of communal tenure, benefit-sharing from land-based resources, restoration and conservation of land quality, land use regulation and development, conservation and sustainable management of land-based resources, ecosystem protection and management principles, land rights delivery, settlement land allocation and land adjudication, among others.

4.2.8 The Kenya Health Policy 2012 – 2030

The policy is based on the Constitution of Kenya 2010, Vision 2030 and global health commitments. It was developed through an inclusive and participatory process involving the health sector and other related sectors. Its broad aim is to ensure equity, people-centeredness and participation, efficiency, multi-sectoral approach and social accountability in delivery of healthcare services. It sets out the goal, objectives, guiding principles and

policy directions aimed at achieving Kenya's health agenda and a comprehensive implementation framework. Also included is the institutional management plan under the devolved system of government taking into account the varied roles of the national and county levels of government. The policy also sets out a monitoring and evaluation framework to track progress in achieving the policy objectives.

4.2.9 The National Environmental Sanitation and Hygiene Policy 2007

The Environmental Sanitation and Hygiene (ESH) Policy is intended to improve people's health and quality of life. Strategic interventions have been developed to determine the success of the policy implementation.

One of the key purposes of this policy is to clarify the various roles in order to enhance the existing legal and constitutional framework and to encourage the private sector, civil society and community participation in the planning, implementation and ownership of ESH services.

Sanitation and the Environment: One of the key objectives of the policy is to protect the environment from pollution and its negative effect on human health. The government will seek to minimize negative impacts arising from various types of sanitation systems, and maximize positive effects. In situations where inappropriate hygiene and sanitation systems have negative environmental impacts, the particular choice of technology will be weighed against the unimproved or less elaborate sanitation practices. The Health Ministry, through its Division of Environmental Health in conjunction with relevant agencies, will provide guidelines for the delivery and management of environmental infrastructure, particularly household sanitation, and solid waste disposal including healthcare waste and other wastes. Well-functioning sanitation and hygiene systems are a means of protecting the environment. Monitoring will be increased and undertaken systematically to help prevent environmental pollution from liquid and solid wastes. The policy is designed in a manner that will create job opportunities, e.g. labour intensive construction, sustainable livelihoods and long-term entrepreneurial activities.

Poor access to adequate sanitation and hygiene is a major hindrance to poverty alleviation. The health risks associated with poor ESH increase poverty. The government envisages that this policy is an important step towards poverty reduction.

4.3 Devolution and Access to Energy Services

There is the concern that the two levels of government may clash on account of lack of clearly-defined roles in the Constitution. Further, no framework exists for devolution of functions within the energy sector to ensure service continuity or standards to guide county governments on devolved responsibility. To deal with these problems, a framework on the functional devolution of roles between the two levels of government will be developed; a royalty of 15% due to the national government from specific county resources developed by the energy sector players will be paid to the specific county government and 5% to the specific local community; minimum standards will be developed to guide county governments

on devolved responsibilities in the energy sector; and some of the licensing services will be devolved to the county governments.

4.4 Kenya Vision 2030

Kenya Vision 2030 was launched on October 30, 2006, and is the country's new development plan for the period 2008 to 2030. It seeks to transform Kenya into an industrialized "middle-income country providing a high quality of life to its citizens by the year 2030".

Vision 2030 is based on three 'pillars': the economic, the social and the political. The adoption of the Vision follows the successful implementation of the Economic Recovery Strategy for Wealth and Employment Creation (ERS) launched in 2002.

The economic, social and political pillars of Kenya Vision 2030 are anchored on macroeconomic stability, continuity in government reforms, enhanced equity and wealth-creation opportunities for the poor, infrastructure, energy, science, technology and innovation, land reform, human resources development, security, as well as public sector reforms.

The foundations for the Vision 2030 are:

Macroeconomic Stability for Long-term Development: The Vision places the highest premium on Kenya's current stable macroeconomic environment which works in favour of the poor, and expects it to continue in the future as a matter of policy. The projects proposed under Vision 2030 will be subjected to the parameters set under the macroeconomic stability framework.

Continuity in Governance Reforms: These will be accelerated in order to create a more conducive environment for doing business, and also to enable Kenyans to fully enjoy their individual rights under the Constitution. Towards this end, the government will intensify the anti-corruption programme through more efficient investigation and prosecution; eliminating bribery in the public service and increasing public education and judicial and legal reform. The government will also fully support the people of Kenya, parliament, civil society and the press, recognizing that they are the ultimate defence against abuse of office.

Infrastructure: The Vision aspires for a country firmly interconnected through a network of roads, railways, ports, airports, water and sanitation facilities and telecommunications. This is a high priority issue.

Enhanced Equity and Wealth-Creation Opportunities for the Poor: The Vision includes equity as a recurrent principle in economic, social and political programmes. Special attention has been given to arid and semi-arid districts, communities with high incidence of poverty, the unemployed youth, women, and all vulnerable groups.

Science, Technology and Innovation (STI): The government will intensify the application of STI to increase productivity and efficiency levels across all three pillars.

It recognizes the critical role played by research and development in accelerating development in the emerging nations. The government will create and implement an STI policy framework to support Vision 2030.

Land Reform: Land is a vital resource for the socio-economic and political developments set out in the Vision. It is recognized that respect for property rights to land, whether owned by individuals, communities or companies, is key to rapid economic growth (A national land use policy has now been created to enable this growth. *See section 2.2.4 above)*.

Human Resources Development: Kenya will create a globally competitive and adaptive human resource base to meet the needs of a rapidly industrializing economy through training and education, raising labour productivity to international levels, creating a human resource database to facilitate better planning, and establish more training institutions.

Security: The government will increase security in order to lower the cost of doing business and provide Kenyans with a more secure environment to live and work in. The strategies will include improving community policing, reducing the police-to-population ratio, and adopting information and communication technology in crime detection and prevention. These measures will be supported by judicial reforms.

Energy: Since development projects recommended under Vision 2030 will increase demand on Kenya's energy supply, she must generate more energy at a lower cost and increase efficiency in energy consumption. The government is committed to continued institutional reforms in the energy sector, including a strong, regulatory framework, and will encourage more power generation by the private sector. New sources of energy will be found through the exploitation of geothermal power, coal, and renewable energy sources.

The Public Sector: An efficient, motivated and well-trained public service is expected to be one of the major foundations of the Vision. Kenya intends to build a public service that is more citizen-focused and results-oriented. The government will intensify efforts to bring about an attitudinal change in public service that values transparency and accountability to the citizens of Kenya.

4.5 Legal and Regulatory Framework

This will be reviewed to align with the energy sector's legal and regulatory framework and the Constitution, and the various relevant statutes will be consolidated into one. Demarcation of roles between the two levels of government will be carried out. Provisions in the law will ensure that investments benefit local communities and their economies in terms of the Constitution. Sharing of royalties equitably from the exploitation of natural resources between the national and county governments will be provided for; the general rules of international law and the treaties and international conventions ratified will be recognized; additional safeguards will be created on use of land, environment and natural resources

critical for energy infrastructure development and service provision. Penalties for energy-related offences will be enhanced.

4.5.1 The Environmental Management and Coordination Act, 2015

The Environmental Management and Co-ordination Act, 1999, provides for the establishment of an appropriate legal and institutional framework for the purpose of managing the environment and matters connected with it has been amended to EMCA, 2015 in order to reflect the requirements of the Constitution with regard to devolution of government. The National Environment Management Authority ("the Authority") was established under section 7 of the Act. Its mandate is to monitor the operations of industries, projects or activities to determine their immediate and long-term effects on the environment. The Mombasa Gas Terminal Ltd., being a proponent whose project activities fall within the ambit of the Act, is therefore subject to its provisions.

The Act (Part VIII) lays down provisions pertaining to environmental quality standards. It establishes a Standards and Enforcement Review Committee whose broad functions are to (a) advise the Authority on how to establish criteria and procedures to measure water and air quality and (b) issue standards and guidelines for the safe and proper disposal of waste (Sections 70, 71, 78, 86). Where Kenya is a party to an international convention, treaty or agreement on the management of the environment, the Authority must initiate legislative proposals to give effect to them (Section 124). The Authority may prescribe measures to ensure that the biological resources in place are preserved, issue guidelines to promote the conservation of the various terrestrial and aquatic systems, and protect species, ecosystems and habitats threatened with extinction.

The EIA Guidelines and Administrative Procedures

The Environment Impact Assessment and Administrative Procedures arose from the policy framework and the legislative and regulatory (the Environmental Management and Co-ordination Act, 1999, and its regulations) procedures in order to assist in the integration of environmental concerns in economic development so as to foster sustainable development. The document sets out guidelines for carrying out Environmental Impact Assessment, Environmental Audit and Monitoring, Strategic Environmental Assessment and dealing with issues of transboundary, regional and international conventions, treaties and agreements. It sets out the procedure in Environmental Impact Assessment studies and Environmental Audits as well as the contents and format of the reports required to be submitted to the National Environment Management Authority for consideration. The Environmental Impact Assessment study review process and decision-making are also explained. The guidelines are mainly intended to assist project proponents, EIA practitioners, lead agencies and members of the public to understand the process and the basis on which decisions are made.

4.5.2 Merchant Shipping Act, 2009

This is an Act of Parliament to make provision for the registration and licensing of Kenyan ships, to regulate proprietary interests in ships, the training and the terms of engagement of

masters and seafarers and matters ancillary thereto; to provide for the prevention of collisions, the safety of navigation, the safety of cargoes, carriage of bulk and dangerous cargoes, the prevention of pollution, maritime security, the liability of ship-owners and others, inquiries and investigations into marine casualties; to make provision for the control, regulation and orderly development of merchant shipping and related services; generally to consolidate the law relating to shipping and for connected purposes

Surveys, inspections and monitoring

The Director-General or a person authorised by him for the purpose, may board, inspect and survey any ship to which this Act applies, enter port facilities in Kenya, demand the production of documents, records and other evidence; and take testimony of witnesses under oath, for the purposes of conducting inspection and survey and for undertaking other activities authorised or required under this Act.

Part III – Restriction on Trading

Restriction on trading in Kenyan waters

(1) A ship shall not trade in or from the waters of Kenya unless the ship—
    (a) Is a Kenyan ship; or
    (b) Has a certificate of foreign registry.
(2) Subject to the provisions of any regulation or any treaty or agreement with any foreign Government, only Kenyan ships may be engaged in any local trade in Kenyan waters.

Part 15 of this act requires that, every foreign ship anchoring in or trading in or from Kenyan waters or entering a port in Kenya shall carry insurance cover against risks of loss or damage to third parties.

Where a ship is in contravention of this section, the owner shall be deemed to have committed an offence and shall be liable, upon conviction, to a fine not exceeding one million shillings, or to imprisonment for a term not exceeding five years, or to both such fine and imprisonment.

Part 16 of the Act, requires that, No owner of a ship or person providing the service of a shipping line shall, either directly or indirectly, provide in the maritime industry the service of crewing agencies, pilotage, clearing and forwarding agent, port facility operator, shipping agent, terminal operator, container freight station, quay side service provider, general ship contractor, haulage, empty container depots, ship chandler or such other service as the Minister may appoint under section 2.

Any person who contravenes the provisions of subsection (1) commits an offence and shall be liable to a fine not exceeding one million shillings or to imprisonment for a term not exceeding three years, or to both such fine and imprisonment.

Part XI – Carriage of Bulk Cargoes and Dangerous Cargoes

The provisions of this Part and any regulations made under section 297 respecting dangerous goods shall apply to all Kenyan ships and to all foreign ships while loading or discharging cargo or fuel, or embarking or disembarking passengers at any place in Kenya as they apply to Kenyan ships.

Regulations (1) The Minister may, by regulations, prescribe which goods, articles or materials to be carried in a ship are dangerous goods in accordance with the Safety Convention in relation to the carriage of dangerous goods, and such regulations shall incorporate by reference, the International Maritime Dangerous Goods (IMDG) Code of the Organization.

No person shall send by or carry in a Kenyan ship any dangerous goods without first distinctly marking their nature on the outside of the outermost package containing the same, in accordance with such regulations as the Minister may make, and without first giving written notice of the nature of such goods and of the name and address of the sender thereof to the master or owner of the ship.

Any person who contravenes any of the provisions of this Part with respect to dangerous goods, including regulations made under section 297, commits an offence and shall be liable, upon conviction, to a fine not exceeding five hundred thousand shillings, or to imprisonment for a term not exceeding three years, or to both such fine and imprisonment.

Where a contravention involves the marking, packing, stowing or quantity of dangerous goods within a ship, that ship shall be deemed, for the purposes of Part XII, to be unsafe by reason of improper loading.

4.5.3 Kenya Standards KS 1938-3:2006

The standard is concerned with the code of practice for handling, storage and distribution of liquefied petroleum gas in domestic, commercial and industrial installations. Part 1 of the standard; Liquefied petroleum gas installations involves gas storage containers of individual capacity not exceeding 500L and a combined water capacity not exceeding 3000L per installation, Part 2 of the standard: Transportation of LPG in bulk by road, Part 3 of the Standard: Liquefied petroleum gas installations involving storage vessels of individual water capacity exceeding 500L and Part 4 of the Standard concerns the storage and filling sites for re-fillable liquefied petroleum gas (LPG) containers not exceeding 15 kg.

4.6 The County Governments Act, 2012

The purpose of this Act is to give effect to Chapter 11 of the Constitution (Devolved Government), to provide for county governments' powers, functions and responsibilities to deliver services. Other aims are to: a) give effect to the objects and principles of devolution as set out in Articles 174 and 175 of the Constitution; give effect to Article 176 (2) of the Constitution in respect of further decentralization; b) provide for public participation in the conduct of the activities of the County Assembly as required under Article 196 of the Constitution; c) prescribe mechanisms to protect minorities within counties pursuant to

Article 197 of the Constitution; and d) prescribe additional requirements in respect of county legislation as contemplated in Article 199 of the Constitution.

The functions and service provision of each county government must be decentralized to: a)the urban areas and cities within the county as required in the Urban Areas and Cities Act (No. 13/2011); b) the sub-counties equivalent to the constituencies within the county established under Article 89 of the Constitution) the wards within the county established under Article 89; d) such number of village units in each county as the respective county assembly may determine; and e) such other or further units as the county government may determine (section 48).

The sub-county administrator is responsible for the coordination, management and supervision of the general administrative functions in the sub-county unit, including the development of policies and plans; service delivery; developmental activities to empower the community; the provision and maintenance of infrastructure and facilities of public services; the facilitation and coordination of citizen participation in the development of policies and plans and delivery of services; and for the exercise of any functions and powers delegated by the County Public Service Board (section 50). The ward administrator is mandated to coordinate, manage and supervise the general administrative functions in the ward and other functions as for the sub-county administrator (section 51). A village administrator has the responsibility to coordinate, manage and supervise administrative functions in the village, including ensuring and coordinating the participation of the village unit in governance; and assisting the village unit to develop administrative capacity for the effective exercise of the functions, powers and participation in governance at the local level and other functions and powers as the Public Service Board may delegate under section 86 (section 52). At the lowest level is the village council for each village unit. The village council comprises the village administrator as the chairperson, and not less than three and not more than five village elders appointed by the village administrator with the approval of the county assembly, taking into account gender balance. All of the administrators are appointed by the Public Service Board.

4.7 The National Government Coordination Act, 2013

This Act is intended to establish an administrative and institutional framework for co-ordination of national government functions at the national and county levels of government. Articles 131 and 132 of the Constitution are cited in support. The Public Service Commission is mandated, in consultation with the Cabinet Secretary, to recruit and appoint national government administrative officers to co-ordinate government functions countrywide. County commissioners are appointed in respect of every county, including a deputy and other junior officers (section 15). A mediation team will be constituted to deal with disputes arising as to the mandate or powers of any of the officers, or their roles in the county and national governments (section 19).

4.8 Transition to Devolved Government Act, 2012

This statute was enacted to provide a framework for the transition to devolved government pursuant to section 15 of the Sixth Schedule to the Constitution. The section provides that Parliament must enact legislation for the phased transfer from the national to the county government of the functions assigned to counties within a period of three years after the date of the first election of county assemblies. Section 23(1) of the Act provides that the Transition Authority is required to identify functions listed in the Fourth Schedule of the Constitution that may be transferred to county governments immediately after the first elections under the 2010 Constitution. This was done through Legal Notice No. 16 of 2013. The said functions are in addition to the executive, legislative and financial functions provided through the establishment of the County Executive and the County Assembly.

The functions devolved include: agriculture; county health services; cultural activities, public entertainment and public amenities; control of air pollution, noise pollution, other public nuisances and outdoor advertising; county transport; animal control and welfare; trade development and regulation; county planning and development; pre-primary education, village polytechnics, home-craft centres and child-care facilities; implementation of specific government policies on natural resources and environmental conservation; fire-fighting services and disaster management; control of drugs and pornography; and ensuring and coordinating the participation of communities and locations in governance at the local level and assisting them to develop the administrative capacity for the effective exercise of the functions and powers and participation in governance at the local level.

Section 24 of the Act provides that the county government must meet the following criteria so as to have the functions in the Fourth Schedule transferred to it:

- Existing legislation relating to the function applied for exists.
- A framework for service delivery already is in place to implement the function.
- Where applicable, the county government should identify or establish administrative units to the function.
- The county government has undertaken a capacity assessment in relation to the function.
- Arrangements for, and the extent of, further decentralization of the function and provision of related services have been made by the county government.
- The required infrastructure and systems to deliver the function are in place.
- The county government has the necessary financial management systems in place.
- The county government has an approved plan in relation to the function.
- Any other variable as may be prescribed after consultations between the Authority, the county government, the Committee for the Implementation the Constitution and the Commission on Revenue Allocation.

The devolved government statutes act as the framework for the transfer of certain functions from the national government to the 47 county governments. The functions commence once

the executive, the legislative and the financial systems are in place. Mombasa Gas Terminal Ltd. will need to familiarize itself with the county's legislative and regulatory provisions as soon as the same are passed and gazette, and ensure compliance with them.

4.9 The Climate Change Act, 2016

The Act provides a framework for mitigating and adapting to the effects of climate change on various sectors of the economy; facilitating and enhancing response to climate change; and providing guidance and measures on how to achieve low carbon climate resilient development, among other things. It lines up with international best practices and standards. It establishes the National Climate Change Council which is tasked with coordinating climate change issues and in particular, several functions which include:

a) advising the national and county governments on legislative and other measures necessary for mitigating and adapting to the effects of climate change;
b) coordinating the activities of various governmental and non-governmental stakeholders on climate change matters;
c) advising the national and county governments on regional and international conventions, treaties and agreements on climate change to which Kenya is a party and following up on their implementation;
d) preparing reports on Kenya's adherence to its international obligations on climate change issues;
e) coordinating local, regional and international negotiations on climate change; and
f) Conducting research on climate change and disseminating information to the national and county governments, the public and stakeholders.

4.10 International Practices, Standards and Conventions

4.10.1 Petroleum Industry Guidelines

Many environmental management systems have been designed to improve the environmental performance of organizations. Globally recognized and accepted EHS international standards, best practices and guidelines can be successfully used by industries to achieve a successful systems-based approach to EHS management. Guidelines based on information from the International Association of Oil and Gas Producers (OGP), the International Organisation for Standardizations (ISO) and the International Electro-Technical Commission (IEC) have become widely accepted as providing a strong basis for preparing regulations, policies and programmes to minimize the impact that these operations have on the environment. The E&P Forum (Oil Industry International Exploration and Production Forum), jointly with UNEP, published a document on the best approaches to achieving high environmental performance and standards worldwide. Within the framework provided, various technical reviews and guidelines already available from other relevant sources can be applied. It developed a general management system to deal with health, safety and environmental (HSE) issues and its key elements are as follows:

- Leadership and Commitment

- Policy and Strategic Objectives
- Organization, Resources and Documentation
- Evaluation and Risk Management
- Environmental planning and compliance programmes
- Implementation and Monitoring
- Audit and Review

Renowned national and international standards for best practice, particularly the ISO 9000 and 14000 series, also offer management systems models that can be used by companies to enhance their environmental performance.

Some regional and national Standards Development Organizations and industry organizations have developed standards found to be acceptable for use internationally. Examples are the American Petroleum Institute (API), the British Standards Institution (BSI) and the Australian Petroleum Production and Exploration Association Limited (APPEA).

From the environmental principles emerging from the codes of conduct and environmental guidelines developed by the above-mentioned oil industry organizations and other bodies, and recognized as being best practices, Alexandra S. Wawryk (2006) identified five that when adequately implemented, should help to minimize the harmful environmental and cultural impacts of oil and gas exploration and production, namely:

a) Environmental Impact Assessment (EIA)
b) Social Impact Assessment (SIA)
c) Environmental Management Systems (EMS)
d) Environmental Performance Evaluation (EPE)
e) Environmental Monitoring, Auditing and Reporting

4.11 Identified Applicable Performance Standards, January 2012

While all Performance Standards (PS) are applicable to this investment project, based on our current information, IFC's environmental and social due diligence indicates that the construction of the LPG storage terminal will have significant impacts which must be managed in a manner consistent with the following Performance Standards:

- PS 1: Social & Environmental Assessment and Management Systems
- PS 2: Labour & Working Conditions
- PS 3: Pollution Prevention & Abatement
- PS 4: Community Health, Safety and Security
- PS6: Biodiversity Conservation & Sustainable Natural Resource Management

PS5 (Land Acquisition and Involuntary Resettlement) does not apply as no land acquisition is needed. PS7 (Indigenous Peoples) does not apply as there are no indigenous communities potentially affected by this project. There are no cultural relic preservation sites, scenic spots, revolutionary and historical relics hence inapplicability of PS 8. There is no

environmentally sensitive area in close proximity to the project site. The proposed project site will comply with the development plan for the Kenya Ports Authority (KPA) as a regulated area and thus will not cause any significant impacts on the surrounding environments.

4.12 PS1: Assessment and Management of Environmental and Social Risks and Impacts

The standard requires the project proponent to have an in-house Environmental and Social Management System that will be used in managing and mitigating environmental impacts and social risks. The standard also requires the proponent to compensate workers and affected communities or offset for risks and negative impacts generated by the project. Grievances from stakeholders and affected communities must be addressed appropriately. Key social and environmental issues that might emanate from the project activities are: workers' rights, occupational health and safety; waste water treatment; solid waste management; noise and dust. The project itself will not cause significant increase to air and water pollution as it consists of the utilization of the AMOG site that is operational, and the MGT is committed to implementing the necessary mitigation measures consistent with PS 1 as well as national regulations. In ensuring compliance to the said standards the proponent commissioned the undertaking of this ESIA study that will has led to the Environmental and Social Management Plan (ESMP) which will aid in development of or refinements in the Environmental and Social Management Framework (ESMF).

The ESMF will be developed and put in place for the construction. Operations and decommissioning phases of the project presenting (i) detailed mitigation measures to address the project impacts (including management of solid, liquid and gas wastes, marine pollution and management of traffic within and outside the project area), (ii) emergency response measures; (iii) occupational health and safety, and workers relations; (iii) a monitoring system, (iv) timeline for ESMP with specific responsibilities assigned; and (v) defined follow-up actions and reviews. To this end, Mombasa Gas Terminal Ltd. MUST sufficiently and continuously throughout the course of the project engage the community members on issues that are likely to affect them and undertake environmental due diligence.

4.13 PS2: Labour and Working Conditions

Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental1 rights of workers. For any business, the workforce is a valuable asset, and a sound worker-management relationship is a key ingredient in the sustainability of a company. Failure to establish and foster a sound worker-management relationship can undermine worker commitment and retention, and can jeopardize a project. Conversely, through a constructive worker-management relationship, and by treating the workers fairly and providing them with safe and healthy working conditions, MGT will create tangible benefits, such as enhancement of the efficiency and productivity of their operations.

Mombasa Gas Terminal Limited is required to conform to these standard and national laws regarding occupational health and safety, working conditions, management of worker

relationship (including terms of employment, workers organizations, non-discrimination and grievance mechanism for workers to express themselves in relation to terms of employment and working conditions). PS 2 thus requires MGT to give equal treatment to men and women in the workplace, and give them equal opportunities in the economic sphere. There must not be any discrimination of employees on any ground. Labour practices must be fair. Forced labour is prohibited. Child labour or exploitative labour is prohibited. All workers are entitled to fair remuneration and reasonable working conditions. They also have the right to participate in a trade union and to go on strike. There must be a grievance mechanism for workers to raise workplace concerns. MGT would be able to foster this through but not limited to the following approaches; workers unions formations, development of grievance mechanism, health and safety training programs for all employees, assessment of health and safety awareness, ensuring all workers are fit for work through a pre-employment medical examination and annual medical re-evaluations with counselling and ensuring access to adequate health care facilities for all employees

4.14 PS3: Pollution Prevention and Abatement

This standard recognizes that project and other economic activities often generate increased levels of pollution to air, water and land and endeavours to direct proponents toward avoiding or minimizing adverse impacts on human health and the environment. This may be achieved by avoiding or minimizing pollution from project activities, reducing project related greenhouse gas emissions (GHG) which threaten the public health and welfare of current and future generations, and by promoting sustainable use of resources, including water and energy.

There are a number of key areas requiring management in relation to pollution prevention for both the construction and operational phases. The construction phase involves the construction of site facilities such as mounted storage yard, access roads on site, office buildings, as well as facilities for water supply and drainage, fire-fighting facilities. The main pollution sources here would consist of mechanical noise, engineering dust, wastewater and solid waste. Pollution on ambient air by the construction activities include dust from surface levelling at the construction site, movements of trucks and other vehicles, (un)loading of construction materials, earthwork and temporary piling of spoils. Engineering dust may increase Particular Matter (PM) content in the air at certain parts within the area, and may also be transported to neighbouring areas by wind, thus affecting livelihood and working of employees of adjacent entities such as those at AMOG, Mombasa Yacht Club, General Industries Limited, Milly Glassworks etc.

MGT is committed to take proper measures to minimize such adverse impacts on ambient air. Measures to be taken during the construction period include, enclosure walls with a height of 2 meters or above around the construction site; using enclosed spaces for storing and mixing construction material such as cement and sand; covering such materials during loading and unloading, use of enclosed vehicles to transport materials, routes of transportation vehicles shall avoid residential quarters and other environmentally sensitive areas, and vehicle speed shall also be limited. In addition, exhaust gas from machinery and vehicles may increase

concentration of carbon monoxide and other pollutants in the air of certain parts of the area but this is envisaged to be of low effect on the workers as most of it will be absorb appropriately by the local environment.

Air emissions during operation include dust, NOx, carbon monoxide and hydrocarbons from vehicles. Mitigation measures include, ensuring a steady speed of vehicles within the project area and regular maintenance of vehicles.

Wastewater from the proposed project during construction period mainly includes wash water for engineering equipment and water from concrete maintenance. However their quantity is insignificant, and not considered as significant pollutants. A simplified sedimentation tank shall be built on the construction site, through which, the engineering wastewater will be collected and settled, and then be used for site sprinkling to reduce fugitive dust. Domestic wastewater (by about 100 construction workers), of which the main part is washing waste will be discharged into the existing wastewater system.

Noise sources come from engineering machinery and vehicles. Mitigation measures include, using advanced engineering equipment and technologies of low noise. This will be a principal criterion for selecting contractors. Also percussion by piling machine or pneumatic hammer will not be allowed, and working hours will be limited between 08:00 and 18:00 hours.

Solid wastes will consist of construction refuse and domestic refuse. Solid waste from the engineering process will be collected by cleaning and hygiene teams of the municipality or by a licensed waste collector and transported to a licensed solid waste disposal site.

Mombasa Gas Terminal Limited is required to consider ambient conditions and apply technically and financially feasible principles of resource efficiency and pollution prevention, as well as techniques that will avoid or minimize adverse impacts on health and the environment during the life of the project.

4.15 PS4: Community Health, Safety and Security

This standard requires the proponent to avoid or minimize risks and adverse impacts to the health, safety and security of the local community arising from the project activities. Mombasa Gas Terminal Ltd. must conform to the standard through adopting effective design layout, construction and operation of its equipment and decommissioning of the infrastructure so that they do not increase community and third party exposure to incidents and injuries. The measures that can be employed include transportation and disposal of hazardous materials safely and appropriately, reduction in air and water quality pollution.

The nearest inhabited areas of Liwatoni and Ganjoni are less than a kilometre from the proposed project site. Also there are schools in the neighbourhood including Ganjoni Primary School, Sacred Heart Primary and Secondary Schools and Valentine School. The transportation trucks the proponent is proposing to use will make use of the existing roads currently being used by the area residents. For this case, a traffic management plan both within and outside the project area is required as part of the Environment and Social Management Plan to

mitigate traffic risks to communities close to public roads used by vehicles/trucks serving the project, and workers within the project area.

In addition to the emergency preparedness and response requirements described in Performance Standard 1, MGT is also required to collaborate with the Affected Communities, local government agencies, and other relevant parties, in their preparations to respond effectively to emergency situations, especially when their participation and collaboration are necessary to respond to such emergency situations at the project site.

4.16 PS5: Land Acquisition and Involuntary Resettlement

The objective of this standard is to avoid or minimize adverse social and economic impacts from land acquisition or restrictions on land use. This means avoiding or minimizing displacement of persons, using alternative project designs and avoiding forced evictions. Other objectives are to improve or restore livelihoods and standards of living and to improve living conditions for displaced persons through providing adequate housing and security of tenure. The Standard is not applicable in the context of this project, as the land allocated to the Mombasa Gas Terminal Ltd. will not necessitate displacement of populations.

4.17 PS6: Biodiversity Conservation and Sustainable Natural Resource Management

This standard seeks to protect and conserve biodiversity, maintain the benefits from ecosystem services, and promote the sustainable management of living natural resources. Mombasa Gas Terminal Ltd. should avoid adverse impacts to priority system services that are of relevance to the affected community where it has direct management control or significant influence over them. Conservation needs must, as far as is possible, be integrated with development priorities.

The project site is in an industrial/commercial area along the Indian Ocean, and therefore PS 5 might not be much relevant but due to the presence of marine ecosystem the standard to some extend will be partially be applicable. The project intends to use a private birth at the Indian Ocean and this might affect the marine life at this particular site. However, the project site is located in an industrial area with restricted activities being permitted by KPA.

Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. For the LPG storage facility, MGT is required to sustainably manage and mitigate impacts on marine life and ecosystem services throughout the project's lifecycle through the following measures:

- The protection and conservation of marine life.
- Maintenance of the benefits from ecosystem services and
- The promotion of sustainable management of marine living and non-living natural resources through the adoption of practices that integrate conservation needs and development priorities.

4.18 PS7: Indigenous Peoples

Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded. Their languages, cultures, religions, spiritual beliefs, and institutions may also come under threat. As a consequence, Indigenous Peoples may be more vulnerable to the adverse impacts associated with project development than non-indigenous communities. This vulnerability may include loss of identity, culture, and natural resource-based livelihoods, as well as exposure to impoverishment and diseases. The project site area of influence has no identifiable Indigenous Peoples hence the PS is not applicable.

4.19 PS8: Cultural Heritage.

Performance Standard 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity. However, for the LPG storage facility, the PS is not applicable as the ESIA team did not identify any known sites of archaeological or cultural heritage value within the project site boundaries and even during construction activities there is no chance of making any chance findings.

4.20 WB Equator Principles;

The Equator Principles (EPs) is a credit risk management framework applied to determining, assessing and managing environmental and social risk in Project Finance transactions. Its main objective is to provide a minimum standard for due diligence in order to inform and support risk during decision-making.

To date, it has been adopted in 35 countries and by 79 financial institutions. These principles are applying to all industry sector projects as well as in project finance advisory services, project financing, project and bridge loans. The EPs bore the Equator Principles Financial Institutions (EPFIs), which implement the principles to ensure internal Environmental and social adherence. Without conformance to internal Environmental and social policies, standards and procedures, the EPFIs are unable to provide project financing. There are ten principles under the EP applied to all projects in a chronological manner namely; i) Review and categorisation, ii) Social and environmental assessment; iii) Applicable Social and Environmental Standards; iv) Action Plan and Management System; v) Consultation and

disclosure; vi) Grievance mechanism; vii) Independent review; viii) Covenants, ix) Independent monitoring and reporting; and EPFI reporting.

4.21 WB guidelines on pollution prevention, natural habitats, environmental assessment;

These guidelines focus on promoting sustainable development by shedding light on the importance of environmental pollution prevention and raising economic benefits through the use of cleaner production and good management techniques. The guidelines are to ensure reduction of pollution emissions from the production processes, mainly through a combination of cleaner production and end of pipe treatment. The guidelines are provided to protect human health and reduce environmental pollution

4.22 The World Bank Group's Environmental, Health and Safety (EHS) Guidelines

The World Bank's 2007 Environment, Health and Safety Guidelines are technical reference documents containing both general and industry specific examples of good international industry practices. The general EHS Guidelines cover environmental, health and safety issues that are applicable by all industry sectors. The Guidelines contain the measures and performance levels that are generally accepted by the International Finance Corporation. Where host country regulations differ from the measures and the levels contained in the EHS Guidelines, projects will be required to adopt the more stringent ones. MGT will thus adopt the World Bank Group's Environmental, Health and Safety (EHS) Guidelines and other best environmental practices.

4.23 The International Code for the Security of Ships and Of Port Facilities

This part of the International Code for the Security of Ships and Port Facilities contains mandatory provisions to which reference is made in chapter XI-2 of the International Convention for the Safety of Life at Sea, 1974 as amended.

The objectives of this Code are:

1. To establish an international framework involving cooperation between Contracting Governments, Government agencies, local administrations and the shipping and port industries to detect security threats and take preventive measures against security incidents affecting ships or port facilities used in international trade;
2. To establish the respective roles and responsibilities of the Contracting Governments, Government agencies, local administrations and the shipping and port industries, at the national and international level for ensuring maritime security;
3. To ensure the early and efficient collection and exchange of security-related information;
4. To provide a methodology for security assessments so as to have in place plans and procedures to react to changing security levels; and
5. To ensure confidence that adequate and proportionate maritime security measures are in place.

Application

This Code applies to:

The following types of ships engaged on international voyages:

1. passenger ships, including high-speed passenger craft;
2. cargo ships, including high-speed craft, of 500 gross tonnage and upwards; and
3. mobile offshore drilling units;

Port facilities serving such ships engaged on international voyages.

Notwithstanding the provisions of section 3.1.2, Contracting Governments shall decide the extent of application of this Part of the Code to those port facilities within their territory which, although used primarily by ships not engaged on international voyages, are required, occasionally, to serve ships arriving or departing on an international voyage.

The Company shall ensure that the ship security plan contains a clear statement emphasizing the master's authority. The Company shall establish in the ship security plan that the master has the overriding authority and responsibility to make decisions with respect to the safety and security of the ship and to request the assistance of the Company or of any Contracting Government as may be necessary.

The Company shall ensure that the company security officer, the master and the ship security officer are given the necessary support to fulfil their duties and responsibilities in accordance with chapter XI-2 and this Part of the Code.

4.24 Kenya Legislation, Regulations, Standards and International Conventions

The Kenyan legislation, regulations, standards and international conventions relevant to this study is presented in tables 4:1 and 4:2 below:

Table 4:1: Kenyan Legislation, Regulations, Standards and International Conventions Relevant to the Project

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
EIA REQUIREMENTS				
Physiography and Geology	The Environmental (Impact Assessment and Audit) Regulations, 2003, Regulations 18 and 45(2)(b)	The National Environment Management Authority	The ESIA Study report must include the potential environmental impacts of the project on the physiography and geology of the area, and propose mitigation measures to be taken during and after the implementation of the project. Failure to prepare an ESIA report in accordance with the Act and regulations is an offence.	The offender is liable on conviction to imprisonment for a term not exceeding two years or to a fine of not more than two million shillings, or to both. Section 138, EMCA
	The Environmental Management and Co-ordination Act, 2015 Section 42 The Environmental (Impact Assessment and Audit) Regulations, 2003 Regulations 18 and	The National Environment Management Authority	After ESIA study, the prior written approval of the Authority must be obtained in relation to a river, lake or wetland to: erect, reconstruct, place, alter, remove or demolish any structure or part of any structure in, or under it; excavate, drill, tunnel or disturb it; introduce into it any animal, whether	The offender is liable on conviction to imprisonment for a term not exceeding two years or to a fine of not more than two million shillings, or to both. Section 138, EMCA

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
	45(2)(b)		indigenous or alien; deposit in, on or under its bed any substance that would have adverse environmental effects on it; direct or block it from its natural and normal course; or drain it. The Environmental and Social Impact Assessment Study report must include the potential environmental impacts of the project on the physiography and geology of the area, and propose mitigation measures to be taken during and after the implementation of the project.	
	The Forests Act, 2005 Section 34 (2)	The Kenya Forest Service Board	Mombasa Gas Terminal Ltd. must not fell, cut, damage or remove protected trees or species or family of trees or their regeneration or aid anyone in committing such acts.	
	The Forests Act, 2005 Sections 52, 55, 63	The Kenya Forest Service Board	A license is required in order to fell, cut, take, burn, injure or remove any forest produce, or to set fire to grass or undergrowth of forest produce. The Environmental	Not less than Shs. 50,000, or imprisonment of not less than one year, or both. In addition, the court may order compensation equal to

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			Impact Assessment process applies with regard to such a license.	the determined value, or Shs. 10,000 for each offence. Sections 52, 55
	The Forests Act, 2005 Section 63	The Kenya Forest Service Board	Any disputes arising will be resolved by the National Environment Tribunal, established under the EMCA 1999.	
	The Forests Act, 2005 Section 43	The Kenya Forest Service Board	A license for a forest-based activity that is likely to result in the depletion of forest cover will include a compulsory requirement to re-vegetate on completion of the activity. Failure to so act is an offence.	Imprisonment for not less than 6 months, or a fine of not less than Shs. 100,000 or both. Section 44
Soils	The Environmental (Impact Assessment and Audit) Regulations, 2003 Regulations 17,18 and 45(2)(b)	The National Environment Management Authority	The Environmental and Social Impact Assessment Study report must include the potential environmental impacts of the project on the soils, including the vegetation cover, and indicate the mitigation measures to be taken during and after the implementation of the project. The views of the people who may be affected by the project must be	The offender is liable on conviction to imprisonment for a term not exceeding two years or to a fine of not more than two million shillings, or to both. Section 138, EMCA

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			sought. Failure to prepare an environmental impact assessment in accordance with the Act and regulations is an offence.	
	The Environmental Management and Co-ordination (Wetland, Riverbank, Lakeshore and Seashore Management) Regulations, 2009Regulation 4(h)	The National Environment Management Authority	Activities that may cause pollution and siltation in wetland areas or in other ways degrade the environment, must be prevented or controlled.	Environmental Restoration orders may be given to allow a wetland, riverbank or lakeshore that has been degraded to regenerate. Section 108, EMCA
Water Resources	The Public Health Act, Cap. 242 (Revised Edition 2012) Sections 63, 130	The Health Ministry	Mombasa Gas Terminal Ltd. must guard against pollution of the camp's water supply source, underlying aquifers and surface water from liquid effluent discharges or solid waste emanating from sanitation systems at the campsite, oil, or chemical leaks from vehicles and equipment. The disposal of waste from such sanitation systems and kitchens must be by a satisfactory system of surface irrigation or sub-irrigation in a manner that does not pollute	The relevant local authority may take legal action against any person causing water pollution. Section 129

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			water supplies or cause other forms of nuisance. There must be compliance with any rules the Cabinet Secretary may make as to the safe discharge of liquid or other material prone to pollute streams or that are likely in any way to be a nuisance or dangerous to health.	
	The Environmental Management and Coordination Act, 2015 Section 72	The National Environment Management Authority	Mombasa Gas Terminal Ltd. must comply with the water pollution control standards against discharge of noxious matter, waste or other pollutants into the aquatic environment.	Imprisonment for a term not exceeding two years, or a fine of up to one million shillings, or both. The offender must in addition, pay the cost of removing the poison, radioactive waste, etc., including restoration of the environment, as well as payment of the cost to third parties in the form of reparation, restitution, restoration or compensation. Section 72
	The Environmental Management and Coordination Act, Cap. 387 (Revised Edition	The National Environment Management	A license must be obtained from the Authority if it is intended to discharge waste into the environment. The application must	Cancellation of license for contravening any provision of the Act or failing to comply with any specified

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
	2012) Section 75(1), (2)	Authority	be made within twelve months of commencement of the project.	conditions in the license. Section 76
	The Water Act, Cap. 372 (Revised Edition 2012) Sections 25(c) and 94(1)	The Environment, Water and Natural Resources Ministry	Mombasa Gas Terminal Ltd. may not wilfully obstruct, interfere with, divert or obstruct water from any watercourse or water resource, or negligently allow such acts, or throw any dirt, effluent, or waste (e.g. oils or chemicals) or other offensive or unwholesome matter into or near any water resource in such a way as to cause or be likely to cause pollution of the water resource.	Any person who contravenes the Water Quality Regulations commits an offence and is liable to a fine not exceeding five hundred thousand shillings. Regulation 27
	The Environmental Management and Co-ordination (Water Quality) Regulations, 2006 Regulations 6(b) and 24	The National Environment Management Authority	Mombasa Gas Terminal Ltd. must obtain an environmental and social impact assessment license in order to carry out any activity near lakes, streams, springs and wells that is likely to have an adverse impact on the quality of the water.	Deliberately polluting water meant for public use is a misdemeanour under the Penal Code, Cap. 63 and the offender is liable to imprisonment for up to one year.
	The Water Resources Management Rules, 2007 Rules 81, 82, 88	The Water Resources Management	Mombasa Gas Terminal Ltd. has a duty to ensure that no toxic or obstructing matter, waste or other pollutants are discharged into any	The offender is liable on conviction to imprisonment for a term not exceeding two years or to a fine of not

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
		Authority	water resource unless the discharge has been treated to permissible levels. Discharge of effluent into a water resource requires a valid discharge permit issued by the National Environment Management Authority. The wilful and deliberate spilling into any water source or onto land where such spillage may contaminate any surface or groundwater is not permitted. Any threat of contamination must swiftly be dealt with.	more than two million shillings, or to both.
	The Environmental (Impact Assessment and Audit) Regulations, 2003 Schedule 2, Issue No. 1 (under Regulation 11)	The National Environment Management Authority	The Environmental Impact Assessment study report must include the potential environmental impacts of the project on the water sources (quantity and quality) and the drainage patterns, and indicate the mitigation measures to be taken during and after the implementation of the project. The views of the people who may be affected by the project must be sought. Failure to prepare an	Imprisonment for a term not exceeding two years or a fine of not more than two million shillings, or both. Section 138, EMCA

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			environmental impact assessment report in accordance with the Act and Regulations is an offence.	
	Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, 1991		Mombasa Gas Terminal Ltd. must endeavour to reduce waste generation to a minimum in terms of quantity and/or hazard potential. Whenever it does generate such wastes, the proponent should transport and dispose of them in a manner consistent with the protection of human health and the environment. Hazardous wastes should as far as is compatible with environmentally sound and efficient management, be disposed of where they were generated, in this case, in Kenya.	
	The Ramsar Convention on Wetlands of International Importance, Especially as Waterfowl Habitat, 1971	The National Environment Management Authority Water Resources Management	Mombasa Gas Terminal Ltd. must make every effort to conserve the wetlands and their flora and fauna.	

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
		Authority		
Ecosystems	The Wildlife (Conservation and Management) Act, No. 47 of 2013 Sections 30, 31, 89	The East African Affairs, Commerce and Tourism Ministry	The Cabinet Secretary may declare a marine or wetland area to be a protected area and restrict or prohibit activities there in order to secure the safety of the flora and fauna or to preserve the habitat and ecology within a national park, reserve or sanctuary. Anyone who acts in contravention of a notice issued in respect of a protected area commits an offence Mombasa Gas Terminal Ltd. should, as a matter of course, minimise carrying out its activities close to these areas so as to avoid disturbance of wildlife as a result of noise generated by its vehicles, machinery and equipment during the course of the project, and the introduction of weeds and pests among the flora. In addition, it must not discharge of hazardous substances, waste or oil into a designated wildlife area, or pollute wildlife habitats and ecosystems, or discharge into a designated	A fine of not less than two million shillings or to imprisonment for a term of not less than five years or to both. The offender may also be required to clean up and pay the full cost of cleaning up the polluted wildlife habitat(s) and ecosystem(s). Section 89

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			wildlife conservation area any pollutant detrimental to wildlife.	
	The Environmental Management and Co-ordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit-Sharing) Regulations, 2006 Regulation 4	The National Environment Management Authority	Mombasa Gas Terminal Ltd. must not engage in any activity that may have an adverse impact on any ecosystem; lead to the introduction of any exotic species; or lead to unsustainable use of natural resources.	Any person convicted of an offence under the Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit-Sharing Regulations is liable to imprisonment for up to eighteen months, or to a fine not exceeding three hundred and fifty thousand shillings, or both. Regulation 24
	The Environmental (Impact Assessment and Audit) Regulations, 2003 Schedule 2, Issue No. 1 (under Regulation 11)	The National Environment Management Authority	The Environmental Impact Assessment study report must include the potential environmental impacts of the project on the area's ecology, incorporating the biological diversity including the effect of the project on the number, diversity, breeding habits, etc., of wild animals and vegetation, and the	The offender is liable on conviction to imprisonment for a term not exceeding two years or to a fine of not more than two million shillings, or to both. Section 138, EMCA

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			gene pool of domesticated plants and animals, and indicate the mitigation measures to be taken during and after the implementation of the project. The views of the people who may be affected by the project must be sought.	
Public Safety and Security	The Environmental (Impact Assessment and Audit) Regulations, 2003 Regulation 7(h)	The National Environment Management Authority	The Environmental Impact Assessment study report must include a plan to ensure the health and safety of the neighbouring communities. Failure to prepare an environmental impact assessment in accordance with the Act and Regulations is an offence.	The offender is liable on conviction to imprisonment for a term not exceeding two years or to a fine of not more than two million shillings, or to both. Section 138 , EMCA
Occupational Health and Safety	The Explosives Act, Cap. 115 (Revised Edition 2012) Sections 6, 7, 11, 13 The Explosives (Blasting Explosives) Rules 78 - 80	The Labour, Social Security and Services Ministry	Mombasa Gas Terminal Ltd. must obtain a license if it intends to purchase and use blasting materials or convey explosives. The use or transport of explosives, in the working of the project is forbidden, unless an explosives manager has been appointed and the inspector notified in writing. The explosives manager is responsible for the	A fine not exceeding three thousand shillings, and in default of payment, imprisonment for a term not exceeding one year. Section 12

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			safety and security of all explosives used, transported or stored, until they are handed to the blaster for use. The explosives manager is also responsible for the safety of every person who is working with explosives or in the vicinity of where explosives are being used, whether under his direct supervision or not.	
	The Energy Act, No. 12 of 2006 (Revised Edition 2012) Sections 95(1), 98 and 117	The Energy Regulatory Commission	Mombasa Gas Terminal Ltd. must comply with the Kenyan or other approved standards on environment, health and safety, and in conformity with the relevant laws. It must notify the Energy Commission of any accident or incident causing loss of life or personal injury, explosion, oil spill, fire or any other accident or incident causing significant harm or damage to property or to the environment.	None specified. A general penalty applies - a fine not exceeding one million shillings. Section 122
	The Occupational Safety and Health Act, No. 15 of 2007 (Revised Edition	The Labour, Social Security	Mombasa Gas Terminal Ltd. has a duty to ensure the safety, health and welfare of all its workers at	A fine not exceeding three hundred thousand shillings or imprisonment for a term

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
	2012) Sections 6, 55, 77- 83, 89, 101	and Services	work at the site, including work procedures that are safe. Visitors to the work site should be similarly protected. The likely emission of poisonous, harmful, or offensive substances such as chemicals or vehicle fumes into the atmosphere should be prevented, and where they occur, they must be rendered harmless and inoffensive. Machinery, protective gear, and tools used at the project site have to comply with the prescribed safety and health standards. Dust, fumes or impurities may cause respiratory problems and must not be allowed to enter the atmosphere without appropriate treatment to prevent air pollution or harm of any kind to life and property. Highly inflammable substances must be kept in a safe place outside any occupied building. Where dangerous fumes are liable to be present, Mombasa Gas Terminal Ltd. must provide a means of exit and suitable breathing apparatus. Means for	not exceeding three months, or both. If contravention continues after conviction, the offender will be liable to a fine not exceeding ten thousand shillings for each day on which the contravention is continued. The court may in addition or instead of a penalty order remedy of the contravention. Sections 109, 110

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			extinguishing fire must be available and easily accessible, and evacuation procedures must be tested regularly.	
	The Environmental (Impact Assessment and Audit) Regulations, 2003 Regulations 7(h) and 18(1)(m)	The National Environment Management Authority	The Environmental Impact Assessment study report must include a plan to ensure the health and safety of the workers. Failure to prepare an environmental impact assessment in accordance with the Act and Regulations is an offence.	The offender is liable on conviction to imprisonment for a term not exceeding two years or to a fine of not more than two million shillings, or to both. Section 138, EMCA
Land Resources	The Land Act, 2012 Section 11(1), (2) The Convention on Biological Diversity, Rio de Janeiro, 1992	The National Land Commission	The National Land Commission is mandated to take appropriate action to maintain land that has endangered or endemic species of flora and fauna, critical habitats or protected areas. The Commission is required to identify ecologically sensitive areas that are within public lands, and demarcate or take any action on those areas to prevent environmental degradation and climate change. Mombasa Gas Terminal Ltd. must minimise activities that would degrade the	

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			environment and cause climate change.	
	The Environmental Management and Co-ordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit-Sharing) Regulations, 2006 Regulation 9(1)	The National Environment Management Authority	Anyone who intends to access genetic resources must apply to the Authority for an access license, and thereafter comply with the conditions imposed on the license or those implied under the Regulations, or of the agreements made in relation to its grant. Contravention or failure to comply with any of the matters provided in the Regulations will constitute an offence	Suspension, cancellation or revocation of the license. Imprisonment for a term not exceeding eighteen months, or to a fine not exceeding three hundred and fifty thousand shillings, or both. Regulation 24
Visual Aesthetics	The Environmental (Impact Assessment and Audit) Regulations, 2003 Schedule 2, Issue No. 3 (under Regulation 11); Regulation 17	The National Environment Management Authority	The Environmental Impact Assessment study report must include the potential environmental impacts of the project on the landscape, including the views opened up or closed, visual impacts (features, removal of vegetation, etc.), compatibility with the surroundings, and amenities opened up or closed (e.g., recreation possibilities) and	The offender is liable on conviction to imprisonment for a term not exceeding two years or to a fine of not more than two million shillings, or to both. Section 138, EMCA

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			indicate the mitigation measures to be taken during and after the implementation of the project. The views of the people who may be affected by the project must be sought. Failure to prepare an environmental impact assessment in accordance with the Act and Regulations is an offence.	
Noise and Vibrations	The Environmental Management and Coordination Act 2015, Sections 101-103	The National Environment Management Authority	Emitting noise in excess of the noise emissions standards is an offence. However, the Authority may on request grant a temporary license allowing emission of noise in excess of the established standards for activities such as demolitions and specific heavy industry on specified terms and conditions. Where exemption is granted, workers exposed to the excessive noise levels must be adequately protected as directed by the Authority.	Imprisonment for a term of not more than eighteen months, or a fine of not more than three hundred and fifty thousand shillings, or both. Section 144
	The Environmental Management and Co-ordination (Noise and		Mombasa Gas Terminal Ltd. must not exceed the laid-down permissible noise levels unless the	Making loud noises so as to annoy a considerable number of people amounts

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
	Excessive Vibration Pollution) (Control) Regulations,2009 Regulations 3-6, 11, 12		noise is reasonably necessary to preserve life, health, safety or property. The use of machinery, generators and vehicles, and activities and operations which are likely to emit noise or excessive vibrations must be carried out within the prescribed levels as set out in Schedules 1 – 3 of the Regulations, unless the noise is reasonably necessary to preserve life, health, safety or property.	to a common nuisance under the Penal Code, Cap. 63, and the offender is liable to imprisonment for up to one year.
	The Explosives Act, Cap. 115 (Revised Edition 2012) Sections 6, 7, 11, 13	The Ministry of Mining	Addressed under Occupational Health and Safety above, but also applicable to Noise and Vibrations	A fine not exceeding three thousand shillings, and in default of payment, imprisonment for a term not exceeding one year. Section 12
Offensive Odours	The Environmental Management and Coordination Act, 2015 Sections 78, 80, 82	The National Environment Management Authority	Mombasa Gas Terminal Ltd. must comply with the emission standards in the Act so as to ensure that substances which cause pollution are not emitted during the course of the project. Its motor vehicles should be operated in a manner that will not cause air pollution,	An imprisonment term not exceeding two years, or a fine not exceeding five hundred thousand shillings, or both. The offender must in addition, pay the cost of removing the pollution and the cost to third parties in

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			and it must ensure that its machinery, equipment and appliances do not cause emissions in contravention of the prescribed standards.	the form of reparation, restitution, restoration or compensation. Section 78(2)
	The Environmental Management and Coordination Act, 2015. Sections 78, 80, 82	The National Environment Management Authority	Mombasa Gas Terminal Ltd. must apply to the Authority for a license in respect of activities that will emit substances or energy causing or likely to cause air pollution. Any conditions specified in the license must be complied with.	Cancellation of license.
	The Environmental Management and Coordination Act, 2015 Sections 78, 80, 82	Mombasa County Government	Mombasa Gas Terminal Ltd. must comply with any rules or regulations that the relevant County Executive Member(s) may make as to the safe discharge of any liquid or other material prone to cause offensive smells. The proponent must also abide by any conditions the County Executive Member(s) may lay down, under which an activity producing smoke, fumes, chemicals, gases or dust (e.g. from the use of motor vehicles, machinery, equipment or	Deliberately fouling the air is a misdemeanour under the Penal Code, Cap. 63 and the offender is liable to imprisonment for up to one year.

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			other devices) that may cause a danger to people in the vicinity, may be carried out. A license may be cancelled or denied if the method adopted or proposed to prevent noxious or offensive vapours, gases or smells arising from the activity are not effective.	
	The Environmental Management Co-ordination (Fossil Fuel Emission Control) Regulations, 2006 Regulation 4	The National Environment Management Authority	Internal combustion engines are subject to inspection and must pass tests to show that they comply with the standards and requirements for the control of air pollution or contamination. It is an offence to operate an internal combustion engine which emits smoke or other pollutant in excess of the emission standards. Mombasa Gas Terminal Ltd. must ensure that power generators and associated machinery and vehicles do not emit toxic carbon gases and particulate matter. The polluter must bear the cost of clearing the pollution generated through fuel emission.	It is an offence to contravene these Regulations, and the offender, if convicted, is liable to a maximum fine of three hundred and fifty thousand shillings or to imprisonment for a term not exceeding eighteen months, or to both. Section 144, EMCA

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
	The Environmental (Impact Assessment and Audit) Regulations, 2003 Sections 17, 18	The National Environment Management Authority	The Environmental Impact Assessment study report must include the potential environmental impacts of the project on the ambient quality of the air, and the mitigation measures to be taken during and after the implementation of the project. The views of the people who may be affected by the project must be sought. Failure to prepare an environmental impact assessment in accordance with the Act and Regulations is an offence.	The offender is liable on conviction to imprisonment for a term not exceeding two years or to a fine of not more than two million shillings, or to both. Section 138, EMCA
	The Kyoto Protocol to the United Nations Framework Convention on Climate Change, Kyoto, 1997		Mombasa Gas Terminal Ltd. must show that they are consistently taking steps to control/reduce greenhouse gas emissions.	
Solid and Liquid Wastes	The Public Health Act, Cap. 242 (Revised Edition 2012) Section 126(e)	The Health Ministry	Mombasa Gas Terminal Ltd. must comply with any rules the Cabinet Secretary may make as to the standard(s) of purity of any liquid which may be discharged as effluent after treatment.	A fine not exceeding fifty thousand shillings, or imprisonment for a term not exceeding six months, or both; and if the offence is of a continuing nature, to a further fine not exceeding

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
				one thousand shillings for each day it continues. Section 164
	The Physical Planning Act, Cap. 286 (Revised Edition 2009) Section 36	The Land, Housing and Urban Development Ministry	If a local authority is of the opinion that the proposed project, any dump site, sewerage treatment plant or other development activity that Mombasa Gas Terminal Ltd. intends to carry on will impact on the environment adversely, the proponent will be required to submit an environmental impact assessment report for consideration by the Physical Planning Liaison Committee which determines development applications.	A fine not exceeding one hundred thousand shillings or imprisonment for a term not exceeding five years or both. Section 30(2)
	The Environmental Management and Coordination Act, 2015	The National Environment Management Authority	Mombasa Gas Terminal Ltd. must ensure that it discharges or disposes of waste in a manner that will not cause pollution to the environment or ill health to any person. A license must be obtained from the Authority in order to: transport waste; dispose of the waste to a waste disposal site (set up in accordance with the license	Imprisonment for not more than two years or a fine not exceeding one million shillings, or both. Section 87(5)

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			issued); or operate a wastes disposal site. The proponent must employ measures essential to minimize wastes by treating, reclaiming or recycling such waste.	
	The Environmental Management and Coordination Act, 2015 Section 91(3), (4) and (5)	The National Environment Management Authority	Hazardous wastes may not be transported, imported or exported without a valid license issued by the Authority.	Imprisonment for not less than two years or a fine of not less than one million shillings or both. Offender responsible for the removal of the waste from Kenya and for its safe disposal. Section 91(6), (7)
	The Environmental Management and Coordination Act, 2015 Section 93(1), (2)	The National Environment Management Authority	Mombasa Gas Terminal Ltd. must not discharge any hazardous substance, chemical, oil or mixture containing oil into any segment of the environment.	In addition to any other sentence imposed by the court, payment of the cost of removing the hazardous substance, chemical, oil or mixture containing oil, including restoration of the environment, as well as payment of the cost to third parties in the form of reparation, restitution, restoration or

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
				compensation. Section 93(3)
	The Environmental Management and Coordination Act, 2015 Section 93(4)	The National Environment Management Authority	Mombasa Gas Terminal Ltd. is required to mitigate any discharge from its storage facility/ies, motor vehicle(s) or vessel(s) by: giving immediate notice to the Authority and other relevant Government officers of the occurrence of such discharge contrary to the Act; immediately beginning clean-up operations using the best available clean-up methods; and by complying with any directions that the Authority may prescribe.	Seizure of the storage facility/ies, motor vehicle(s) or vessel(s). Where the operator fails to take the mitigation measures within a reasonable time (not more than six months), the Authority may, upon a court order, dispose of the storage facility/ies, motor vehicle(s) or vessel(s) to meet the costs of taking the necessary remedial and restoration measures. Section 93(5), (6)
	The Environmental Management and Co-ordination (Waste Management) Regulations, 2006 - Parts II and III; Schedule 3	The National Environment Management Authority	Mombasa Gas Terminal Ltd. must obtain an Environmental Impact Assessment license if it intends to engage in any activity likely to generate hazardous waste. Toxic or hazardous waste generated must be treated and disposed of	Imprisonment not exceeding two years, or a fine not exceeding one million shillings, or both. Section 141, EMCA

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			according to the laid-down guidelines (Schedule 3 of the Regulations). Waste generated must be minimized by adopting cleaner production methods. The waste product can also be reused and recycled. The proponent is required to mitigate pollution by installing at its premises anti-pollution equipment for treating the waste it generates.	
	Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, Bamako, 1991,		Mombasa Gas Terminal Ltd. must endeavour to reduce waste generation to a minimum in terms of quantity and/or hazard potential. Whenever it does generate such wastes, Mombasa Gas Terminal Ltd. should transport and dispose of them in a manner consistent with the protection of human health and the environment. Hazardous wastes should as far as is compatible with environmentally sound and efficient management, be disposed of where they were generated, in	

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			this case, in Kenya.	
	The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, Basel, 1989		Appropriate legal, administrative and other measures must be taken within the area under the project's jurisdiction to prohibit the import of all hazardous wastes. A licence is required for trans-boundary movement of waste, and to export or transit waste. It is an offence to violate the provisions of the Regulations.	
	The Environmental (Impact Assessment and Audit) Regulations, 2003 Regulations 7(1)(e) and (f); and 17	The National Environment Management Authority	The Environmental Impact Assessment study report must include the potential environmental impacts of the project's methods of waste discharge and disposal into the environment, and indicate the mitigation measures to be taken during and after the implementation of the project. The views of the people who may be affected by the project must be sought. Failure to prepare an environmental impact assessment in accordance with the Act and	The offender is liable on conviction to imprisonment for a term not exceeding two years or to a fine of not more than two million shillings, or to both. Section 138, EMCA

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			Regulations is an offence.	
Archaeological and Natural Heritage Sites	The National Museums and Heritage Act, No. 6 of 2006 Section 34	The Ministry of Sports, Culture and the Arts	The Cabinet Secretary may prohibit or restrict access or any development on an open space or on a specified site on which a buried monument or object of archaeological or paleontological interest exists, if, in his/her opinion, it is liable to damage that monument or object. The restriction may include the adjacent area, or a geo-park. A breach of a prohibition or restriction order or a breach of any law made by the Cabinet Secretary in respect of protected areas amounts to an offence. Mombasa Gas Terminal Ltd. should avoid the use of heavy vehicles and machinery in or close to these areas as they may damage the archaeological, historical or cultural sites.	A fine not exceeding one million shillings or imprisonment for a term not exceeding twelve months, or to both. Section 36
	The Convention Concerning the Protection of the World		Mombasa Gas Terminal Ltd. must endeavour to protect cultural and natural heritage from the adverse	

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
	Cultural and Natural Heritage, Paris, 1972		effects that its activities may engender.	
Natural Resource Management and Land Use	The Constitution of Kenya, 2010 Article 69(2)	The State	Mombasa Gas Terminal Ltd. is expected to co-operate with the State organs and other people to protect and conserve the environment and ensure that the use and development of the natural resources are ecologically sustainable.	Environmental rights are enforceable in the Land and Environment Court. Regulation 70
	The Land Act, 2012 Section 19(1), (2)	The National Land Commission	Mombasa Gas Terminal Ltd. must comply with any rules or regulations the Commission may make for sustainably conserving land-based natural resources. Regulations made may include: measures to protect critical ecosystems and habitats; incentives for communities and individuals to invest in natural resource conservation programmes that generate income; measures to facilitate the access, use and co-management of forests, water and other resources by communities who hold customary rights to	Disputes arising from matters provided for under this law may be referred to the Land and Environment Court which has exclusive jurisdiction to handle them. Section 150

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			them; procedures on involving stakeholders in managing and utilizing land-based natural resources; and measures to ensure benefit-sharing for the affected communities.	
	The Environmental (Impact Assessment and Audit) Regulations, 2003 Regulations 17, 18	The National Environment Management Authority	The Environmental Impact Assessment study report must include the potential environmental impacts of the project on the current and surrounding land use and land use potentials, and indicate the mitigation measures to be taken during and after the implementation of the project. The views and participation of stakeholders and the local community who may be affected by the project must be sought. Failure to prepare an environmental impact assessment in accordance with the Act and regulations is an offence.	Imprisonment for a term not exceeding two years or a fine of not more than two million shillings, to both.
	The Water Act, Cap. 372	The Water Resources	Water is vested in the State subject to rights of user that may	

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
	(Revised Edition 2012)	Management Authority	be granted under the law. Mombasa Gas Terminal Ltd. must strictly abide by any state scheme that may be formulated for the use for any public purpose (e.g. the distribution, apportionment or measurement of water) of the whole or part of a water resource. This would include community water projects.	
	African Convention on the Conservation of Natural Resources (Revised Version) Maputo, 2003 IFC Performance Standard 6		The proponent must endeavour to meet developmental and environmental needs in a sustainable, fair and equitable manner.	
Community Health, Safety and Security	The Constitution of Kenya, 2010 Article 43(1)(a)	The State	Everyone has the right to a high standard of health and health care services. Mombasa Gas Terminal Ltd. must seek to avoid adverse impacts on the health and safety of the affected community (including workers, contractors and visitors to the site) that may arise as a result	

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			of noise during excavation, and use of machinery, vehicles, generators and other equipment, or air pollution arising from substances such as dust, fumes and fumes during the life of the project in work and non-work related situations.	
	IFC Performance Standard 3		Mombasa Gas Terminal Ltd. must seek to avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities, reduce project related GHG emissions and promote sustainable use of resources, including water and energy.	
	The Environmental Management and Coordination Act, 2015. Sections 102, 103	The National Environment Management Authority	Emitting noise in excess of the noise emissions standards (subject to the Civil Aviation Act) is an offence. However, the Authority may on request grant a temporary license allowing emission of noise in excess of the established standards for activities such as demolitions and specific heavy industry on specified terms and	Imprisonment for a term of not more than twenty-four months, or a fine of not more than three five hundred thousand shillings, or both. Section 140

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			conditions. Where exemption is granted, workers exposed to the excessive noise levels must be adequately protected as directed by the Authority.	
	The Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Regulations 3, 4, 5, 6(1), 11 and 12(1), (2)	The National Environment Management Authority	Mombasa Gas Terminal Ltd. must not exceed the laid-down permissible noise levels unless the noise is reasonably necessary to preserve life, health, safety or property. The use of generators and vehicles, and activities which are likely to emit noise or excessive vibrations must be carried out within the prescribed levels as set out in Schedules 1 – 3 of the Regulations, unless the noise is reasonably necessary to preserve life, health, safety or property.	Making loud noises so as to annoy a considerable number of people amounts to a common nuisance under the Penal Code, Cap. 63, and the offender is liable to imprisonment for up to one year.
	The Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Regulation 15	The National Environment Management Authority	During the environmental impact assessment studies, Mombasa Gas Terminal Ltd. must identify natural resources, land uses or activities that may be affected by noise or excessive vibrations from the project activities; determine the measures which are needed in the plans and specifications to	A fine not exceeding three hundred and fifty thousand shillings or imprisonment for a term not exceeding eighteen months, or both. Regulation 28

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			minimize or eliminate adverse noise or vibration impacts; and incorporate the needed abatement measures in the plans and specifications.	
	IFC Performance Standard 4		It is the Mombasa Gas Terminal Ltd. responsibility to avoid or minimize risks and adverse impacts to the health and safety of the local community arising from the project activities.	
Economic and Social Rights	The Constitution of Kenya, 2010 Article 43	The State	Everyone has the right to: a high standard of health and health care services; accessible and adequate housing and reasonable standards of sanitation; adequate food of acceptable quality; clean and safe water in sufficient quantities; social security and education. Mombasa Gas Terminal Ltd. can support the government's efforts in enforcing these rights by incorporating some of them in its local CSR plans.	
	The International Covenant on Economic, Social and Cultural		The proponent should support Kenya's programmes toward the granting of economic, social, and	

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
	Rights (ICESCR)		cultural rights to individuals, including labour rights and the right to health, the right to education, and the right to an adequate standard of living.	
	IFC Performance Standard 1		Mombasa Gas Terminal Ltd. must compensate workers and affected communities or offset for risks and negative impacts generated by the project. Grievances from stakeholders and affected communities must be addressed appropriately. Mombasa Gas Terminal Ltd. must sufficiently and continuously throughout the course of the project engage the affected community on issues that are likely to affect them.	
Labour/ Employment	The Constitution of Kenya, 2010 Articles 27(1) -(5), 30, 32(3) and 41(1) -(2)(a) The Labour Relations Act, 2007 Sections 5, 76 IFC Performance Standard 2	The State The Labour Ministry	Mombasa Gas Terminal Ltd. must ensure that men and women in their employ are treated equally in the workplace, given equal opportunities in the economic sphere. There must not be any discrimination on any ground. Forced labour is prohibited. Labour practices must be fair. Workers must be given fair remuneration;	For a trade union, employers' organisation or federation – a fine not exceeding forty thousand shillings. Section 82

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			they are entitled to reasonable working conditions and have the right to participate in a trade union and go on strike. There must be a grievance mechanism for workers to raise workplace concerns. Children must not be engaged in hazardous or exploitative labour.	
	The Occupational Safety and Health Act, 2007 Sections 55, 65, 77-80, 82, 83, 89, 101, 102	The Labour Ministry	Mombasa Gas Terminal Ltd. has a duty to ensure the safety, health and welfare of all its workers at work at the site and in the field environment, including work procedures that are safe. Visitors to the work sites should be similarly protected. The likely emission of poisonous, harmful, or offensive substances such as chemicals or fumes into the atmosphere (e.g. arising from the use or movement of machinery or vehicles) should be prevented, and where they occur, they must be rendered harmless and inoffensive. Machinery, protective gear, and tools used at the project site have to comply with the prescribed	

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			safety and health standards. Dust, fumes or impurities may cause respiratory problems and must not be allowed to enter the atmosphere without appropriate treatment to prevent air pollution or harm of any kind to life and property. Highly inflammable substances must be kept in a safe place outside any occupied building. Where dangerous fumes are liable to be present, Mombasa Gas Terminal Ltd. must provide a means of exit and suitable breathing apparatus. Means for extinguishing fire must be available and easily accessible, and evacuation procedures must be tested regularly.	
	The Work Injury Benefits Act, 2007	Directorate of Work Injury Benefits	Employees who sustain work-related injuries and contract diseases in the course of their employment must be compensated.	
	The Explosives Act, Cap. 115 Section 8	The Environment and Natural Resources	Mombasa Gas Terminal Ltd. must obtain a license if it intends to purchase and use blasting materials or convey explosives.	A fine not is exceeding three thousand shillings, and in default of payment, imprisonment for a term not

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
		Ministry	The use or transport of explosives, in the working of the project is forbidden, unless an explosives manager has been appointed and the inspector notified in writing. The explosives manager is responsible for the safety and security of all explosives used, transported or stored, until they are handed to the blaster for use. The explosives manager is also responsible for the safety of every person who is working with explosives or in the vicinity of the locality where explosives are being used, whether under his direct supervision or not.	exceeding one year. Section 8
	The Energy Act, No. 12 of 2006 Section 117	The Energy Regulatory Commission	Mombasa Gas Terminal Ltd. must comply with the Kenyan or other approved standards on environment, health and safety, and in conformity with the relevant laws. It must notify the Energy Commission of any accident or incident causing loss of life or personal injury, explosion, oil spill, fire or any other accident or incident causing significant harm or	A general penalty applies - a fine not exceeding one million shillings. Section 122

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
			damage to property or to the environment. All Mombasa Gas Terminal's equipment must conform to the relevant Kenya Standard, and where that does not exist, the relevant international standards approved by the Kenya Bureau of Standards will apply.	
	International Labour Organisation (ILO) Conventions		Freedom of association and the effective recognition of the right to collective bargaining; the elimination of all forms of forced or compulsory labour; the effective abolition of child labour; and the elimination of discrimination in respect of employment and occupation are considered as fundamental principles and rights at work. Mombasa Gas Terminal Ltd. should abide by these principles.	
Culture and Natural Heritage	The Constitution of Kenya, 2010 Article 44	The State	All people have the right to participate in their cultural life and to enjoy their culture. Mombasa Gas Terminal Ltd. should endeavour not to interfere with these rights in any way, but rather respect them.	

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
	The National Museums and Heritage Act, Cap. 216 Section 25	The Ministry for National Heritage and Culture	The Cabinet Secretary may prohibit or restrict access or any development on an open space or on a specified site on which a buried monument or object of archaeological or paleontological interest exists, if, in his/her opinion, it is liable to damage that monument or object. The restriction may include the adjacent area, or a geo-park. A breach of a prohibition or restriction order or a breach of any law made by the Cabinet Secretary in respect of protected areas amounts to an offence. Mombasa Gas Terminal Ltd. should avoid the use of heavy vehicles and machinery in or close to these areas as they may damage the archaeological, historical or cultural sites.	A fine not exceeding one million shillings or imprisonment for a term not exceeding twelve months, or to both. Section 36
	The Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris, 1972		Mombasa Gas Terminal Ltd. has the responsibility to protect the host country's cultural and natural heritage of outstanding universal value.	
Minorities and	The Constitution of	The State	Affirmative action programmes are	

Environmental or Social Parameter	Legislation/Regulations/ International Conventions	Regulatory Agency	Relevance to Project	**Offences and Penalties**
Marginalized Groups	Kenya, 2010 Article 56		required to ensure that minorities and marginalized people participate and are represented in all areas of life; are given special opportunities in educational and economic fields, and access to employment; develop their cultural values and practices and have reasonable access to water, health services and infrastructure. These are areas where Mombasa Gas Terminal Ltd. may be engaged in partnership with the government with regard to its CSR policy.	

4.25 International Conventions

The Kenya Constitution provides that the general rules of international law shall form part of the laws of Kenya, as shall any treaty or convention that she ratifies (Article 2). Kenya has ratified or subscribed to a number of international conventions that relate to the environment within her borders.

Table 4:2: International conventions that Kenya has ratified

	Convention	Entry into force	Date of ratification
1.	African Convention for the Conservation of Nature and Natural Resources, Algiers, 1968 Parties must conserve their natural resources – soil, water, flora and fauna – ensuring that they are used and scientifically developed in a manner that will benefit their people.	16 June, 1969	12 May, 1969 (accession)
2.	African Convention on the Conservation of Natural Resources (Revised Version) Maputo, 2003 Parties must ensure that developmental and environmental needs are met in a sustainable, fair and equitable manner.	11 July, 2003	17 December, 2003 (signature)
3.	Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Ramsar, 1971. It provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.	21 December, 1975	5 October, 1990
4.	Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris, 1972. It establishes a system of collective protection of cultural and natural heritage of outstanding universal value.	17 December, 1975	1 July, 1983
5.	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington, 1973. It aims at ensuring that international trade in specimens of wild animals and plants does not threaten their survival.	1 July, 1975	13 March, 1979
6.	Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979. It aims to protect those species of wild animals that migrate across or outside of national boundaries. Parties must protect them, conserve and restore their habitat, mitigate obstacles to migration and control	1 November, 1983	1 May, 1999

	Convention	Entry into force	Date of ratification
	other factors that might endanger them.		
7.	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, Basel, 1989. It aims at protecting human health and the environment against the adverse effects resulting from the generation, management, transboundary movements and disposal of hazardous wastes.	5 May, 1992	2000 (accession)
8.	Amendments to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, Geneva, 1995. The amendment prohibits exports of hazardous wastes destined for final disposal or recycling purposes from Annex VII countries to non-Annex VII countries (Annex VII not yet in force).	5 May, 1992	9 September, 2009 (acceptance)
9.	United Nations Framework Convention on Climatic Change, New York, 1992. It sets an overall framework for intergovernmental efforts to tackle the challenge posed by climatic change, recognizing that the climate system can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases.	21 March, 1994	30 August, 1994
10.	Kyoto Protocol to the United Nations Framework Convention on Climate Change, Kyoto, 1997. It sets binding targets for 37 industrialized countries and the European Community as well as for countries undergoing the process of transition to a market economy in order to reduce greenhouse gas emissions.	16 February, 2005	2005 (accession)
11.	Convention on Biological Diversity, Rio de Janeiro, 1992 It aims at granting the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the use of genetic resources.	29 December, 1993	27 June, 1994
12.	Stockholm Convention on Persistent Organic Pollutants, Stockholm, 2001. It protects human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife. It requires Parties to take measures to eliminate or reduce the release of persistent organic	17 May, 2001	24 September, 2004

	Convention	Entry into force	Date of ratification
	pollutants into the environment.		
13.	Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, Bamako, 1991 It binds Parties to take appropriate legal, administrative and other measures within the area under their jurisdiction to prohibit the import of all hazardous wastes, for any reason, into Africa from non-Contracting Parties.	22 April, 1998	17 December, 2003 (signature)
14.	United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, 1994 It seeks to combat desertification and mitigate the effects of drought through national action programmes and is based on the principles of participation, partnership and decentralization – for good governance and sustainable development.	26 December, 1996	24 June, 1997
15.	Convention of the African Energy Commission, 2001 It aims to ensure, co-ordinate and harmonise the protection, preservation, development and the national exploitation, marketing and integration of Africa's energy resources.	13 December, 2006	29 December, 2006
16.	Convention for the Protection of the World Cultural and Natural Heritage, 1972 It seeks to have nations co-operate to protect world heritage that is of such outstanding universal value that it is vital to preserve it for future generations.	17 December, 1975	5 June, 1991

5. PROJECT SITE BASELINE INFORMATION

5.1 INTRODUCTION

This chapter provides details of the desktop studies and baseline field survey based on the methods outlined in Chapter 3.

5.2 Physical environment

5.2.1 Geology

Generally, the geological setting of the Kenyan coastal zone is characterized by outcrops of Permian-Carboniferous age that about, to the east, the metamorphic rocks of the Mozambique Belt, and to the east, sedimentary rocks of Triassic age. Further east and to the northern border of the coastline, sediments of Tertiary to Quaternary age overlie these older rocks. The project area lies in a passive continental margin that evolved from faulting and subsequent rifting during the breakup of Gondwanaland in the Mesozoic era (Pepper & Everhart 1963).

Jurassic shales and limestones of marine origin known as the Kambe formation are unconformably overlain by the Permo-Triassic sediments. The tectonic history of the Cainozoic in the coastal area is characterized by extensive erosion and faulting removing the older Cretaceous deposits. The rocks present within the project area display the tectonic history and sedimentary origin from the Permo-Triassic age.

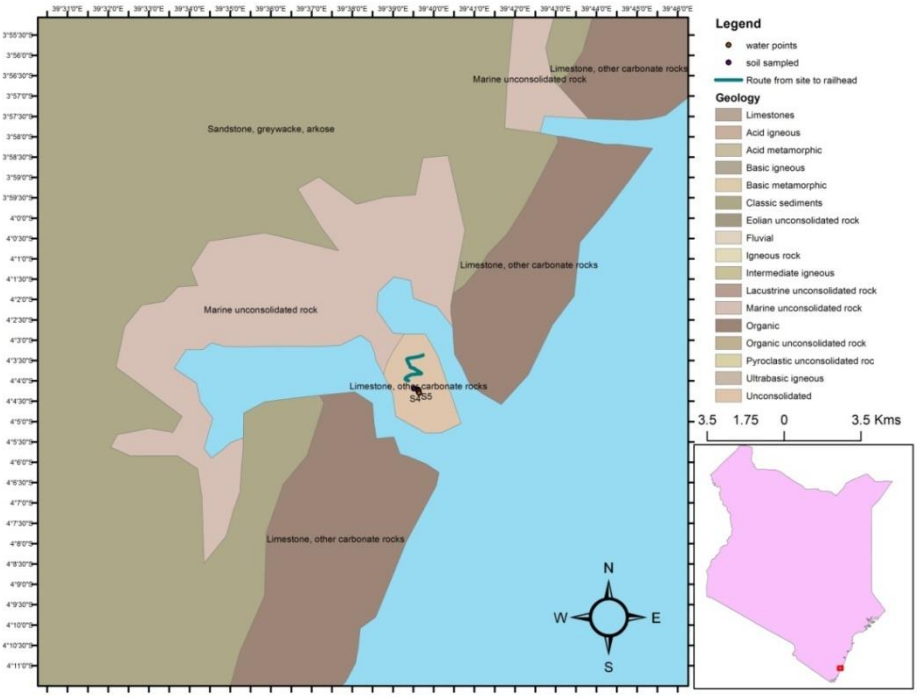


Figure 3: Geology of the area under study

5.2.2 Soil

The proposed LPG terminal site falls under Reef coastal plains (Pc8/Pc9) and the area is surrounded by similar soil unit and Coastal Uplands (Uc2). The soils are quite sodic; therefore, the soil structure is usually pulverized during the dry season and susceptible to windborne erosion. Working with heavy machinery during the wet season will require a lot of precaution due to the stickiness and plasticity of the soils. The soils have high to moderate fertility.

The identification of soils is based on the presence of diagnostic horizons and diagnostic properties which are defined by measurable morphological, physical and chemical criteria related to soil characteristics that are the result of soil genesis/formation. The soil units as recognized by FAO-UNESCO legend is presented below (Sombroek et al. 1982). Figure 5.2 presents the soil mapping units of the project area.

5.2.2.1 Soil Sample Analysis

There were six soil samples collected on the project site. This was accomplished by use of a shovel and a scoop. The sampling comprised of surface/ top soil only to a depth of 30cm. The samples were composite and accurate representative samples were collected with this procedure and the same taken for laboratory analysis by Kenya Agricultural and Livestock Research Organization in Nairobi.

From the laboratory analysis the six samples were mainly of medium alkalinity in their Soil PH with the minimum and maximum levels being at 7.92 and 8.40 respectively. The samples had adequate Electrical Conductivity (mS/cm) potential of between 0.20 mS/cm and 0.33 mS/cm and with all the samples exhibiting low Total Nitrogen ranging from 0.05% to 0.15%. The Total Organic Carbon for the samples was low and moderate for four and two samples respectively. For Phosphorus determination under the Phosphorus (Olsen) ppm method testing all the six samples showed low Phosphorus content ranging from 0.1ppm to 1 ppm. Potassium results showed low and moderate levels- four samples showing low and two indicating moderate levels. Magnesium content was either adequate or high with four of the samples indicating adequate levels (1.89-2.83) and two high levels (4.30). As a true reflection of the parent material for the soil formation all the samples showed high Calcium content of between 35.7-38.8. For the rest of the elements analyzed that included Manganese, Copper, Iron, Zinc and Sodium the results were adequate as indicated in the report.

Mapping Unit	Description
Uc2	The landform is Coastal Uplands. The soils developed on shales. The soils comprise well drained to imperfectly drained, shallow to moderately deep, yellowish brown to very dark grey, firm to very firm clay. They are classified as eutric Cambisols, vetro-luvic Phaozems and vertic Cambisols.
Pc8	They are developed on raised coral reef limestones with a mixture of lagoonal deposits. They are well drained, deep, dark red to reddish brown, friable, rocky sandy clay loam to sandy clay with a top soil of loamy sand.

	They are classified as rhodic Ferralsols.
Pc9	They are well drained, shallow, dark brown to dark reddish brown, friable, rocky sandy clay loam to sandy clay. They are classified as Lithosols and ferralic Cambisols.

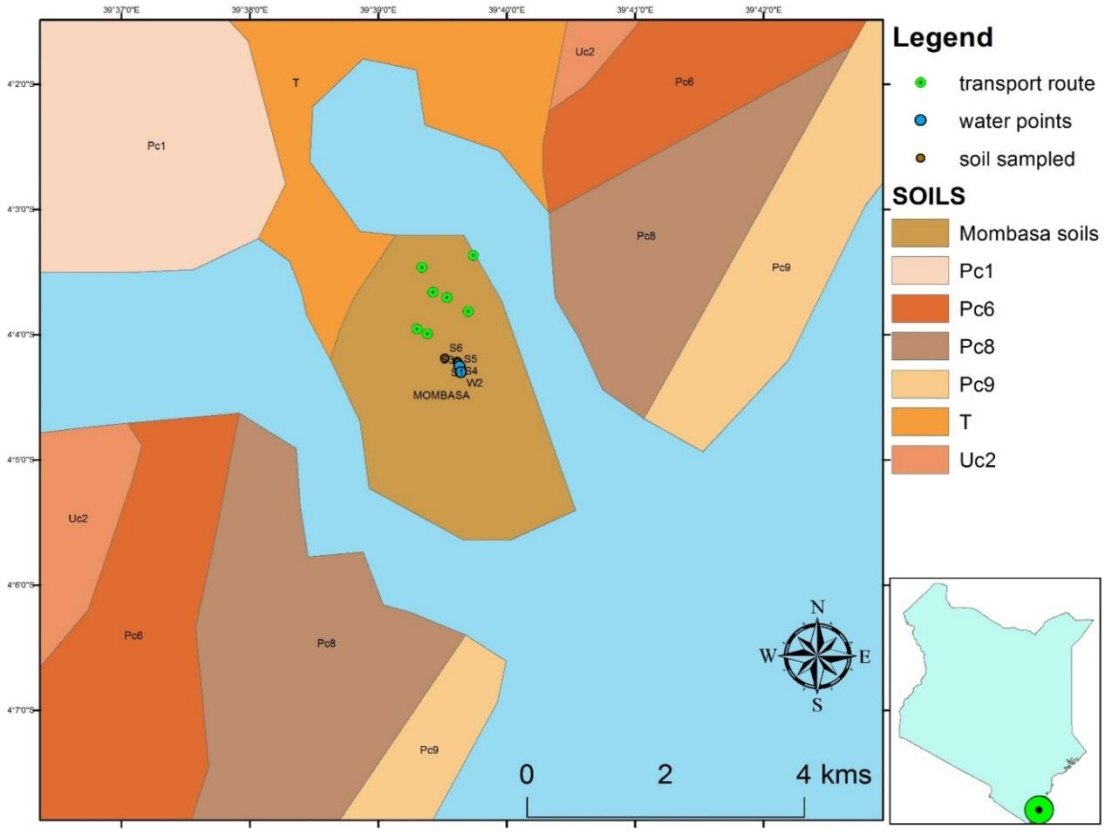


Figure 4: Soil mapping units in the project area

5.2.3 Oceanography

The oceanic currents influencing the Kenyan coast are four. They include the Equatorial Counter Current (ECC), the South Equatorial Current (SEC), the East African Coastal Current (EACC), and the Somali Current (SC). When South Equatorial current reaches the African coast at Cape Delgado, it divides into two currents. The Mozambique Current, which drifts southwards, and the East African Coastal Current, which flows north-eastwards, parallel to the coast.

The Somali currents and the Monsoon winds both influence the distance the East African Coastal Current moves up the East African Coast. During the South-East Monsoon, the EACC joins the Somali Current beyond Malindi and flows northwards to the horn of Africa. Conversely, during the North-East Monsoon the EACC stretches only as far north as Malindi or

Lamu, where it meets the opposing Somali Current, the only current off the coast of Kenya that seasonally reverses its flow. When the two currents meet, they cause outburst, which is believed to be responsible for the high output in the northern Kenyan coast. The highest Sea surface temperatures are recorded during the North-East Monsoon and lowest during the South-East Monsoon, averaging. Seasonal temperature variations decrease with increasing water depth, with temperatures stabilizing at 6–7 °C and 2.5 °C at 1,000 and 2,000m depth respectively.

Salinity variation of the East African Coastal Current waters is low, ranging between 34.5 and 35.4 ppt. This variation is primarily due to heavy rainfall between March and May and the associated terrestrial freshwater runoff, as well as input from rivers. In estuaries and tidal creek systems such as Gazi Bay, Mtwapa, Mwache/Port Reitz and Tudor, there are significant seasonal salinity variations, particularly in the inshore waters. During the dry season, salinity can rise to 38 ppt, while in a rainy season it can be as low as 19 ppt. The Kenya coast experiences mixed semi-diurnal tides, with approximately two tidal cycles every 24 hours. The reference port for tidal observations in Kenya is Kilindini (Port of Mombasa), where the maximum tidal range generally does not exceed 3.8 m.

5.2.4 Water Resources

The main water source for Mombasa County is Mzima springs in Chyulu hills in Taita Taveta County. The others include Baricho, Marere and Tiwi boreholes in the south coast. This supply however is able to meet 65% of the County water demand. The County however has a significant potential in terms of groundwater resources due to its relatively high water table. In the rural areas, there are three springs, water pans and boreholes operated by private investors, NGOs and local CBOs. The exploitation of the ground water resource is however limited due to salinity resulting of seawater intrusion, and is also curtailed by pollution from numerous pit latrines and septic tanks in the town.(*source: baseline survey report on WASH 2015*)

The project site however, lies within the vicinity of the Indian Ocean from which water is generally not abstracted for use on site by the neighbouring industries and facilities. The water from the ocean is used for cleaning of ships docked along the coastline.

Plate: 5-1 A section of Indian Ocean as observed from the project site

5.2.4.1 Groundwater

Groundwater resources are not commonly utilized for potable uses in homes due to the high salinity levels. Within the project site there is a borehole which supplies water for non-potable uses. The neighbouring Mombasa Yacht Club has a well which also supplies water for non-potable use as caption.

Plate: 5-2 Water well and tanks at the neighbouring Mombasa Yatch Club

5.2.4.2 Ground Water Quality Analysis

The community in the project area utilizes ground water and water from Coast Water Services Board (CWSB) for domestic use and consumption. Two ground water samples were collected from two different locations to assess the quality of water in the project area. The water samples were examined for physio-chemical parameters.

The pH value of the sampled water varies from 7.90 to 7.71 in the two locations, which is within the required standards. Alkalinity level varies between 292 to 320 mg$CaCO_3$/l, which is also within the WHO Standards. Electrical Conductivity levels vary from 4780 to 5200 µS/cm. This is above the permissible WHO Standards of Max 2500. Total dissolved solids ranges from 2963.6 to 3224 mg/l, which is above the WHO and KEBS (KS 459-1:2007) Standards. The hardness values in ground water of the project area ranges between 1140 to 2020 mg$CaCO_3$/l. The hardness values in all location are above the WHO (Max 500) and KEBS (KS 459-1:2007) Standards (Max 300). The levels of Calcium and Chloride in the two samples were also found to be above the WHO and KEBS (KS 459-1:2007) Standards. There was no metallic contamination found in any of the ground water sample of the Project area. Most of the parameters in ground water sample were within the WHO and KEBS (KS 459-1:2007) Standard. In conclusion the two samples were found to be very hard, saline and require treatment before domestic use.

Ground Water Sampling Locations

Station	Source	Distance from the site	Latitude	Longitude
Mombasa Yatch Club	Borehole	100 m	4^0 4'14.22''S	39^0 39'37.05''E
AMOG Water Point	Borehole	Onsite	4^0 4'17.27''S	39^0 3938.79''E

5.2.5 Climate and Air Quality

5.2.5.1 Rainfall

The study area lies in Agro-climatic zones III and IV classified as semi-humid and semi-humid to semi-arid (Sombroek et al, 1982). The average annual rainfall for the zones is 800-1400mm and 600-1100 mm respectively. The climate and weather variations on the Kenyan coast are dominated by the large-scale pressure systems of the western Indian Ocean and the two distinct monsoon periods. This produces a bimodal rainfall pattern with the long rains in March to June with a peak in May and the short rains in October to December/January with a peak in November. Average annual rainfall is presented in the graphs below.

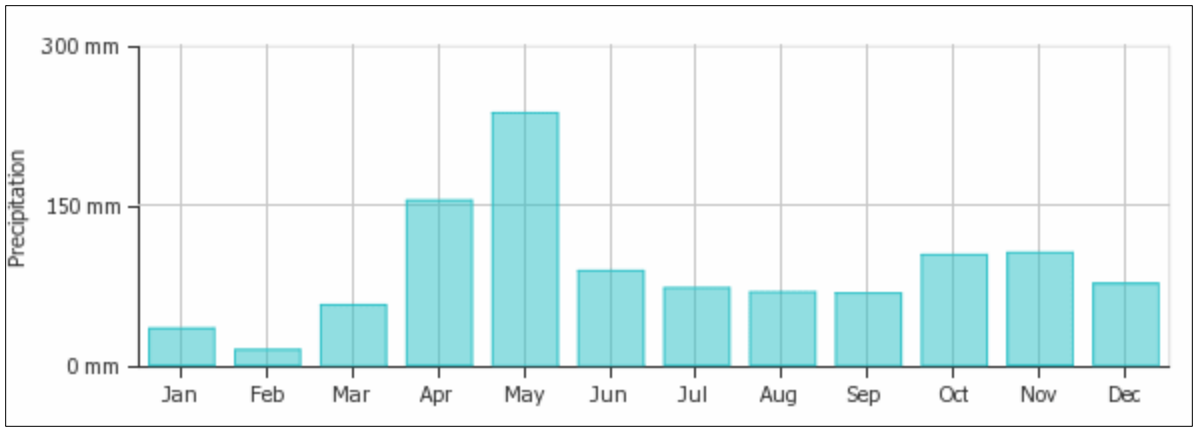


Figure 5.3: Annual Average Rainfall Graph for Mombasa County

5.2.5.2 Temperature

The mean annual temperature for the study area is 28-31°C making it fairly hot to very hot. The highest temperatures are experienced between March and April and the lowest temperatures between July and August. The graphs below present the annual average temperatures for Mombasa Counties.

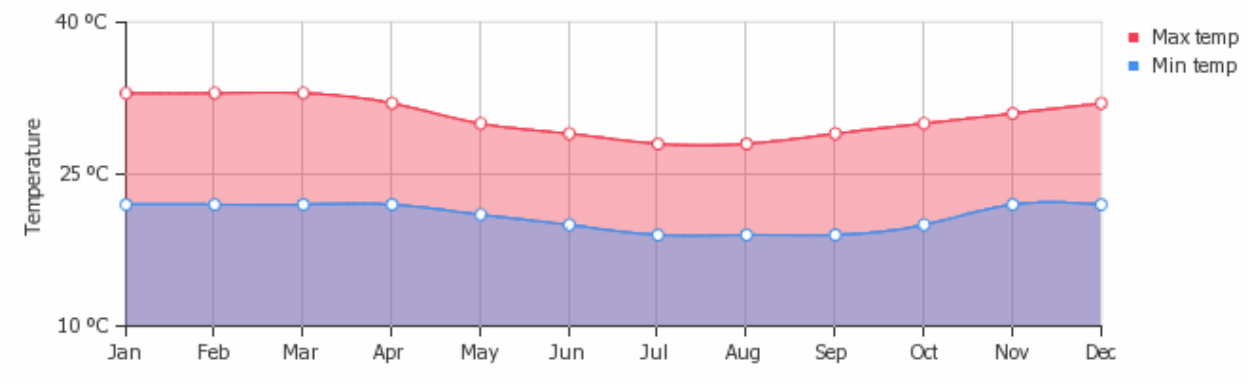


Figure 5.4: Annual Average Temperature for Mombasa

5.2.5.3 Air Quality

The project area is generally densely populated with a number of industries beside the proposed site and residential areas across the ocean, opposite the site. Air pollution is however minimal, caused by vehicles raising dust and emitting exhaust fumes when traversing the area.

5.2.6 Landscape and visual receptors

The study area falls under the Coastal Belt comprising of coastal plains that rise to levels of 140 m and foot plateaus occurring at 140m-600 m above sea level. Since the County is a city, it is characterised by built up areas bordering the Indian Ocean.

5.2.7 Biological Environment

5.2.7.1 Habitat (Flora)

Vegetation characteristic of any area is usually determined by either or a combination of land form, soil, climate, animals and man. Based on the parameters mentioned, the vegetation of the study area is influenced primarily by landform (coastal plain) and associated soil types, climate, man and animals.

There is minimal vegetation on and around the project site since it lies within the industrial zone of Mombasa. On site, there are a number of grass species growing due to long term non-use, and a few trees on site. The species observed include *Azadirachta indica, Casuarina equisetifolia,Cieba pentandra, Ricinus communis, Plumeria rubra Mangifera indica,Cocos nucifera,thevetia peruviana, Leucaena leucocephala, Terminalia sp*, and *Acacia melifra* and Grass species include *Eragrosti, Cenchru, Cymbopogon spp, Bothriochloa spp. and Heteropogon sp.*

Plate: 5-3 Grass species at the site (*Eragrosti, Cenchru*) and *Leucaena leucocephala*

5.2.7.2 Terrestrial Mammals spotted at the Site (Fauna)

The Vervet Monkey is widespread and often abundant. However, it is very patchily distributed over its extensive geographic range, linked to the availability of appropriate sleeping trees and drinking water. During the EIA study few "*Cercopithecus pygerythrus*", or African green monkeys, were seen within the proposed project site. According to IUCN there are no major threats on this specie, although Vervet Monkeys are actively persecuted (shot and hunted) by

landowners in areas where they raid crops or interact with humans. In Mombasa Island there are no large scale livestock keeping and none was spotted near the site due to industrial activities however, on the peri-urban places like Likoni few sheep, goats and cattle were spotted.

Plate: 5-4 Vervet Monkey (*(Cercopithecus pygerythrus)* spotted on site

5.2.7.3 Avi-Fauna

The Kenyan coast provides a number of habitats for migrating and local birds. In addition to the intertidal areas, especially mudflats, other habitats include creeks, narrow recesses in the coastline subject to tidal movement, estuaries, and salt pans which are small natural depressions flooded only occasionally and filled with salt deposits. The proposed project site had limited presence of birds due to heavy industrial activities and human settlements. However, few migratory and local bird species such as Black Necked Weaver "*Ploceus nigerimus*" were seen during the study. Others included egrets, crab plovers "*Dromas ardeola*", kingfishers "*Halcyon senegaloides"*, and sunbirds "*Anthreptes pallidigaster"*. There were also several Indian Crows which are not indigenous to East Africa but lots of them are found in Mombasa especially in dumping sites. The plate below shows Crows in a nearby dumping site in Ganjoni area. These Indian crows were introduced in East Africa intentionally around 1890 in order to control rubbish. Finally the site does not fall in any designated Important Bird Areas of Kenya.

Plate: 5-5 Indian Crow (Source: *www.bbc.com/news/world-africa)*

5.2.7.4 Marine and Aquatic Resources

The aquatic flora and fauna are much more diverse at the Kenyan Coast. Some of the identifiable species include prawns (*Penaeus indicus*, *P. monodon*, *P. semisulcatus*, *Metapenaeus monoceros*); crabs (Scylla serrata, Uca spp., Sesarma spp. and Birgus latro); molluscs (oysters such as Brachydontes spp., and *Crassostrea cucullata*; and cockles, *Donax* spp.) The marine faunal species majorly are *Tridacna squamosa*, *Pinctada margaritifera*, green turtle (*Chelonia midas*), and hawksbill (*Eretmochelys imbricata*). Other fauna include the long-spined sea urchin (*Diadema setosa*), the giant sea anemone, and lobsters among others Seagrasses which are not really grasses but marine flowering plants are also found in predominantly sandy and muddy areas where their roots can penetrate and provide easy anchorage and provide a habitat for a variety of commercially important fish species as well as act as feeding grounds for endangered species such as the green turtle (*Chelonia mydas*), the hawksbill turtle (*Eretmochelys imbricata*) while the Loggerhead (*Caretta caretta*) and the Dugong (Dugong dugon) are classified as Vulnerable. Other endangered species include molluscs such as Tritons Trumpet (*Charonia tritonis*- Rare), Green Snail (*Turbo marmoratus*), Fluted Giant clam (*Tridacna squamosa*), Small Giant clam (*Tridacna maxima*), Pearl Oyster (*Pinctada spp*) and the Spiny Lobster (*Panulirus spp*). Twelve species of seagrass have been recorded from Kenyan waters namely, Cymodocea ciliata, C. *rotundat*a, C. *serrulata, Halodule uninervis*, *H. wrightii, Halophila balfourii*, H. minor, H. *ovalis, Syringodium isoetifolium, Zostera capensis, Enhalus acoroides* and *Thalassia hemprichii* with *Cymodocea ciliata* and *Thalassia hemprichii* being the most abundant species in Kenyan waters. The seaweed species occurring along the Kenyan coast can be assigned to one of four groups, conveniently distinguished by their colour - blue-greens, greens, browns and reds. Near the project site on the shores at Mombasa Yacht Club green seaweeds occur in smaller numbers. The green seaweeds are adapted here as they are mainly found in shallow water where they

are able to make the best use of sunlight and grow better. They are also highly resistant to changes in salinity and temperature and can cope with the wide range of conditions encountered in the intertidal zone. They include the bright green sea lettuce, with Ulva pertusa growing in continuous sheets while others like Ulva reticulata, are delicately perforated and net-like. The green seaweeds are much sought after by grazing fish and molluscs and are often found at the water's edge at low tide as observed from the Mombasa Yacht Club point.

Plate: 5-6 Green coloured seaweed

5.2.8 Marine Beaches and Dunes

Marine beaches and dunes occur along the coastal areas and are usually characterized by bare sand dunes. At the project site these features are not available and a small section of the site that borders the Indian Ocean forms part of the project site which was reclaimed. The area is partially grassed with some open areas existing.

The project area has no marine beach and dunes activities as it is part of the KPA regulated area and only permitted activities by KPA are allowed in this area.

Plate: 5-7 Project reclaimed land bordering Indian Ocean

5.2.9 Coral

Coral reefs exist along most of the Kenya coast as coral flats, lagoons, reef platforms and as fringing reefs. However at the project site there were no coral reefs located nearby.

5.2.10 Mangroves

There are 8 species of mangrove trees and shrubs found along the Kenya coast *Rhizophora mucronata, Ceriops tagal, Bruguiera gymnorrhiza, Sonneratia alba, Xylocarpus granatum, Avicennia marina, Lumnitzera racemosa and Heritiera littoralis*. The mangrove swamps along the Kenyan coast cover approximately 53,000 hectares. However, near the proposed project site there were no mangroves trees save for the remnants that were observed on the Likoni shores as in the plate below.

Plate: 5-8 Mangrove remnants as observed from Likoni side

5.2.11 Reptiles

On the project site, arthropods, reptiles and other small living organisms including: Odonata (Dragon flies and Damselflies), Isosptera (Termites), Coleoptera (Beetles), Orthoptera (Grasshoppers and Crickets), Diptera (Tsetse flies), Lepidoptera (Butterflies and Moths), Hymenoptera (wasps, ants and bees), and Myriapods (millipedes and centipedes) were spotted. Other species include the lizards and skinks.

Plate: 5-9 Skink lizard and millipede

5.2.12 Waste Management

5.2.12.1 Solid Waste

The project area is located in an urban setting thus solid waste generation is significant. Owing to this, during the construction phase too, quantities of excavated materials and other wastes such as stones, wood, broken glasses, containers, rods of metal, pieces of iron etc. will be generated which will require disposal in an appropriate and environmentally acceptable manner following strict adherence to NEMA regulations and County Government by-laws. The disposal strategy is based upon the waste management principle of reducing the amount of waste requiring final disposal through the development of outline plans for waste avoidance, material re-use, and recycling. There is also a dumpsite situated along one route to the project site with which the majority of solid wastes include plastic bottles, worn cartons, waste food stuff, and plastic papers amongst others wastes. The dumpsite can be used for disposal after acquiring license/permit from relevant authorities. However, during operation the proponent is advised to put up oil water interceptor tank on one side of the plot which will take care of all runoff from the project site during operation phase before discharge of the same to an approved drainage channel that will be constructed in line with the Physical Planning Act of Mombasa County.

Plate: 5-10 Sump site adjacent to the road leading to the proposed site

5.2.12.2 Liquid Waste

During the assessment of the existing sanitation conditions/facilities of the Mbaraki Creek “Project site” or Africa Marine Oil and Gas compound the following point emerges: At present

the existing sanitation facilities at the project site are quite good and connected to septic tanks for safe disposal of raw sewage from the existing office buildings and the workshop.

Plate: 5-11 Sludge tanks on site

5.3 Ecosystem services

The Ecological Society of America defines ecosystem services as the processes by which the environment produces resources that support human life such as clean water, timber, habitats and pollination. TEEB (The Economics of Ecosystems and Biodiversity 2014), classifies ecosystem services into the following categories:

- **Food:** ecosystems provide the conditions for growing food. The food is derived from managed agro-ecosystems but marine and freshwater systems or forests also provide food for human consumption;
- **Raw materials:** ecosystems provide a great diversity of materials for construction and fuel including wood, bio fuels and plant oils that are directly derived from wild and cultivated plant species;
- **Fresh water:** ecosystems play a vital role in the global hydrological cycle, as they regulate the flow and purification of water. Vegetation and forests influence the quantity of water available locally; and
- **Medicinal resources:** ecosystems and biodiversity provide many plants used as traditional medicines as well as providing the raw materials for the pharmaceutical industry. All ecosystems are a potential source of medicinal resources.

The inhabitants in the peri-urban and rural parts around the project area rely on grass and shrubs as fodder for their livestock. Other raw materials derived from the ecosystem include grass and palm leaves for constructing houses, wood and timber for construction of modern houses and herbs such as Neem tree for medicinal purposes.

5.4 Social, Economic and Cultural Setting

Socioeconomic and cultural assessment is an important component of the Environmental Impact Assessment of any industrial project. It is carried out to help develop the sustainability strategy for the area, where the industrial project would be executed. This section presents the socioeconomic and cultural profile of Mombasa County and analyses the baseline status of the study area. In this report, the socioeconomic aspects discussed include administrative setting, demography, economic structure, education and literacy level and health facilities. Other aspects discussed are transport and communication infrastructure and energy sources in the study area.

5.4.1 Administration

Mombasa County is one of the forty seven (47) counties of Kenya and is located at the heart of the Coastal strip of Kenya. It covers an area of 229.9 sq. km and 65 sq. km of land and water masses respectively (Mombasa County Government: First County Integrated Development Plan, 2013 – 2017). It is situated between Longitudes 39° 34' and 39° 46' east and between Latitudes 3° 56' and 4° 10' south. The county borders Kilifi to the north, the Indian Ocean to the east, Kwale County to the south and Kilifi and Kwale counties to the west. Mombasa town is the second largest in Kenya after Nairobi and is famed for its tourist attractions such as the Fort Jesus, Haller Park and Mamba Village among others. Mombasa is also a transport hub holding the port that serves the East African region.

Administratively, similar to other Kenya counties, Mombasa County has both national and county government administrative structures. It is sub-divided into seven (7) divisions, eighteen (18) locations and thirty (30) sub-locations. In terms of political units, the county has six (6) constituencies namely Changamwe, Jomvu, Kisauni, Nyali, Mvita and Likoni.

Table 5:1: National Government Administration

Level of Administration	Area of Governance	Designation	Person-in-charge
Region	Coast	Regional Coordinator	Mr. Nelson Marwa
County	Mombasa	County Commissioner	Mr. Evans Achoki
Sub-county	Mvita	Deputy County Commissioner	
Location	Ganjoni	Chief	Mr. M. Sadik
Sub-location	Ganjoni	Assistant Chief	

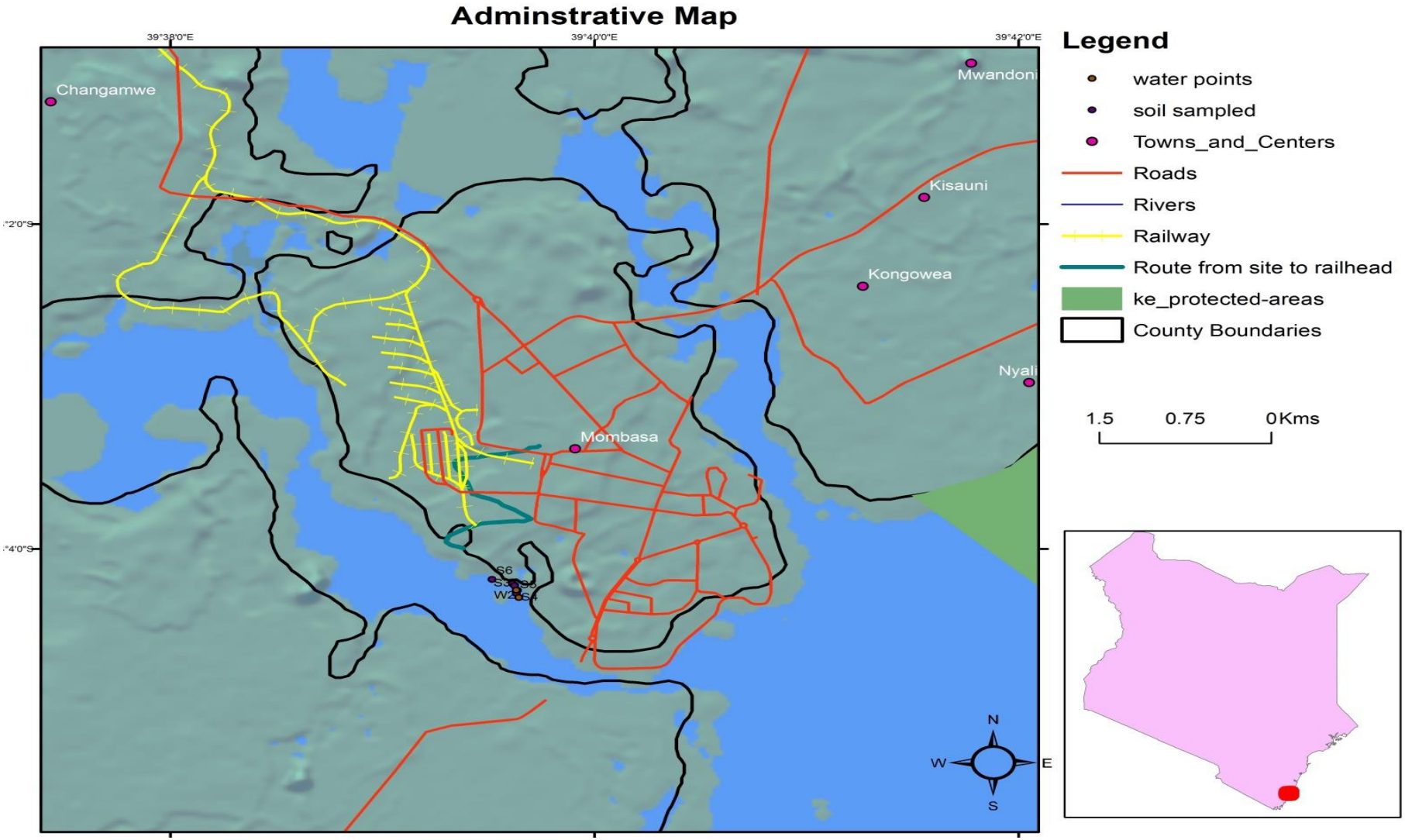
Table 5:2: County Government Administration

Level of Governance	Area of Governance	Designation	Person in charge
County	Mombasa	Governor	Mr. Ali Hassan Joho
		Deputy Governor	Dr. William K. Kingi

Table 5:3: Elected Political Leaders

Level of Governance	Area of Governance	Designation	Person in charge
County	Mombasa	Governor	H.E Ali Hassan Joho
		Deputy Governor	Hon. Dr. William K. Kingi
		Senator	Hon. Mohamed Faki
		Women Representative	Hon. Asha Hussein Mohamed
Constituency	Mvita	Member of National Assembly	Hon. Adbulswamad Sheriff Nassir
Ward	Shimanzi/Ganjoni	Member of County Assembly	Hon. Prischilla Mema Mumba

Administrative map of Mombasa County



5.4.2 Demographic Information

5.4.2.1 Population Size and Composition

Demography is a very important indicator of environmental wellbeing of an area. It includes population, sex ratio, households, education and literacy levels, population density among others. In this report, demographic features of Mombasa County were assessed based on the population census data of 2009 and the subsequent population projections up to 2017. In Mombasa County, population distribution and settlement patterns are influenced by proximity to key social and physical infrastructure networks such as roads, housing, water and electricity. Other factors that influence settlement patterns include accessibility to employment opportunities and security.

Table 5-4 below shows the county population projection by constituencies. The total population of the county in 2009 was 939,370 people comprising 484,204 males and 455,166 females. It was projected to reach 1,051,825 in 2012 and rise to 1,271,920 persons by 2017.

5.4.2.2 Population Density and Distribution

According to the 2009 population census, the population density of Mombasa County was 6,131 persons per square kilometre. This was projected to increase to 6,640.5 persons per square kilometre by 2015 owing to high population growth contributed to by the increased numbers of people seeking employment in the manufacturing, service and processing industries, the Port of Mombasa, Kenya Ferry Services, Container Freight Terminals, go downs and hotels.

Densely populated areas of the county are Majengo, Bamburi, Bangladesh, Mikindani, Jomvu, Miritini, Migadini, Port Reitz, Mishomoroni and Bombolulu among others. There also exist a number of settlement schemes in the county namely Mwakirunge, Jomvu-Kuu, Bububu-A, Shika-adabu, Vyemani, Mwembelegeza and Majaoni. In addition, there also exist a number of informal settlement areas inhabited by landless people. They include Mishomoroni, Junda and Kisumu ndogo in Kisauni Sub-county; Shika-Adabu and Ngomeni in Likoni Sub-county and Bangladesh in Changamwe Sub-county.

On the other hand, sparsely populated areas, most of which are found in the outskirts of the county, are Mwakirunge-Maunguja, Mwangala, Mreroni and the Mkupe Jetty area. These areas are least developed in terms of infrastructure such as road network, electricity and water supply. Education and health facilities are also scantly available in these areas making the inhabitants highly prone to poverty and disease incidences.

Table 5-4 shows population densities of each of the six sub-counties of Mombasa County, and the projected trends up to the year 2017.

Table 5:4: Population Distribution and Density by Sub-county

	2009 Census		2012 Projections		2015 Projections		2017 Projections	
Constituency	**Pop**	**Density**	**Pop**	**Density**	**Pop**	**Density**	**Pop**	**Density**
Changamwe	147,613	9,226	165,438	5,705	185,415	6,394	200,005	6,898
Jomvu	102,566	3,537	114,951	7,184	128,832	8,052	139,005	8,688
Kisauni	194,065	2,188	217,499	2,246	243,762	2,293	263,010	2,474
Nyali	185,990	8,129	208,449	9,103	233,619	10,202	252,066	11,007
Likoni	166,008	4,040	186,054	4,527	208,520	5,073	224,986	5,474
Mvita	143,128	9,671	160,411	11,078	179,781	12,416	193,977	13,396
County Total	939,370	6,131	1,052,802	6,640.5	1,179,929	7,405	1,273,099	7,989.5

Source: Kenya National Bureau of Statistics, Mombasa 2013

The high population densities in Mvita, Changamwe and Nyali sub-counties is attributed to proximity to key infrastructural developments such as roads, water, electricity and employment opportunities due to the presence of industries and other physical facilities such as the Port of Mombasa and the Moi International Airport, Mombasa.

5.4.2.3 Fertility, Maternal Mortality and Child Mortality rates

According to the Mombasa County Annual Development Plan 2016 – 2017, Mombasa has a fertility rate of 3.3 per cent. This places it among the counties in the country with low fertility rate. Maternal mortality rate stands at 223 while child mortality rate is 115.

5.4.2.4 Birth, Death and Growth Rates

The county's crude birth rate is 37.1 per cent while crude death rate stands at 8.9 per cent with a growth rate of 28.2 per cent.

5.4.3 Infrastructure

5.4.3.1 Transport Network

a. Roads and Railway

There are a total of 257.17 kilometres of bitumen surface roads, 127 kilometres of gravel surface roads and 91.29 kilometres of earth surface roads in the county. Main classified roads include Mombasa - Nairobi Highway (A109), Mombasa - Malindi road (B8) and Likoni – Lunga Lunga Road A(14) connecting Kenya and Tanzania. Others include; Airport road (C110),

Mbaraki - Shimanzi road (C114) and Mtongwe road (C109). While the major roads are in a fair condition, access roads within the residential and industrial areas are in deplorable state.

The situation is worsened by the poor storm drainage systems most of which is dilapidated. The roads are maintained by the national government through Kenya Rural Roads Authority (KeRRA), Kenya Urban Roads Authority (KURA), the Kenya National Highways Authority (KeNHA) and the county government. KeNHA is responsible for classified national trunk roads (class A, B and C roads) while KURA, KERRA and Mombasa County government are responsible for roads in the urban areas, access roads to estates and other settlement areas.

The Dongo-Kundu by-pass is expected to ease congestion at the central Business district, as traffic from Nairobi to South coast shall be diverted at Miritini towards Likoni and Diani. The residents of the coastal city largely use matatus (mini-buses) to move around the city and its suburbs. Tuk-tuks (three wheelers) are also widely within the city. The project site has a good accessible road of bitumen standard.

Mombasa has approximately 10 kilometres of railway line and 3 railway stations operated by Rift Valley Railways (RVR) offering cargo services between Mombasa and Nairobi and the new Standard Gauge Railway (SGR) Station located in Miritini operated by the Kenya Railways. The SGR currently offers quick daytime passenger services between Mombasa and Nairobi and vice versa. The county government of Mombasa envisions having light commuter rail within the city in the long run.

b. Harbour and Airport

The port of Mombasa, the largest in Kenya, is a key resource and the gateway to the East and Central African region. The port serves the entire region‘s export and import needs. In 2012, dredging was undertaken with a view of deepening the Likoni channel to facilitate usage of the port by larger vessels. Currently, the port has 19 deep-water berths with two additional berths nearing completion and two oil terminals.

Rail connects the port to the interior. There is no bridge between Mombasa Island and south coast; instead the distance is served by ferries operated by the Kenya Ferry Service from Kilindini and Mtongwe to Likoni in the south coast of Mombasa.

Moi International Airport serves the city of Mombasa. It is located in Port Reitz area on the mainland metropolitan area. Flights to Nairobi and other Kenyan, European and Middle Eastern destinations depart from the airport.

5.4.3.2 Communication Network

Telecommunication services are available in literally every part of Mombasa County. The project area is well served with all the mobile phone network providers and the wireless phone connections including Safaricom, Airtel and Telkom.

5.4.4 Energy sources

A number of industries and residential places in Mombasa town are connected to electricity supply by Kenya Power. Apart from electricity other sources of energy include solar, gas, and diesel powered generators. Gas is used mainly for cooking and industrial purposes.

According to a report by KNBS & SID (2013) Mvita constituency had the highest level of LPG use in Mombasa County at 23% which was almost eight times that of Likoni constituency, which had the lowest share at 3%. Mvita constituency was 14 percentage points above the county average. The report further found out that Shimanzi/Ganjoni ward had the highest level of LPG use in Mombasa County at 31%.This is 31 percentage points above Mwakirunge ward, which had the lowest share. Shimanzi/Ganjoni was 22 percentage points above the county average.

5.4.5 Water for Domestic Use

The reticulated water supply system in the county is owned and managed by Mombasa Water and Sewerage Company. This water supply comes from Mzima Springs in Taita Taveta County, Marere and Sabaki/Baricho in Kilifi County and Tiwi Boreholes in Kwale County. It is estimated that the water supply only meets 65 per cent of the county's water demand.

5.4.6 Livelihoods and Economic Activities

The formal sector in Mombasa County provides majority of employment. Major employers include the hotel industry, shipping industry, the government of Kenya, and various private institutions and businesses. In the financial sector, the county boasts of over thirty eight (38) banks and a host of microfinance institutions operating in various parts of the county.

5.4.7 Education

Literacy levels in the county of Mombasa are relatively low at 86.3 per cent. The net enrolment ratio in early childhood development centres, primary and secondary schools is 57.4%, 81.1% and 32.5% respectively. The education sector in Mombasa County currently faces challenges such as inadequate school physical infrastructure, for example, classrooms, desks, laboratories and inadequate staffing. Within the locality of the project site there are several primary and Secondary Schools such as Ganjoni Primary, Liwatoni Primary and Secondary school, Sacred Heart Primary and secondary school, and Valentine Primary and Secondary School. Across the Indian Ocean there is Puma Primary and Secondary School, Peleleza Primary Bridge International and Likoni School for the Blind.

Plate: 5-12 Puma and Sacred Heart Schools

5.4.8 Health

Mombasa has one level five hospital, that is, Coast General Hospital, which also doubles as a referral facility serving the entire coast region and two level four hospitals, that is, Port Reitz and Tudor Hospitals. Additionally, Mombasa County has over thirty five public dispensaries and health centres, eighteen clinics and four special clinics. In the project area health services are obtained mainly from Ganjoni Clinic and Seaside Hospital.

Health sector in the county faces such challenges as inadequate health personnel as the doctor to patient ratio stands at 1:11,875 while the nurse to population ratio is 1:18,678 way much lower than the World Health Organization's recommended doctor to patient ratio of 1:600 and nurse to patient ratio of 1:500.

5.4.9 Land Tenure and Settlement Patterns

Land tenure regimes in Mombasa County are public, private and community owned. Within the private ownership, tenancy-at-will regime is found. As a result of the rapidly growing population, the county has witnessed a high rate of urbanization and mushrooming of informal settlements such as Bangladesh, Magongo, Likoni, Longo, Kisauni, and Bamburi among others. The project location site is found within an industrial zone and in close proximity to Liwatoni and Ganjoni residential areas.

Plate: 5-13 Industries and Warehouses along Taib Abdul Nasir Road

5.4.10 Tourism and Cultural Heritage Sites

Mombasa being an ancient town is a centre of coastal tourism in Kenya. It hosts several tourist attractions including world heritage sites such as the Fort Jesus among other tourist destinations such as the Haller Park, Mamba Village etc. Tourism facilities are available in Mombasa in abundance. There are over 201 registered hotels and lodges. The Nyali, Bamburi, Shanzu, Shelly, Tiwi, and Diani beaches provide several luxury hotels for revellers.

6. STAKEHOLDER ENGAGEMENT AND PUBLIC PARTICIPATION

6.1 Introduction

Stakeholder engagement can be described as an organization's efforts to understand and involve stakeholders and their concerns in its activities and decision-making processes.[2] Stakeholders are defined here as any group or individual who can affect, or can be affected by, an organization or its activities, including employees, community groups, environmental non-profit organizations, customers and others. The overall purpose of stakeholder engagement in this project is to drive strategic direction and operational excellence for the proponent. Done correctly, engaging stakeholders can result in learning, innovation, and enhanced performance that will not only benefit the proponent, but also its stakeholders and society as a whole. In addition to serving as a key tool to support a facility's sustainability reporting efforts, stakeholder engagement is a foundation that supports a facility's broader sustainability efforts to set strategic goals, implement action plans, and assess its performance over time.

Public participation is essentially concerned with involving, informing and consulting the public in planning, management and other decision-making activities. Public participation tries to ensure that due consideration is given to public values, concerns and preferences when decisions are made. It encompasses the public actively sharing in the decisions that government and other agencies make in their search for solutions to issues of public interest.

The main objectives of the consultation were to:

- inform the public and key stakeholders about the proposed project and activities that will be undertaken;
- seek views, concerns and opinions of people in the area concerning the project;
- incorporate the views, concerns and proposals of community members, and other stakeholders on their expectations from the project activities;
- establish if the local people foresee any positive or negative environmental effects from the project and if so, how they would wish the perceived impacts to be addressed; and
- obtain socioeconomic information about the project area.

6.2 Methodology

Public participation was mainly achieved through direct interviews, observations and questionnaire administration. Traditionally the tool used to collect information is the administration of open ended questionnaires where the respondent is free to comment on issues at own thinking. After individuals complete the questionnaires individually and the expert finds some divergent and conflicting responses, usually Focus Group Discussions are held only on the conflicting ideas for the respondents to discuss the contentious issues and come to an agreement by themselves after informing each other.

[2] *The Stakeholder Engagement Manual – Volume 1: The Guide to Practitioners Perspectives on Stakeholder Engagement. Stakeholder Research Associates, UNEP; and Accountability, 2005, p.6*

Stakeholders were identified and Key Informant interviews carried out. Two public consultation meetings were carried out in Liwatoni and Likoni areas to gather information on concerns regarding the proposed project. Questionnaires were then administered. For the study reported here interviews were conducted individually on a pre-set open ended questionnaire to collect the views of various stakeholders. Respondents were selected among the communities surrounding the proposed project site on both sides of the ocean. All the stakeholders accepted to respond.

The following is a detailed discussion of public consultation methodology used by the ESIA team:

6.2.1 Key Informant Interviews

Key Informant interviews were used to get responses from key stakeholders in the project area. Their comments were sought through engaging them in discussions about the proposed project and associated activities.

Plate: 6-1: Consultation with Mr. Sadik, Chief Ganjoni Location

6.2.2 Questionnaire administration

Questionnaires were uniformly distributed to the sampled residents. The neighbours were informed of the proposed project and requested for their views concerning the project. They were used to capture their views in terms of the positive and negative impacts that they anticipate the project and the mitigation measures.

Plate: 6-2: Stakeholder Consultation and Public Participation

6.2.3 Issues and concerns raised

Tables 6.1 and 6.2 below summarize the expectations, concerns and the mitigation measures that were discussed during the key informant interviews, stakeholders' consultations and public meetings.

Table 6:1 Summary of Stakeholders' Expectations, Concerns and Mitigation Measures

Stakeholders	Expectations (Positive Impacts)	Concerns (Adverse Impacts)	Proposed Mitigation Measures and Recommendations by the Stakeholders
Daniel Githinji (Kenya Ports Authority)		• Was concerned that the project may not feasible at the proposed site without having in place appropriate safety, security and environmental measures to avert anticipate serious negative impacts such as fire outbreaks • The project should be aligned with KPA's Master Plan	• Proponent to seek approvals from KPA. • Consider alternative site; • *Issues raised have been addressed adequately by the proposed ESMP.*
L. M. Mwangemi (Kenya Urban Roads Authority)		• Was concerned that road works and traffic flows may be interfered with thus there is need to consult widely with the various road agencies on traffic management plan.	• Consult all road agencies, KURA, KERRA, KeNHA, KWS for any future proposals which they might have.
Kennedy A. Shikami (Kenya Fisheries Service)		• Was concerned that the proposed site is at the entrance/channel to the Port and that any serious incident of fire outbreak may adversely affect the incoming and departing ships.	• Implement fire safety standards. • Liaise with KPA – seek to access the KPA Master Plan for the Port. This alone will take care of all and any other mitigation measures that could arise. • *Issues raised have been addressed adequately by proposed ESMP.*
Leyla Ali (Wanainchi Marine)	• Economic impacts of the project will the fruitful in the long run.	• Noise and air pollution/damage of existing road (currently not in good condition to accommodate building machinery). • Being a residential area, pollution is a major concern especially the smell of gas to the residents. • No objection to the project.	• *Issues raised have been addressed adequately by the proposed ESMP.*

Stakeholders	Expectations (Positive Impacts)	Concerns (Adverse Impacts)	Proposed Mitigation Measures and Recommendations by the Stakeholders
Karisa Nzai (Kenya Ferry Services)	• It will boost the economy of the whole country not only Mombasa County. • Job opportunities for our boys and girls	• It is good to have that project but not ideally situated on site;	• Find a safer area for this money, job creator project
Mohamed Hassan (Kenya Ports Authority)	• The project is good for the country	• The project has a potential for serious marine pollution. • The project site is very close to the channel and entrance and any serious incident will heavily impact on the vessel traffic. • Anticipate impacts especially for the port may have serious economic consequences	• Adequate measures must be put in place to prevent pollution. • The proponent should consider an alternative site for the project. • *Issues raised have been addressed adequately by the proposed ESMP.*
Lepore Kirorei (Kenya Navy)		• Was concerned that world over, best practice requires that oil/LPG facilities be constructed away from entrance to the port. thus • The facility at African Marine (Dry-Dock) is a key critical infrastructure to the Kenyan Maritime industry – especially ship maintenance. • The proponent should consider the Port's (KPA) Master Plan including the bridge and other vital infrastructure close by.	• Wide consultation is required with all users of the port especially KMA, KPA, Kenya Navy, State Department of Fisheries, County Government of Mombasa and the fishermen community. • The project should be put up near the AGOL ship Gas station at Port Reitz or elsewhere offshore. • Coordinate and liaise with KPA for a suitable location. • The proponent should implement the International Code for the Security of Ships

Stakeholders	Expectations (Positive Impacts)	Concerns (Adverse Impacts)	Proposed Mitigation Measures and Recommendations by the Stakeholders
			and of Port Facilities.
Rashid A. Were (Interior)		• The proposed location of the LPG terminal is not ideal because the proposed site is just next to the entrance channel of the port. • The LPG terminal at the entrance of the channel will open the port to a lot of hazard.	• Implement appropriate safety measures to curb hazards. • Involve all the stakeholders in this project especially the KPA • *Issues raised have been addressed adequately by the ESMP.*
Captain William Ruto (KPA)		• The proposed site is in a dry dock area • The site is very close to the navigation channel which is the entrance of the port of Mombasa • Best practice world over is to construct oil/LPG facility furthest and not at the entrance.	• The project is very important and the ideal location is Port Reitz Area or Dongo Kundu. • Proponent to seek approval from KPA • *Issues raised have been addressed adequately by MGT and the proposed ESMP.*

Table 6:2 Summary of Issues/Concerns raised by members of the public, Expectations and Mitigation Measures

Public forum at Liwatoni and Likoni Areas	Expectations (Positive Impacts)	Concerns (Adverse Impacts)	Proposed Mitigation Measures and Recommendations by the Stakeholders
	• Increased Employment opportunities to the residents during construction and operation phases. • Increase in cheap and affordable gas supply which will alleviate the overdependence on charcoal use. • Improve both county and national economy and act as a source of revenue collection. • Infrastructure upgrades especially the roads leading to the facility. • Increased Corporate Social Responsibilities within the area.	• Production of toxic/pungent gasses that may affect area resident's health. • Air and dust pollution which may cause respiratory ailments to local residents. • Interference with ocean stability thereby affecting marine life and fishing activities • In case of gas leakage, fire incidents and explosions may affect the entire area causing massive property destruction and loss of life. • Traffic snarl-up during construction and operation phases in the area. • Noise pollution during construction and operation. • Ecological system will be disrupted during construction phase hence displacement of flora and fauna in the project site is expected. • Security of the surrounding area will be jeopardized. • Long exposure to petroleum	• Put appropriate mechanisms to prevent environmental hazards • Put leakage detection mechanism in place to help in minimizing fire incidents. • Stabilize the area soil to avoid soil wash into the ocean. • Ensure CSR activities are aimed at improving Hospitals and Roads within the area. • Look for alternative sparsely populated site since the project site is near residential areas. e.g. "Dongo Kundu" areas. • Ensure project site is fenced off to avoid intrusion by non-authorised persons. • Ensure workers to the site are well trained and are always under strict supervision either by private environmental health and safety monitor or out sourced inspectors e.g. from NEMA. • The plant must be fitted with adequate safety and monitoring control devices and operated by competent persons with strict time frame maintenance. • Ensure constant education and public awareness of the project activities and its impacts to the residents. • Ensure registered waste handler is contracted to collect waste from the site for appropriate disposal in the designated dumping sites.

Public forum at Liwatoni and Likoni Areas	Expectations (Positive Impacts)	Concerns (Adverse Impacts)	Proposed Mitigation Measures and Recommendations by the Stakeholders
		products may cause different types of cancers to nearby residents. • Production of solid waste during the operation and construction phases. • Soils wash as a result of construction. • Water pollution due to oil spills. • Risks of accidents caused by heavy tankers transporting the LPG containers.	• Ensure that exposed excavated soil heaps are covered and dampen to reduce dust emission. Similarly ensure that, the exposed soil surface is compacted and re-vegetated either by grass or ornamental flowers. • Liaise with Mombasa traffic department to help ease traffic congestion on the access roads. • Install oil traps to prevent accidental oil spills from contaminating the ocean waters. • Build strong fire-walls which can withstand heat for long enough and ensure fire fighting equipment's are installed. In addition, put up a robust fire fighting station near the project site to curb fire accidents In case of any. • Ensure engineering design of the containers is of international standards and are air tight. • Put up Emergency Health Facility near the project site as part of CSR. • Install state of the art air cleaning filters to disperse pungent smell into the atmosphere.

7. PROJECT ALTERNATIVES

7.1 Introduction

IFC Performance Standard 1 (Assessment and Management of Environmental and Social Risks and Impacts) ("PS1") requires an assessment process that identifies the risk and potential impacts associated with a project. Specifically, "the process may comprise a full scale environmental and social impact assessment, a limited or focused environmental assessment or straight forward application of environmental siting, pollution standards, design criteria or construction standards"

PS1 states that for developments or large expansions with specifically identified physical elements, aspects and facilities that are likely to generate potential environmental or social impacts, the client conducted a comprehensive ESIA, including an examination of alternatives, where appropriate.

This section presents an overview of the alternatives considered as part of the ESIA study. With a view of shedding light of the proposed project's impacts on the existing environment and at the same time achieve its objectives; available alternatives were sought in line with the requirements under ESIA regulations and Environmental Management and Coordination (Amendment) Act of 2015 (EMCA). In this analysis, alternatives were considered on the following basis:

- Site
- Technology
- Flora
- Aquatic organisms and Ichthy of fauna (aquatic biota)
- Fauna (especially birds and mammals)
- Integral environmental vulnerability of adjacent marine areas
- Landscape and soil cover
- No project alternatives

In addition, consideration was also given to the following criteria:

- The presence of specially protected environmental zones
- The availability and accessibility of existing infrastructure

7.2 Alternatives to Site

The Proponent has only one proposed site for the construction of the LPG import terminal for the storage and distribution of LPG. The site is located at Kenya Ports Authority premises who are the sole users of the land. The setting up of the LPG import terminal on the said plot at Kenya Ports Authority is welcomed as the proponent plans to deliver the products by ship directly to the private berth that is on the site. The berth will ease and facilitate LPG vessels offloading into the mounted storage to be set up on the site. The facility will also have

loading facilities for trucks to be able to load directly from the storage for distribution. This will help in reducing logistical constraints of transporting LPG vessels from one point to the next.

There is no viable alternative to this site owing to the availability of private berth for ship docking and scarcity of appropriate development land in Mbaraki creek in Mombasa County. The site is currently vacant and is bound by the Africa Marine Oil and Gas and Mombasa Yatch Club. The site has existing road infrastructure. Moreover, the proposed site is ideal because it is located away from the main KPA factory where the main cargo operations occur and hence would not compromise the safety of the factory operations and workers.

7.3 Alternatives of Technological Options

LPG exists as either a gas (vapour) or as a liquid, when it is under a modest amount of pressure in gas bottles, cylinders, tanks and larger LPG storage vessels. Mombasa Gas Terminal intend to use ISO Certified tanks sizing is 6.05m (20ft) long, 2.4m wide and 2.55m high in storing and transportation converse to pipeline. Transportation from the terminal will be through large road tankers to rail heads. I.e. Rift Valley Railways in Port Rietz and Standard Gauge Railways in Miritini for wider circulation in the entire country. The technology involved will enable vapour displacement from the storage tanks of the LPG carriers to feed back to the mound (and vice-versa) as a closed system to prevent major pressure changes between the LPG in storage at the mound and ship.

7.4 No Project Alternatives

This means that the status quo remains and the proponent will have to contend with the land being idle. This may lead to underutilization of the land and the proponent missing out on the good returns from the LPG sector and the economies of scale.

The No-Project alternative is not favoured as it simply deprives the Kenyan Public and both the County and the National Government of socio-economic and environmental advantages detailed in positive impacts during operation sections of this report. Key advantages include;

- Constant availability and reliability of fuel for lighting and energy home use
- Reduced expenditure on LPG importation
- Limiting illegal vending of unlicensed natural gas.
- Secure supply of natural gas will provide the country with an environmentally friendly source of energy

Whereas the No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors

- The economic status of the nation and the local community will deteriorate;

- The full regional economic potential will not be exploited;
- Poverty levels will remain high;
- No employment opportunities will be created for local populations;

Despite few risks associated with LPG were identified, these risks are manageable and therefore the "No Action Alternative is not justified"

7.5 Waste Management Alternatives

Solid wastes will be generated from construction and rehabilitation activities at the project sites. There will also be solid and effluent wastes generated during the operational phase. The Mombasa Gas Terminal Ltd. will give priority to reduction at source of the materials or containment of wastes where possible. Sewage/effluents should be connected to a reticulated sewage Waste Management System. Any reusable/recyclable materials must be disposed accordingly. This will call for a source reduction and waste segregation systems of waste management being implemented on the site. Sanitary land filling or collection by a licenced waste collector will be the last option for the proponent. It is to the interest of the proponent and the community that the waste is effectively managed so as to maintain a safe and healthy environment to the worker and the community at large.

7.6 Proceeding With the Proposed Project with Mitigation Measures

This option is the preferred option and it entails carrying out the proposed construction of LPG storage facility with the detailed mitigation measures in chapter eight (8) to prevent, offset, or avoid any negative impacts thereby maximizing it gains. This option would therefore lead to achieving the sectoral lead agencies policies, goals and objectives of vision 2030.

8. IMPACT IDENTIFICATION

8.1 Introduction

This section presents the potential impacts associated with the project, perceived impacts by consulted stakeholders, as well as the proposed assessment methodology and any potential mitigation options that have been identified at this stage of Scoping.

8.2 CONSTRUCTION PHASE IMPACTS

The proposed project is anticipated to generate the following impacts on the biophysical environment. It is expected that the significance of these impacts will reduce with the proposed mitigation measures as outlined.

8.2.1 Geology and Physiographic Impacts

The geology and physiography of the project area will be affected by activities that will include; mobilization of equipment, earthworks and civil related works and erection during facility construction. The risk of subsidence due to passage of heavy vehicles is negligible due to the geology, but localised compaction of surface soils may occur in some places due to vehicular movement. There might be scarring and displacement of sediments from quarries and borrow pits while extracting materials for civil work activities.

8.2.1.1 Mitigation measures

The proposed project site is localized in coverage thus no major alterations to geomorphology, geology and physiography. However, to prevent the localized impacts:

- The proponent should strive to confine heavy equipment and vehicular movement to existing road access,
- Defined vehicular access routes will be in place onsite and within the project area,
- In case a borrow pit is established to acquire materials for civil work then the pit/ quarry should be reclaimed afterwards,
- The construction activities should not alter or in any way interfere with any natural or manmade watercourses.

There potential geological and physiographic impacts during construction are generally low

8.2.2 Soil Erosion and Pollution

There is a possibility of soil erosion and pollution to occur during construction phase of the project. There will be vegetation clearance which would lead to soil erosion when bare-land is exposed to natural agents such as wind and surface run-off. Removal of top soil after site clearance by agents such as wind, rain water, and surface run off is a likely action to occur. Similarly, accidental oil spills from construction equipment and discharge of wastewater from equipment washing to the environment might accelerate soil pollution to some extent. Oil spills may infiltrate into soil causing soil pollution and later water/marine pollution. However,

this impact is localized around machinery maintenance areas or garage and areas of concentrated activities.

8.2.2.1 Mitigation measures

- Minimal vegetation clearance on the site and where necessary stumps left intact to bind soil together,
- A safety data sheet should be maintained for all potentially hazardous materials, as well as supporting documentation for the transport, use and disposal of such materials used in construction,
- Used motor oil and filters from vehicles and generators should be removed from the area for proper disposal,
- Used motor oil should not be used for dust suppression on access roads,
- Disposal of chemicals and motor oil should be documented, including quantities involved and disposal locations,
- A plan should be prepared to prevent and contain accidental oil discharges or fuel spillages, and
- A licensed waste oil handler should collect used oil from the site for safe disposal.
- Re-vegetate disturbed areas once construction and demolition works are completed; during construction and decommissioning phases respectively;
- Carrying out site audits and surveys to identify any contaminated areas and remediate them accordingly

Severity of impacts are localized with low intensity and expected to be **low and short-lived.**

8.2.3 Delivery of LPG Vessels by Sea

The LPG Vessels shall be imported by barge/ship in complete units, received at the MGT site's private berth, driven to receiving rails by Self Propelled Modular Trailer (SPMT) and skidded into final position. This method of transportation and installation is well tested for fabricated units of this scale.

It is anticipated that the entire delivery and installation process should take 3 to 4 days (for all vessels), with fully supervised shifts working 24 hours. A preliminary check of the structural capacity of the private berth wall has been undertaken and it is anticipated that no traffic should be encountered.

8.2.3.1 Mitigation measures

- A full offloading and installation methodology should be developed, with supporting engineering design and checks, to ensure the safety of the offloading, delivery and installation operation,
- The offloading, delivery and installation operation should be undertaken during favourable weather conditions with close attention paid to weather forecasts and wind conditions it the project site.

The impacts of delivery of LPG vessels and accessories by sea is assessed as low.

8.2.4 Noise and vibration

Construction techniques will involve:

- Driving of piles into the ground extending to the basalt formation. Methods may include driven, percussive or auger installed piling techniques.
- Noise generated through excavation and tipping of fill material
- Noise generated from power generator
- Noise generated through the operation of heavy construction plant

Impact receptors will be:

- Construction workers within the site
- Personnel on adjacent property closest to the noise source; i.e. COMARCO, Mombasa Yacht Club, Abson Motors, Kenya among others.

Adjacent properties are located a significant distance from the construction site and this will provide a good level of attenuation from the noise sources. These properties are of largely an 'industrial' nature and may therefore be considered less sensitive, especially where heavy plant or noisy processes are in operation. In addition, the prevailing wind is from an easterly direction. Which may also have a noticeable effect in reducing the noise levels on adjacent property.

All construction activities will be of a temporary nature. It is anticipated that the piling will be undertaken over an 8 to 12 week period.

8.2.4.1 Mitigation Measures

It is not possible to avoid the construction techniques above, however the following mitigation measures are proposed to reduce the impacts.

- Construction workers will be provided with appropriate ear protection
- Use of vibratory hand operated equipment will be minimised
- Noisy operations will be restricted to daytime operation
- Power generator and other equipment should be state-of-the-art and equipped with silencers/mufflers where the option is available
- Effect a noise regulation policy for all operations in accordance with the Environmental management and Coordination (Noise and Excessive vibration pollution) Regulation.
- Construction plant will be maintained in good running order; all vehicles should comply with the requirements of Road Traffic Act.

The potential noise and vibration impacts during construction are therefore assessed as low.

8.2.5 Air quality

The main issues with regard to air quality during construction are:

- Dust generated during the earthworks, mud on roads
- Exhaust gases from the operation of heavy plant can be a potent source of NOx, CO, PM and other pollutants

Impact receptors will be:

- Construction workers within the site
- Personnel on adjacent properties closest to the noise source.

Adjacent properties are located a significant distance from the construction site and this will provide a significant buffer to the proliferation of dust nuisance. In addition the prevailing easterly wind will tend to also reduce the impact, however it is noted that when the wind turns from the south or the west this could exacerbate any nuisance.

8.2.5.1 Mitigation Measures

The following mitigation measures are proposed to reduce the air quality impacts.

- For potentially dusty earth works operations, construction workers to be enclosed within ventilated cabs or provided with facemasks for potentially dusty earth works operations.
- Where appropriate water damping to be used to control dust. Particular attention to be paid when the wind is from the south or west.
- Limit traffic speed and restrict movement of vehicles as to minimize dust generation
- Construction plant will be maintained in good running order; all vehicles should comply with the requirements of Road Traffic Act and its subsequent regulations for emission control.

The potential air quality impacts during construction are therefore assessed as **low**.

8.2.6 Water Usage

It is assumed that all potable/fresh water requirements during the construction stage will be met through bowsers provided by Coast Water Services Board (CWSB), or a temporary CWSB connection to feed the site compound.

Potable and fresh water will be provided for the welfare of construction workers, for wash-down of equipment and for damping down of earthworks to reduce dust. These requirements will be commensurate with efficient construction practices. A considerable volume of water will be required for the hydro-testing of the pressure vessels. It is proposed that this will be pumped directly from the sea into the clean vessels. Following testing, the uncontaminated water will be discharged to the sea. Seawater may also be used for damping down during earthworks operations.

8.2.6.1 Mitigation Measures

- Install and properly manage site sanitation facilities
- Ensure that all taps are well fit and leaking
- Ensure that portable water is not used in ablution or sanitary facilities.

Therefore potential potable water usage impacts during construction are therefore assessed as **low**.

8.2.7 Energy Usage

It is assumed that all electrical requirements during the construction stage will be met through on-site generators or a temporary Kenya Power connection to feed a site office. It is in the contractor's interests to ensure that fuel consumption is reduced to a minimum and commensurate with efficient construction practices.

8.2.7.1 Mitigation Measures

- Ensure that all lighting system are switched off when not in use
- Install energy saving bulbs
- Design the office infrastructure to maximise the use of natural light.
- Install metering system for monitoring

Therefore, potential energy usage impacts during construction are therefore assessed as **low**.

8.2.8 Road Traffic

Road traffic will be generated to and from site during the construction stage due to;

- Transportation of construction workers using the existing road network.
- Transportation of imported construction materials using the existing road network; i.e. imported mound fill, ready mixed concrete, reinforcement, road materials, other building materials.
- Transportation of exported fill to an agreed reclamation site or other licensed dumping ground.

Impact receptors will be:

- Users of the entrance roads and the connecting public access.

It is estimated that a peak of approximately 20 HGV movements (each way, to and from site) per day will be necessary during the earthworks activities. In the context of the adjacent port and industrial operations, it is considered that these additional HGV movements will have a low impact on the intensification of vehicular traffic on the existing road system.

The likely increase in HGV movements during peak construction (8 to 12 weeks) will therefore amount to minimal compared to the existing situation. This impact is therefore assessed as negligible and it is proposed that a full Traffic Impact Assessment is not necessary.

Road users which are likely to be most affected by the construction traffic are Mombasa Yacht Club and Milly Glass Works, however the Site activities themselves will be well confined and it is proposed that close liaison with these parties will avoid any significant nuisance.

8.2.8.1 Mitigation Measures

In order to minimise the impact of additional road traffic during construction stage the following measures will be adopted:

- Deliveries will be made to site outside of the periods of high congestion on the public road system (i.e. early morning, late afternoon).

- Materials haulage companies to use competent drivers and ensure that shift patterns do not result in excessive working hours resulting in compromised road safety
- All haulage vehicles shall be maintained in good running order and should comply with the requirements of Road Traffic Act.
- Should the surface materials at site generated by preliminary earthworks and piling be of suitable quality these materials shall be deployed and the volume of imported materials diminished.
- Where feasible, and to limit the number of movements of haulage vehicles to and from the Port area, it is anticipated that bulk materials will be shipped to Port and moved directly to site (i.e. steel reinforcement, geogrid, etc. subject to appropriate port clearance).

Potential road traffic impacts during construction are therefore assessed as **low**.

8.2.9 Impacts on Terrestrial Biodiversity

Construction activities at the project site will require stripping of top soils and clearance of few trees, shrubs and vegetation where the facilities will be located. Although minimal, few floral species mainly *Azadirachta indica* and *Mangifera indica* as well as *leuceana spp* species will be cut to pave way for new facilities. The project site has no rare or scarce plant species, the vegetation consists mainly grasses and common shrubs. In addition, the Site lies largely on reclaimed land with the surface material comprising 100% fill material with no landscaped features of any kind; it is therefore determined that, there is negligible impact to terrestrial biodiversity.

8.2.9.1 Mitigation Measures

- Plant more ornamental trees/flowers to stabilize stripped top soil.
- Clear vegetation only in construction areas and demarcate areas where no clearing will happen.
- Educate contractors on the importance of flora and fauna in the area, including the appropriate regulatory requirements to preserve fauna and flora
- Avoid/minimize paved surfaces on the site,

8.2.10 Water Quality

During construction poor maintenance and operation of heavy trucks and equipment might lead to oil and fuel spills at the construction site which may contaminate land and surface water resources in the area. Other sources include; Silt load run-off due to surface erosion particularly during earthworks activities and fuel storage and re-fuelling of vehicles, liquid bitumen from asphalt surfacing.

The Site is also located centrally within the main industrial area of Mombasa County. Recently the southern portion of the project site was extended further seawards by the construction of the private berth and the reclamation of more land. Hence the immediate marine ecosystem

is not considered to be of a 'sensitive' nature. However, In order to minimise the risk of reduced water quality during construction stage the following measures will be adopted.

8.2.10.1 Mitigation measures

- Earthworks activities shall be halted when rain conditions are such that excessive erosion and silt loaded run-off noticed.
- The construction programme will avoid excessive exposure of bare earth surfaces which may be more prone to erosion.
- If appropriate, settlement lagoons can be used to allow silts to be retained prior to discharge of run-off to the existing drainage channels or direct to sea;
- Care will be taken to avoid excessive mud being transferred by construction plant to the access roads and public highway. Where this is likely to become a nuisance it will be cleared by the Contractor.
- Consideration will be given to undertaking routine maintenance of plant and vehicles off-site in a properly equipped workshop
- All haulage vehicles shall be maintained in good running condition and should comply with the requirements of Road Traffic Act.
- Existing drainage channels to be cleared of silt / debris and trash screens installed if appropriate.
- Used oil interceptors shall be installed to trap any accidental leakages.
- All effluent shall be treated before discharge to any sewer line

8.2.11 Solid Waste

Construction activities will lead to solid waste generation mainly from Non-degradable and non-toxic materials: Such as Plastic and metal packaging materials, excess concrete from ready-mix deliveries, Metal off-cuts from trimming reinforcing bars and pipes to length. Whereas Degradable and non-toxic: shall be generated from food wastes, Papers, cardboard and timber packaging materials and this will lead to an increased load on the municipal/County waste authority.

All options will be considered in avoiding or minimising transporting any unsuitable excavated materials from site, as this is undesirable from both an ecological and economic perspective. The quantity of material for disposal will be determined by further soils investigation and testing. The identification of a suitable reclamation area or dumping ground will be through further discussions with the KPA in consultation with the County Government of Mombasa and will of course be subject to appropriate licensing. A location close to the Site will be preferred.

In order to minimise the impacts due to the generation of solid wastes during construction stage the following measures will be adopted;

8.2.11.1 Mitigation Measures

- The contractor shall put in place a waste management plan aimed at minimising the production of all wastes.
- Where possible measures will be put in place to recycle materials such as metal off-cuts, some plastics and clean paper/cardboard utilising existing specialist recycling firms in Kenya.
- A suitable location within site for placing excess concrete and washing down equipment will be agreed with no discernable impact.
- Non-recyclable materials will be segregated and stored in plastic bins, collected and disposed of through the municipal waste system.
- Provide disposal bins at designated areas at the project site to help in waste segregation to encourage recycling.
- Enforce regular collection and disposal of garbage by the project contractor through licensed NEMA waste handler
- Clean storm water drains to minimize clogging

Potential impacts due to the generation of solid wastes during construction are therefore was assessed as being **Low**.

Potential impacts due to the possible spread of unsuitable excavated materials will be assessed when the quantity and location is known. However, it is reasonable to assume that measures can be put in place to ensure that high impacts are avoided, with a resulting impact being either low or moderate.

8.2.12 Foul Smell

There shall be effluents from the civil works, workers and storm water drainage. It is envisaged that during construction stage, effluents that shall be discharged will be domestic effluent generated by the construction workers which will peak at an estimated 100 people per day. Essentially from toilets, showers and mess facilities.

No construction process related effluents will be generated.

8.2.12.1 Mitigation measures

- Firm measures will be enforced to ensure that construction workers do not foul areas surrounding the site.
- The sewerage will be collected and treated via an on-site septic tank and leaching field, with arrangements in place for periodic de-sludging and disposal using a licensed carrier by County Government of Mombasa and NEMA.

Potential impacts due to the generation of foul effluent during construction are therefore assessed to be **Low**.

8.2.13 Landscape and Visual Environment

Construction activities such as clearing of top soil and few shrubs, transportation of earth moving materials/equipment to the site and construction of the storage mounds will have insignificant impact on aesthetic values of the area. In addition the size of the LPG mound is considerable (21m high, approx. 90m x 75m base). This is considered in the context of the adjacent port facilities and an extensive number of large industrial sheds, buildings and other structures.

Whilst the proportions of the mound are large, they are not dissimilar to many of the industrial buildings within the port. As the sides of the mound will be concrete clad, this may from a distance appear 'building like'. It is considered that existing port structures will continue to dominate the skyline.

An appropriate level of external lighting will be installed for operational and security purposes. In the context of the adjacent port facilities, which also utilise external lighting this is not considered to be significantly visually detrimental. Despite the facility posing no major visual impact consider the following mitigation measures where appropriate.

8.2.13.1 Mitigation measures

- Consider suitable paint colour for large structures that can blend with the background minimise visual impact to adjacent areas.
- Ensure good housekeeping of the site in order to create a positive image in the eyes of the public.
- Consolidating facilities within the boundaries of the project area
- Designing fencing to follow the contour of natural and planned vegetation to maximum visual screening to the extent practicable
- Use of directional lighting to limit light spill (i.e. spread of light outwards from where it is needed into adjacent areas)

8.2.14 Occupational Accidents

Construction workers are prone to accidents resulting from construction activities. These accidents may have acute or chronic impacts depending on nature, severity and intensity. In this regard, construction and mobilization activities of the proposed LPG storage facility would result into accidental injuries and hazards which can negatively impact the workforce. Because of the intensive engineering and construction activities including erection and fastening of roofing materials, metal grinding and cutting, concrete work, steel erection and welding among others, construction workers will be exposed to risks of accidents and injuries. At times, such injuries may be from accidental falls from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others.

8.2.14.1 Mitigation Measures

The proponent should provide and maintain a working environment in which employees are not exposed to hazards through:

- maintaining safe workplaces, plant and work systems;
- providing information, instruction and trainings;
- consulting with employee-elected health and safety representatives and/ or other employees about occupational health, safety and welfare;
- providing adequate personal protective clothing and equipment;
- ensuring all work procedures are undertaken without exposing workers to hazards;
- staff needs to be educated on preventing infection by thorough hand washing after work and before eating and also by ensuring all PPE are in good condition;
- adequate respiratory protection including properly fitted masks equipped with filters especially designed to capture dust and micro-organisms shall be provided;
- ensuring chemicals are stored in a designated enclosed area, and material safety data sheets (MSDS) that provide advice on storage, emergency and first aid of these chemicals are within easy reach;
- Install and operationalize effective Fire-fighting and Emergency Evacuation Plans;
- ensuring that there are basic first aid facilities for staff and clean up equipment for any spills that occur; and
- Training should be provided for all staff to ensure adequate knowledge of safe manual handling and correct use of equipment and vehicles by covering all safety procedures to ensure that general work safety exists on the project.

8.2.15 Employment opportunities

Construction of the storage terminal will have substantial labour benefits to the county. Labour required from the local workforce is estimated to be 200,000 man hours. It is therefore concluded that the provision of employment opportunities during construction will therefore provide a positive socio-economic impact.

8.2.16 Impacts on Security

The presence of labourers and expensive construction equipment, machinery and materials in the sites could potentially pose a security risk at the project site. Furthermore, offenders may capitalize on the increased movement during construction and anonymity created by the construction activities to carry out criminal activities in the site and surrounding areas. The impacts on the area's security are considered to be of medium significance. Therefore, appropriate security measures should be provided at the site through fencing, security checks/screening of workers and their guests and 24 hours security watch by expert security men to prevent such criminal activities from happening at the site.

8.2.17 Income Generation among Suppliers

During construction phase, the proposed project plan to import construction materials from overseas countries and also source locally available materials such as cement, iron sheets, steel bars, pipes, etc. from the local market. This demand therefore, will create market for local people in Mombasa and/or elsewhere in the country engaged in supplying construction materials leading to significant positive economic benefits to suppliers in Mombasa.

8.2.18 Increased STDs and HIV/AIDS Cases

The project is expected to employ or contract a significant number of staffs and casual labourers during construction and operation phases. Social interactions among staffs and with locals cannot be avoided. Considering the nature with which HIV/AIDS is contracted and spread, this number is significant to make a serious contribution to the pandemic. Also, presence of monetary strength will act as catalyst and thus enhance such social interactions between the project workers and the local people. The extent of this impact is localized with a medium intensity. It is likely that the impact might occur. The impact can be highly improved/eliminated with mitigation. Therefore, the impact is negative and of high significance.

8.2.19 Informal Business Growth

During construction period the informal sector will benefit from the operations. This will involve different local entrepreneurs such as local food vending operators who will be selling their products and services to be used on site. Such a move for instance, shall promote these local entrepreneurs in the local areas as most of the workers working on the proposed project site will be buying food from them.

8.2.20 Impact on surrounding social facilities

The impact on the surrounding social facilities and services will be detrimental. A study of the area suggests that the existing social facilities are not sufficient to sustain and accommodate the people who currently live in the area hence the pressure that will be placed on the resources. This is very significant and the proponent needs to make plans on how basic needs will be met by his work force. Such social facilities include water supply and healthcare facilities.

8.3 OPERATIONAL PHASE IMPACTS

The impacts of potential increases to future production of downstream LPG bottling plants is outside the scope of this assessment.

The global impacts of increased local consumption of LPG are also outside the scope of this assessment.

8.3.1 Soil Erosion

Environmental baseline data of soils is documented to provide a baseline against which possible impacts were to be assessed. Soil erosion would occur during the operational phase activities involving earthworks during maintenance and rehabilitation activities. Paved surfaces and compacted soil could decrease soil absorptive capacity and result to increased surface run-off. The surface run-off could result to adverse effects such as erosion of the top soil layer and blockage of surface drainage.

8.3.1.1 Mitigation

- Minimal earthworks to be undertaken during rehabilitation,
- Restore all the sites that were damaged during rehabilitation,
- Have appropriate soil stabilization measures adopted on the site,
- All storm water should be drained separately and not allowed into the pits

8.3.2 Marine and Aquatic Environment

The impact sources from the project operations will include mobilization of equipment and machinery, construction wastes, oil leakages and storm water. These potential sources might have detrimental effects to coastal and marine sources / habitats if poorly implemented. Therefore, owing to the geomorphological and drainage nature and pattern on the site, the aquatic/marine environments will be susceptible to changes in surface hydrology and contamination of surface water and the marine environment especially during rainy seasons as a result of increased storm run-off. Contaminations of the water sources through sedimentation as a result of surface run-off, refuse/ garbage disposal /septic systems, and fuel/ oil based products. These processes might then lead to a change in the ecology of the marine/ aquatic environments and also the socio-economic well-being of the local communities as a consequence of related possible reduced productivity of the aquatic habitats in the adjacent areas. This can be through disturbance to benthic habitats, marine pollution from accidental discharges and introduction of invasive marine species.

8.3.2.1 Mitigations Measures:

- The project site is in a KPA regulated area with limited activities permitted,
- LPG Vessels/storage tanks utilized for the activity are not allowed to leak or discharge content
- All equipment, vehicles and machinery should be sanitized prior to mobilization to the project site to avoid transfer of invasive/alien species and remove bio fouling
- All project activities should be located away from shores of the Indian Ocean, sea grass beds, coral reef areas, productive shallow water areas and any other environmentally sensitive area;
- All sewage and putrescible wastes should be handled and disposed-off in accordance with EMCA Waste management regulation, 2006

- All harmful packaged substances should be handled and disposed of in accordance with MARPOL Annex V
- A Garbage Management Plan should be put in place detailing wastes generated and disposal requirements. There should be no discharge of plastics or plastic products of any kind from vessels to the aquatic environment
- All storage facilities and handling equipment will be in good working order and designed in such a way as to prevent and contain any spillage as far as practicable
- All solid, liquid and hazardous wastes (other than sewage, grey water and putrescible wastes) should be compacted and stored in designated areas and sent onshore for recycling, disposal, treatment or appropriate final disposal;
- There should be Correct segregation of solid and hazardous wastes
- Used motor oil and filters from vehicles and generators should be properly disposed-off; and
- A log of any chemicals and motor oil disposed should be maintained. This should include the quantity disposed and the disposal location

8.3.3 Noise

The normal operation and maintenance of the proposed facility will generate little, if any noise.

The number of LPG ship movements is expected to increase along with the maximum size of vessel up to 25,000DWT. This noise impact generated by these vessels should be considered in the context of the existing port operations at both Port Reitz Container Terminal and Kipevu Oil Terminal. At both locations the average vessel size is considerably larger and the number of ship movements greater by a significant amount. In addition the activities of the offloading cranes and stacking vehicles generate noise. Due to the fact that there is no mechanical handling operation during import, and the pumps will generate little noise, the LPG berthing and offloading activities are significantly quieter than the container terminal or KOT. The berth on the site already regularly docks large fuel vessels. More significantly, there already exists a dedicated berth at the neighbouring facility for unloading into fuel storage, Mbaraki Bulk Terminal, which handles fuel vessels up to 50,000 DWT. Dredging plans for the Port will increase this capacity to 80,000DWT. This is significantly larger than the planned vessels to unload at the MGT facility.

Adjacent properties are of an 'industrial' nature and may therefore be considered of limited sensitivity, especially where heavy plant or noisy processes are in operation (i.e. tipping of coal, fabrication etc.).

8.3.3.1 Mitigation Measures

- Ensure that all workers are provided with appropriate ear protection equipment
- Noisy operations will be restricted to daytime operation
- Power generator and other equipment should be state-of-the-art and equipped with silencers/mufflers where the option is available

- Effect a noise regulation policy for all operations in accordance with the Environmental management and Coordination (Noise and Excessive vibration pollution) Regulation.
- Ensure that all vehicles should with the requirements of Road Traffic Act.

Potential noise impacts during operation are therefore assessed as **low.**

8.3.4 Air quality

There are no venting scenarios anticipated during normal operation of the proposed facility, including offloading of LPG carriers. Vapour displaced from the storage tanks of the LPG carriers is fed back to the mound (and vice-versa) as a closed system to prevent major pressure changes between the LPG in storage at the mound and ship.

There are no venting scenarios anticipated during normal maintenance. The facility utilises LPG compressors to recover liquids and vapours from the LPG Terminal between valve isolations. Vapours are compressed and liquefied and then returned to any remaining active storage or export to a ship if necessary.

'Stenching' (or odorising) of the LPG product does not take place at the proposed facility, therefore the risk of odour nuisance from spills is eliminated.

In the unlikely event of a LPG release dispersion of a liquid LPG release to below its Lower Explosive Limit is neither toxic nor polluting.

8.3.4.1 Mitigation Measures

The following mitigation measures are proposed to reduce the air quality impacts.

- Where appropriate water damping to be used to control dust. Particular attention to be paid when the wind is from the south or west.
- Limit traffic speed and restrict movement of vehicles as to minimize dust generation
- Ensure all vehicles have complied with the requirements of Road Traffic Act and its subsequent regulations for emission control.

Potential air quality impacts during operation are therefore assessed as **low**.

8.3.5 Water usage

A potable water connection shall be provided by the CWSB supply. Based on a daily consumption estimate of 50L per person per day the water supply required shall be no more than 1,000L per day. This increased demand in the local CWSB network may be considered negligible; however commitment of supply must still be sought from CWSB and any improvements to offsite infrastructure agreed.

8.3.5.1 Mitigation Measures

In order to minimise the impacts during operation due to increased water usage the following measures will be adopted:

- The site distribution network and connection to the CWSB supply will be designed and constructed to industry standard specifications to ensure losses within the new network are reduced to a minimum.
- Where appropriate, water efficient fittings will be used, i.e. wash hand basins, showers etc.

The firewater distribution system will connect to an MGT owned and maintained dedicated firewater pump house located at the facility. This utilises sea water and therefore does not require any form of tanked storage or connection to the CWSB supply.

Potential potable water usage impacts during operation are therefore assessed as **low.**

8.3.6 Energy usage

An electrical power connection shall be provided by the Kenya Power. The electrical power requirements for the facility during normal background operations are estimated as 30KVA. The peak electrical power requirement is estimated 650KVA whilst re-exporting to ships. This increased demand in the local Kenya Power network may be considered negligible; however commitment of supply must still be sought from Kenya Power and any improvements to offsite infrastructure agreed.

8.3.6.1 Mitigation Measures

In order to minimise the impacts during operation due to increased energy usage the following measures will be adopted:

- The facility will be provided with LPG fuelled generators to provide operational back-up should the Kenya Power supply be interrupted.
- Where appropriate, energy efficient fittings will be used, i.e. lighting, controls etc.

Potential energy usage impacts during operation are therefore assessed as **low**.

8.3.7 Road Traffic

The staffing levels during normal operation and maintenance are estimated between 10 and 13. Road traffic to the site will comprise staff vehicles and the occasional delivery vehicle for maintenance or 'domestic' goods as well as trucks loading LPG for wider distribution, MGT expects 1-2 trucks per hour at peak.

8.3.7.1 Mitigation Measures

In order to minimise the impact of additional road traffic during operational phase, the following measures will be adopted:

- Ensure that outward distributions are made outside of the periods of high congestion on the public road system (i.e. early morning, late afternoon).
- Materials haulage companies to use competent drivers and ensure that shift patterns do not result in excessive working hours resulting in compromised road safety
- All haulage vehicles shall be maintained in good running order and should comply with the requirements of Road Traffic Act.

Potential Road traffic impacts during operation are therefore assessed as **low**.

8.3.8 Marine Traffic

LPG carriers will use the existing private berthing facility, which is located on site.

The number of LPG ship calls is anticipated to be one per month at peak of operations. This increase should be considered within the overall context of the port.

The size of the import LPG carriers will increase up to approximately 25,000 DTW. The container ships, which currently operate out of the Port Reitz Container Terminal are often significantly larger than the maximum anticipated size of LPG carrier, and will outnumber the large LPG significantly.

Increased LPG import through the private berth shall allow some congestion from the current import position at KOT to be alleviated.

Impact receptors will be:

- Other shipping operating within the vicinity harbour
- The marine environment and ecosystems
- Existing port infrastructure, berthing and offloading facilities

The anticipated increase in number of LPG carrier movements is non-negligible but is understood to be well within the capacity of the port.

8.3.8.1 Mitigation measures

- KPA to control and regulate shipping movements within the port area,
- KPA to have adequate controls enforced to ensure the safety of ship manoeuvres and berthing operations, and that this includes the avoidance and mitigation of potential negative environmental impacts.
- Put in place good marine traffic plan
- Work in collaboration with KPA to ensure the safety of ship movement and berthing operations.

On the assumption that adequate controls are in place regarding port shipping movements, the potential impacts due to the overall increase in movements and size of LPG Carriers are assessed as **low**.

The potential benefit to KPA and the anticipated alleviation of congestion at KOT are assessed as **positive.**

8.3.9 Water Quality

The main issue with regard to water quality during operation is the potential for hydrocarbon spills from vehicles or equipment during "maintenance" discharging into the marine receiving waters immediate West and South of the site. Another major source of risk to water quality is storm water run-off from the mound being contaminated by oil or other pollutants by virtue of any release of product being gas which will vaporise if released. *NB – there is no venting of gas during normal operations or maintenance*

In order to minimise the hazard from storm water run-off from the car park the following mitigation measures shall be employed.

8.3.9.1 Mitigation Measures

- The proponent to ensure that Oil interceptor is installed in all drainage system of the site to enable safe disposal of storm drain prior to discharge from site.
- A maintenance regime will be in place to ensure the correct functioning of the oil interceptor.
- The storm water drainage system within the site will, if appropriate, include trash screens and silt traps prior to discharge to the sea. These will be maintained by the operator, particularly after cyclonic conditions when the system may be put under stress.

For LPG carriers the ballast water is understood to be clean discharge, and therefore poses no pollution threat to marine or terrestrial ecosystem. Potential water quality impacts during operation are therefore assessed as **low**.

8.3.10 Generation of Solid Waste

During normal operation and maintenance of the facility no 'residues' are expected to be produced which will require disposal. Solid wastes produced during the operation of the facility are expected to be of a domestic nature comprising; Non-degradable and non-toxic: Plastic wrappings, miscellaneous office wastes such as printer cartridges and compact disks CDs amongst others while degradable and non-toxic: Food wastes, Paper and cardboards.

It is anticipated that not more than 10kg of wastes will be produced per day; this will be stored in plastic bins, collected and disposed of through the municipal waste system. Other feasible measures include;

8.3.10.1 Mitigation Measures

- The wastes should be properly segregated and separated to encourage recycling of recyclable materials using Kenyan firms.
- Provide dustbin cubicles at designated locations for collection point.

- Place waste receptacles at strategic points to discourage littering.
- The proponent to work hand in hand with private refuse handlers and the County Government of Mombasa to facilitate waste handling, and disposal from the site.

Potential impacts during operation due to the generation of solid wastes are therefore assessed as **low.**

8.3.11 Generation of Foul Effluents

There shall be effluents generation from administration staff and other workers/employees and it is envisaged that during operation stage, effluents that shall be discharged will be domestic effluent essentially from toilets, showers and mess facilities. The sludge will be channelled to on-site septic tank and leaching field, with arrangements in place for periodic de-sludging and disposal using a licensed carrier from either private or County Government waste handlers. Other measures are as outlined below;

8.3.11.1 Mitigation Measures

- Conduct regular inspections for sewer pipe blockages or damages and fix them before any leakage to terrestrial or aquatic environment;
- All drain pipes passing under the building, driveway or parking should be of heavy duty PVC pipe tube encased in 150mm concrete all round. All manholes on drive ways and parking areas should have heavy duty covers.
- Ensure no undue interference with the laid drainage system.

Potential impacts due to the generation of foul effluent during operation are therefore assessed as **low**.

8.3.12 Terrestrial Biodiversity

There is a little vegetation on the site at the moment which will be cleared to pave way for the project construction. However, during operation activities, fauna such as small bird life and Monkeys will have to find new nesting and homes. It was also observed that there is no terrestrial biodiversity of significance within the project site as most of birdlife observed are migratory.

8.3.12.1 Mitigation Measures

- Landscaping should be done within the site to improve site appearance after project completion.
- Minimize vegetation clearance and preserve few trees within the project site to provide nesting ground for birdlife and monkeys home.
- All Vehicles coming into the site must use designated roads
- Work areas should be clearly defined and demarcated, where necessary to avoid unnecessary disturbance on areas outside the development footprint.

- Develop a plan for control of harmful weeds and invasive plants that could occur as a result of new surface disturbance activities at the site.

Potential impacts to the terrestrial biodiversity during operation are therefore assessed as **low**.

8.3.13 Occupational health and safety

The calculated Individual Risk levels for all categories of staff do not exceed the acceptability criteria for broadly acceptable risk, and are one order of magnitude lower than the benchmark used by the major oil and gas companies (including Shell, Total, Esso, BP). The mounding minimises the risks present to the adjacent neighbours to a position where additional risk imposed on their operation is insignificant. The mound effectively eradicates jet fire and flash fire risk modes from propagating towards the adjacent neighbours. Pumps, compressors, liquid and vapour lines are planned to be located in a way that any potential leaks and subsequent potential jet fire from the equipment is deemed unlikely to impact the Operations, Maintenance and Administration Building. The orientation of the mound and position of the import and export pipework have been chosen to ensure that the predominant risk faces out towards the sea channel which is currently unoccupied. For this case, future development in this area will need to consider the mitigation of these risks either through the construction of a firewall, appropriate set-back and / or other measures.

8.3.13.1 Mitigation Measures for Site safety

- The number of mechanical joints should be kept to minimum, replace mechanical joints by welded joints where practicable. This shall be of help in reducing the leaks from flanges.
- Deployment of a local firewall around the equipment found on top of the mound to eradicate any potential fire radiation impact onto the roof of the building.
- Flammable gas detection system should be fitted across the site, including in the vicinity of the building.
- Ensure that upon flammable gas detection local to the HVAC intake duct, the building air HVAC is tripped to prevent gas ingress into the building
- Building should be constructed in-line with International standards, guided by the purpose of its usage.
- Hazardous Area Classification should be conducted and findings to be implemented.
- Active fire protection system should be designed in line with relevant international codes/ standards.
- Suitable standard operating procedures and Preventative maintenance programmes should be prepared and implemented.
- Site specific Emergency Response Plan shall be prepared.
- Any inspection and maintenance undertaken within the pressure vessels should be undertaken by personnel trained in confined spaces.
- All LPG liquids and vapours will be removed from the system using the dedicated compressors / recovery system, prior to entry.

- Public access to the undeveloped areas immediately adjacent to the facility shall continue to be controlled and monitored by the KPA (in liaison with the operational staff), and kept to a minimum.
- In the event of a cyclone the facility will be placed in Shutdown Mode with all ESD valves isolated. The control room will remain manned by a security guard. The existing rock revetment is approximately 4.0m above mean sea level (AMSL) and affords a first line of defence to storm surge and waves. The building will be constructed at an appropriate level AMSL to reduce the risk of flooding from storm surge to a minimum. Appropriate freeboard and slopes will be afforded around the building to avoid potential flooding due to surface water run-off. The building structure will be designed to resist wind gusts imposed during severe cyclones. Therefore the risk to the security guard during the cyclone will be similar to any well designed modern building.
- Applicable Occupational Health and Safety mitigation measures as outlined in construction phase will be implemented

8.3.14 Fire Prevention and Management

The proponent has developed fire procedures and guidance information that will be implemented on the project site to help in the prevention and management of fire. The document helps highlight fire hazards, precautions and suppression facilities necessary to prevent fires from occurring or spreading to prevent loss of life, serious injuries and damage to plant, equipment and structures. The major source of fire is likely to be caused by gas leakage which when it will come into contact with naked flames then there is the possibility of fire occurring on the site.

The following general instructions should be followed and adhered to by the proponent:

- Materials and equipment should be maintained in an orderly manner that reduces or prevents the possibility of fire spread.
- Materials should not be stored in a manner that obstructs fire points, sprinkler heads, alarms, emergency exits, electrical panels and walkways.
- Materials should not be stored close to, or in a manner that conceals, floor openings or hoist ways.
- Consideration should be given to the fire loading imposed in an area by the placement of materials.
- Doors provided for emergency escape should open outwards in the direction of travel.
- Equipment should not be fuelled while the engine is running.
- Smoking is prohibited whilst refuelling activities are taking place.
- Incompatible materials will not be stored in proximity to each other.
- ‘No smoking policy’ will be applied. Provide smoking areas away from the work site.

The fire detection, suppression and suppression systems to be installed will meet the highest international standards and are listed again below for convenience:

8.3.14.1 Safety Instrumented System (SIS)

A central dual mode redundant Safety Instrumented System (SIS) designed to SIL2 shall be deployed on a second Hima H51q platform with approximately 200 I/O (input/output). The Safety System shall be housed in a separate area of the cabinet suite with field cabling for safety loops segregated from PCMS wiring.

The SIS and PCMS systems will communicate with the Citect SCADA system and with each other via Ethernet using Hima's safety protocol and Modbus TCP respectively.

The Safety Instrumented System consolidates a number of systems together and provides real time information graphically for the following function groups.

- Point Gas Detectors
- Open Path Gas Detectors
- Fire Detectors
- Emergency Shutdown Devices
- ESD Valves
- CCTV System
- Lighting
- Nitrogen System
- Firewater System

8.3.15 Fire Fighting

Process unit fires should be extinguished principally by fuel removal. This will depend upon operational changes to reduce pressure, introducing steam to the systems and the de-pressuring of part or the entire unit involved. Small fires will be combated with dry chemical or steam. Foam will be used where it can blanket an ignited pool of liquid. Water in the form of spray or high pressure fog will be most effective on large area or intensive fires that threaten damage to supporting structures and adjacent equipment. However, the use of water on hot equipment may cause flanges and joints to leak, thereby adding to the fire hence the same will not be utilized. In case of electrical machinery fires, machine operators will switch to spare machine and no use of water or foam or de-energization allowed and only the use of dry chemical equipment or carbon dioxide extinguishers promoted.

8.3.16 Portable Fire Fighting Equipment

There should be portable fire-fighting equipment on the site and the proponent has committed to the provision of the same. Appropriate fire extinguishers, e.g. Carbon Dioxide or Dry Powder; must be provided close to electrical distribution panels and other major items of electrical equipment. An adequate number of portable fire extinguishers will also be made available throughout the project site, located in conspicuous positions close to exits on each floor, mounted off the floor at a height of approximately 1.0metre and clearly signed fire point. Training will also be undertaken for an adequate number of personnel in the use of these equipment and regular reviews be undertaken to make improvements of the short-falls.

8.3.17 Maintenance and Inspection

Fire extinguishers, hydrants and other fire protection equipment must be maintained and inspected on a regular basis. This will include weekly checks to ensure that all fire hydrants are clear of any obstruction and clearly marked, suitable fire extinguishers are in place adjacent to the fire risks and they are fully charged, undamaged, no signs of visible corrosion, clean from dirt and hoses are in good condition

8.3.18 Evacuation Routes

MGT will setup defined evacuation routes for vehicles and personnel. If a fire breaks out, all vehicles will quickly be moved from the area. Personnel not involved in fire-fighting fire must also leave. Evacuation routes should be the most direct route out of the fuel facility and the same routes should be clearly be displayed and shown on maps for all personnel to be aware.
Fire drills will be to train personnel to react quickly to fires. Fire drills should be as realistic as possible. Evacuation routes should be used and fire extinguishers manned. Fire drills should be conducted at least once a month or when there is personnel turnover.
In the event of a fire, major plant failure, explosion, bomb threat or the need to evacuate the plant, the actions listed below should be followed:

- On the continuous sound of the alarm siren (bells), STOP all activities and vacate the building or area without delay, by the nearest exit;
- Plant operators to initiate appropriate Emergency Management Procedures, and where possible, confirm plant is in safe state prior to vacating buildings;
- Move quickly, but do not run;
- Do not return to a work area to collect belongings;
- Keep left in corridors and stairs;
- Do not overtake others along the route;
- Assemble in the designated Assembly Point;
- At Assembly Point report to the responsible warden; and
- Do not enter the building or work area under any circumstances until the all clear is given.

During staff induction, all visitors and contractors admitted to the site should be advised of the Site Evacuation Procedure and the location of Assembly Point.

8.3.19 Emergency Preparedness and Response

MGT shall establish and implement an emergency response plan to respond effectively to emergency situations on the site which include, but not limited to, fire, flooding, major incident occurrence and security alert.
The emergency plan should:

- Establish evacuation procedures
- Assign responsibilities to specific individuals
- Provide notification to the Authority and outside agencies such as fire station, hospital, etc.
- Establish means of communications

- Assign locations for emergency centres
- Provide in-house emergency responses
- Include site security and controlled access

The information developed as part of the emergency plan should be documented and communicated as appropriate within the site to ensure that the site organization can respond to emergency situations. The Contractor should establish a program of training, drills and exercises to test and evaluate the effectiveness of the plan.
The Contractor should at least once every six months, organize and table top emergency exercises based on likely site scenarios in which the key site personnel work through their emergency response roles and appropriate measures are adopted and implemented on the site.

8.3.19.1 Emergency Planning –

MGT has prepared a site specific Emergency Response Plan which shall be agreed with the KPA and corresponds with the KPA's overall Port Emergency Plan. All members of staff will need to receive appropriate training on the implementation of the Emergency Response Plan. The Emergency Response Plan forms part of the Environmental Monitoring Plan. MGT will have a dedicated HSE officer and team to ensure the highest safety standards are maintained at all times.

The QRA undertaken concludes that;

- The calculated Individual Risk levels for all categories of staff do not exceed the acceptability criteria.
- The mound minimises the risks present to the adjacent neighbours to a position where additional risk imposed on their operation is insignificant.
- Pumps, compressors, liquid and vapour lines are planned to be located in such a way that any potential leaks and subsequent potential jet fire from the equipment is deemed unlikely to impact the Operations, Maintenance and Administration Building.
- The orientation of the mound and position of the import and export pipework have been chosen to ensure that the predominant risk faces out towards the channel which is currently unoccupied.

The following additional measures will be implemented to mitigate health and safety risks;

The number of mechanical joints should be kept to a minimum, Consider replacing mechanical joints by welded joints where practicable. This shall be of help in reducing the leaks from flanges.

- Deployment of a local firewall around the equipment found on top of the mound to eradicate any potential fire radiation impact onto the roof of the building.
- Flammable gas detection system shall be fitted across the site, including in the vicinity of the building.

- Ensure that upon flammable gas detection local to the HVAC intake duct, the building air HVAC is tripped to prevent gas ingress into the building
- Buildings shall be constructed inline with International standards, guided by the purpose of its usage.
- Hazardous Area Classification shall be conducted and findings shall be implemented.
- Active fire protection system shall be designed in line with relevant international codes/standards.
- Suitable standard operating procedures shall be prepared.
- Preventative maintenance programme shall be implemented.
- Site specific Emergency Response Plan has been prepared.
- Any inspection and maintenance undertaken within the pressure vessels will undertaken by personnel trained in confined spaces. All LPG liquids and vapours will be removed from the system using the dedicated compressors / recovery system, prior to entry.
- Public access to areas immediately adjacent to the facility shall continue to be controlled and monitored by the KPA (in liaison with the operational staff), and kept to a minimum.

Potential occupational health and safety impacts during operation are therefore assessed as **moderate**.

8.3.20 Cultural and historical heritage

The proposed facility is located on existing reclaimed land; therefore no impacts to cultural of historical impacts are anticipated during normal operation. The construction of the LPG terminal on existing reclaimed land will not have a significant impact on the existing context of the area

8.3.21 Socio-economic

The commissioning of this facility will provide the following positive impacts;

- Provision of the projected bulk storage requirements for Kenya up to 2025, as determined by the 2014 Petroleum Master Plan for Kenya.
- Allows larger delivery cargo sizes, the use of mid-sized refrigerated carriers and an economy of scale in the terminal build costs. All these factors combine to improve the delivered cost of gas for the import terminal operation.
- The commissioning of this facility will provide the additional storage capacity to permit the bulk storage facilities within the centre of the port area to be potentially decommissioned, in line with the KPA's strategic plan. This will result in a positive impact to safety risk in the centre of the Port.
- The proposed project has the potential of improving the living standards of the local people through employment and supplies opportunities. In addition Milio International through their CSR policy may initiate projects that have cumulative benefits to the residents of the project area

Potential socio-economic impacts during operation are therefore assessed as **positive.**

8.4 IMPACTS DURING DECOMMISSIONING

The life of the facility is expected to be a minimum of 30 years but it is anticipated that this can be extended provided a thorough Pressure Systems Written Scheme of Examination is adhered to.

The decommissioning of the facility will involve the pumping of sea-water into the pressure vessels to displace residual LPG. Nearly all of the LPG will be recovered and it is estimated that no more than 5T of LPG will be released to the atmosphere in a controlled manner by cyclic purge using Nitrogen dilution. The sea-water will be discharged direct to sea. This will be uncontaminated given that the source LPG is derived from refrigerated sources.

Demolition is the reverse of construction; however the following assumptions are made;

- The foundations and base slab for the mound will be rehabilitated for future alternative use, or left in-situ. Breaking up and removal should be avoided if possible.
- The precast components of the retaining wall should be examined as suitable for stockpiling and reuse, or sent to a local crusher plant for recycling.
- The piping components will be examined as suitable for recycling.
- It is anticipated that the mound fill, following removal and disposal of the geogrid, will be stockpiled on site for alternative re-use as a construction material locally. An alternative may be to raise the level of the site by spreading evenly.
- Vessels are unlikely to be scrapped. Upon examination the LPG vessels may be exported elsewhere for re-use.

8.4.1 Loss of Aesthetics due to abandoned project facilities

In closure of the project, the proponent may decide to demolish the facilities including all other temporary structures. Loss of aesthetics may result from the demolished waste remaining on site for a long time to the extent of becoming an eyesore. The proponent shall ensure that demolished waste is removed from the site and properly disposed of in designated and licensed dumpsites.

8.4.2 Loss of Employment

If for whatever reason the project is closed down, the people employed by the project will lose their jobs. This will have significant impact to these people and their families. Other groups of people who are dependent on the project, such as suppliers of various services (e.g. Security Company) will also lose the market. There is need for workers to have saving schemes that will cushion them in the event of losing employment.

8.4.3 Abandoned Infrastructure

When it happens that operation should be halted there will remain behind machinery which will need proper disposal. MGT should undertake proper decommissioning process of all its facility activities.

Therefore, the potential impacts during decommissioning and demolition are summarised as follows:

- Noise and vibration - low
- Air quality - low
- Water usage - low
- Energy usage - low
- Road Traffic – low or moderate
- Export of LPG vessels by Sea - low
- Water quality - low
- Generation of solid wastes - low
- Generation of foul effluents - low
- Terrestrial biodiversity - low
- Employment opportunities - positive

8.4.4 Fire Prevention and Management

Fire prevention and management measures developed during operation phase shall be implemented by MGT and contractors.

9. CUMULATIVE IMPACTS

9.1 Introduction

Cumulative impacts are divided into two categories; additive and in combination.

Additive impacts – these are impacts that may result from the combined or incremental effects of present and future activities. While a single activity may itself result in an insignificant impact, it may, when combined with other impacts (significant or insignificant) in the same geographical area and occurring at the same time, result in a cumulative impact that is significant.

In-combination impacts – occur where different types of impact from the project being considered are likely to affect the same environmental or socioeconomic features. For example, a sensitive receptor being affected by both noise and dust during construction could potentially experience a combined effect greater than the individual impacts in isolation. Details of the various expected cumulative impacts are provided in the following sections.

9.2 Temporal and spatial boundaries

The spatial boundaries within which a cumulative effect could happen are defined by the area of influence of the project. The temporal boundaries within which a cumulative effect could occur include: the period during which the construction of LPG storage area and associated facilities and as well as during the project operational phase.

9.3 Assessment of potential additive impacts

Additive impacts that may arise as a result of the project activities are explained as follows:

- The combined impacts on terrestrial environment and vegetation clearance would be of low significance given the construction work will be confined to AMOG site. However, MGT and the contractor should liaise with each other so as to reduce the vegetation clearance on the site;
- Both during construction and operational phases considerable oil leaks and associated surface run-off may be experience hence the need to have a Site Oil Contingency Plan
- Negative effects on air quality may occur from dust generated by project traffic and construction related activities, but these will be of low significance, given the temporary nature of the construction work in a one given area and the limited amount of trucks used to transport the gas;
- It is anticipated that there will be an increase in traffic along the roads leading to the site and this could lead to an increased risk of traffic accidents. There is need for effective and efficient journey and traffic management plans to be developed and implemented;

- There is potential for cumulative beneficial impacts arising from employment of local people, but the overall impact will be low as the majority of the workforce needed require skills that might not be available locally; and
- The presence of the LPG Storage facility will reduce effects of stock outs and in the long run help reduce the prices of cooking gas in the country.

9.4 Assessment of 'in-combination' impacts

The assessment of the combined effects of individual impacts of a project relies on a qualitative assessment of potential interactions using available information and professional judgment and experience. Some types of impact are considered to have direct inter-relationships that could potentially occur interactively to generate a combined effect on sensitive receptors. For example noise, vibration, traffic, dust and visual intrusion occurring together during construction or operations have a combined effect. Some other types of impact have limited or no potential to have a combined impact on sensitive receptors. If this occurs, they could potentially experience a combination of temporary effects associated with increased noise, vibration, localised dust generation, visual intrusion and risk of accidents with both construction and operational traffic.

9.5 Other Projects

The other projects or operational facilities that will interact with the MGT LPG storage facility and with likely significant impacts are outlined below:

9.5.1 AMOG Ship Breaking Yard

The MGT project site is adjacent to the AMOG ship yard and without due diligence the combined impacts/ practices will be highly significant on the biophysical and human environment. The likely practices will include release of oils, asbestos and toxic paints into the local environment. This is likely to disrupt the marine line as well as impact on the workers on the site through pollution and exposure to toxins.

During the ship dismantling process emissions are likely to be emitted into the air as well as controlled and uncontrolled fires. For example, fires can be caused by burning cables in open as well as irresponsible ways of separating valuable metals from insulation materials such as Polyvinyl Chloride (PVC). PVC produces dioxin, Hydrochloric acid vapour and thick smoke when burned. Uncontrolled fires are also likely to result as a consequence of explosions that occur during cutting when there is fuel or flammable cargo residues inside the ship hull. When a scrap ship bursts into flames, the variety of emission in to the air is extensive and when the emissions released from the LPG storage facility there will be significant impacts at the local level. Fires released from the AMOG ship yard are likely to come into contact with leakages from the MGT LPG facility and thus the need for safety precautions. Basel Convention (2013) report recognizes that even with best practices still some amount of emissions will be emitted in to the atmosphere, but under controlled working environment the quantities are small.

The other combined impact from both the AMOG shipping yard and the MGT storage LPG facility is the one against marine ecosystem. The ships from the yard are run ashore when the tide water is high and anchored to wait for the low tide. During the low tides the vessels are accessed by foot and ships emptied of all the machinery and equipment. Other cause of pollution is from remains of fuel and other oily consumables such as lubricants and hydraulic oils that are removed and rolled in barrels across the beaches. The main pollutants that are likely to be experienced and have the potential to cause pollution and impact on the marine ecosystem include; toxic and persistent heavy metals, petroleum hydrocarbons and bacterial contaminants. The environmental impacts are further likely to be exacerbated by working on bare soil and thus also impact on the micro-organisms.

Ship breaking and dismantling workers are exposed to hazards that are not immediate but have serious long-term impact on their health. The hazards include workers being in contact with substances that are harmful to the health. Long term exposure to toxic materials to the health of the workers and the associated exposures from MGT facility will increase occupational health hazards.

Significance

- Ocean pollution and marine ecosystem disturbance;
- Emissions to air and possible fire outbreaks; and
- Occupational health hazards

9.5.2 Milly Glass Manufacturing

The impacts associated with glass manufacturing will include; air emissions, waste water and solid wastes.

The glass manufacturing process is a high-temperature, energy-intensive activity with associated emission of combustion by-products (sulphur dioxide, carbon dioxide, and nitrogen oxides) as well as oxidizing atmospheric nitrogen. Particulate Matter (PM) is also found in furnace emissions and may contain low levels of metals while emissions from the forming and finishing phases are related to the various types of glass production processes.

Particulate Matter are a significant pollutant emitted by glass manufacturing facilities as all the various sub-sectors of glass manufacturing involve the use of powdered, granular, or dusty raw materials. Raw materials storage and mixing are also common activities for all glass industry sub-sectors. Dust emissions are an expected result of raw materials transportation, handling, storage, and mixing. Dust generated by these processes is typically coarser than the particulates emitted from the hot processes, which have sizes below 1 μm, but the small particulates readily agglomerate into larger particles. For the dust emitted from handling processes result to occupational health and safety (OHS) issues, PM from hot processes in the batch plant is a potential environmental issue. Particulate Matter is a key health issue as particles of metals, chemicals, acids and dust that the particulates are comprised of are so tiny (10 micrometers or even smaller) and are able or easily enters the nose and throat to reach the lungs where damage is felt.

During glass manufacturing process, air-polluting compounds such as nitrogen oxides, sulphur dioxide and particulate matter are normally released.

Another important aspect of the glass manufacturing process is the industrial waste water. Water uses typically will involve those used for cooling and cullet cleaning. Aqueous emissions thus consist of contact cooling water system purges, cleaning waters, and surface water runoff. The water from the industrial process should thus be well managed and not released into the environment before attaining the relevant required water standards as it relates to Waste Water Management. Care should also be taken to minimize the liquid effluents being released from the glass manufacturing process.

Solid waste is also released from the glass manufacturing processes. Solid waste is mainly generated from glass shipping areas. Clean-up and maintenance in receiving areas can reduce this waste and allow material spills to be collected and added to the raw materials. Paving the receiving areas could allow for efficient and effective collection or clean-up and allows spilled material to be adequately identified, segregated, and recycled into the process.

The most significant occupational health and safety hazards occurring during the operational phase of glass manufacturing project include the following; exposure to heat, exposure to noise, exposure to respiratory hazards, physical hazards and electrical hazards.

Mitigation measures will include construction of a proximity wall between MGT and AMOG sites. In addition, all operations at AMOG will cease during vessel unloading at MGT.

Significance

- Occupational health and safety hazards;
- Liquid and solid wastes generation; and
- Air Pollution

9.5.3 Base Titanium, Likoni Port Facility

Base Resources wholly-owned subsidiary, Base Titanium Limited, operates the 100% owned Kwale Mineral Sands Operations in Kenya, which commenced production in late 2013.The company is involved in the extraction of titanium-bearing minerals (such as ilmenite, rutile and Zircon). After the separation of the three minerals the ilmenite and most of the rutile produced is then transported in bulk to Base's own Likoni Port facility and the balance of the rutile and all of the zircon produced is containerized and transported to the main Mombasa container port.

From the development of a ship loading facility at Likoni and access roads created, moderate impact on plant species diversity such as the coral rag forest was disturbed. The clearance of the site for the port related facilities led to the loss of forest habitat and the fragmentation of the forest and thus impacting on the fauna. Construction of a jetty at the port also caused impacts on the benthic habitat, oil spillages and heavy metals or mineral spillage into the Ocean are also possible sources of marine pollution and will impact on the marine life. From the operation of the jetty channel edge communities will be affected, effects of opportunistic

species are also likely to result in the long term and invasive marine species could be experienced.

The operation of the Likoni Port Facility by Base Titanium is also likely to impact on the occupational, health and safety of the workers employed. The effects would include radiation effects and respiratory related diseases from the project facilities.

Significance

- There is the risk of shipping accidents that would be caused at the project site;
- Marine traffic at the project facility; and
- Community health and safety

9.5.4 Comarco Marine Contractors and Logistic Specialists Company

The Comarco Group ("Comarco") was established in Mombasa, Kenya in 1971 before expanding its range of activities and area of operations to working throughout the Indian Ocean and along the entire eastern Africa seaboard and interior. The company currently operates throughout Asia and Africa providing services by sea and river, over beaches and on land to the oil industry, offshore and onshore projects, construction and logistics organisations using their experience, know-how, and equipment. Currently, Comarco is the leading marine and specialized contractor, with over forty years of experience in the region, owning and operating its own fleet of tugs, barges, supply vessels and specialized equipment for offshore, close shore and beach operations.

Significance

- There is the risk of shipping accidents that would be caused at the project site;
- Marine traffic; and
- Road traffic is expected and that may result to conflicts among MGT and Comarco.

9.5.5 Transboundary impacts

According to IFC Guide Note (GN) 36, transboundary impacts refer those impacts that extend to multiple countries, beyond the host country of the project, but are not global in nature. Some of the notable transboundary impacts include air pollution extending to multiple countries, use or pollution of international waterways, and transboundary epidemic disease transmission. For the MGT LPG Storage facility, transboundary impacts are not anticipated as minimal oil spillages might occur and containment measures have been put in place while although there might be compromise to the air quality , the same will be localised at the project site.

10. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental and Social Management Plan (ESMP) specifies the mitigation and management measures which the proponent will undertake and shows how the project will mobilize organizational capacity and resources to implement these measures. The EMP covers information on the management and/or mitigation measures that will be taken into consideration to address impacts in respect of the following project phases: design, construction, operation and decommissioning

The proposed ESMP will be the responsibility of the project proponent and the approach to be employed in managing impacts is as follows;

Approach	Description
Avoidance	Avoiding activities that could result in adverse impacts and/ or resources or areas considered sensitive
Prevention	Preventing the occurrence of negative environmental impacts and/ or preventing such an occurrence having negative impacts.
Minimization	Limiting or reducing the degree, extent, magnitude or duration of adverse impacts through scaling down, relocating, redesigning and or realigning elements of the project
Mitigation	Measures taken to minimize adverse impacts on the environment
Enhancement	Magnifying and/ or improving the positive effects or benefits of a project
Rehabilitation	Repairing affected resources
Restoration	Restoring affected resources to an earlier (possibly more stable and productive) state, typically “background or ‘pristine’ condition

Table 10:1 Key Project Roles and Responsibilities

Role	Responsibility
Management	▪ Manage implementation of the ESMS: plan, implement, assess and improve. ▪ Oversee and monitor implementation of the ESMP for the Project. ▪ Provide strategic environmental and social direction to the Project.
Supervision	▪ Work with contractors to achieve environmental and social performance by undertaking the following: - conduct readiness reviews with contractors to ensure their ESMS implementation meets Project requirements; - work with contractors to improve their ESMS where gaps are identified; - conduct training and awareness programmes with personnel involved in ESMP implementation; - ensure regular monitoring and evaluation of the project's performance against the ESMP; - maintain records of all non-conformances and work with the relevant parties to resolve within reasonable time frames; - assess the efficacy of the mitigation measures and manage continuous improvement around these measures; - work with contractors to close out grievances lodged by communities within the defined timelines; - maintain accurate records of open and closed grievances, and work with contractors towards reducing the number of grievances lodged by implementing appropriate mitigation measures; and - Assist with the development of relevant and timely communications to Project-impacted communities by providing information to the Stakeholder Engagement team on upcoming project activities.
Delivery/ Implementation	▪ Monitor and report on any Project activities that could negatively impact on communities. ▪ Facilitate on-going, reciprocal information sharing and communication between the Project and impacted communities; including helping to resolve any Project-related issues raised. ▪ Support the project's grievance procedure by providing on-going grievance procedure guidance and training to Project personnel, contractors and impacted communities and other relevant stakeholder groups (e.g. tourism industry stakeholders). ▪ Conduct regular inspections and note non-conformances with the Project's environmental and social requirements.

10.1 Training, Education and Competency

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

10.2 Monitoring and Compliance Assessment

During the construction phase, the Proponent will monitor and inspect contractors' written records to demonstrate compliance with the ESMP. This compliance monitoring will verify that the responsible parties are implementing the specifications contained in the ESMP. Compliance will mean that the contractor is fulfilling contractual obligations. To determine the effectiveness of the ESMP, the Proponent will use a series of internal and external inspections and audits:

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

10.3 Incident handling and Reporting

An incident can arise from the following:

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

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

10.4 Checking /Assessment and Improvement

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

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

10.5 Corrective Action

As part of the ESMS, the Project will implement a formal environmental and social tracking system that will include the details of all environmental and social non-conformances, identify the corrective actions required, assign actions/timings to responsible parties and indicate the status of the actions required. This will ensure a coordinated approach between the Project and its contractors, and drive changes for continuous improvement

10.6 Grievance Management

The Project will develop and implement a Grievance Procedure that is described in the Project's Stakeholder Engagement Plan (SEP). The Grievance Procedure describes how community members can raise grievances regarding the Project's activities. The Grievance Procedure addresses verbal or written grievances, which must include sufficient information about the complaint or claim so that a proper and informed evaluation of the grievance can be made. When a grievance is filed, it will be logged and evaluated using the process outlined in the SEP. All grievances will be tracked for monitoring and reporting purposes and to ensure timely and proper resolution

10.7 Reporting

This section outlines the reporting and notification associated with implementation of the ESMP. The Project and contractors will work closely together to identify and agree all such Project notification and reporting requirements.

It is envisaged that reporting will cover at least the following areas:

10.7.1 Contractor Monthly Reporting

Contractors will prepare a monthly report containing key information around the contractors' implementation of the environmental and social requirements and mitigation measures and will cover, among others:

- environmental and social assessment and improvement findings;
- incident notifications;
- non-conformances/non-compliances and corrective actions;
- key performance indicators;
- details of any environmental or social surveys or studies; and
- environmental and social training conducted.

10.7.2 Incident Notification and Reporting

Contractors will notify the Project proponent immediately following any environmental or social incident. The project proponent will ensure that all environmental and social incidences are appropriately documented, that the relevant parties are notified, and that reporting requirements around the incident are adhered to.

10.7.3 Management Review

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

10.8 Liaison /Communication to Stakeholders

Throughout the project cycle, the Proponent will liaise with authorities especially NEMA Kenya to ensure on-going feedback on the environment performance of the project. As part of the project monitoring and evaluation, it is that an independent environmental and social consultant will be engaged by the proponent and their auditing reports will be shared with stakeholders in a transparent manner, as they become available.

10.9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

Table 10:2 Environmental and Social Management Plan (ESMP)

Parameters	Impact	Mitigation measures	Responsibility
Construction Phase			
General Site Organization	Occupational accidents	• Site plan to be developed showing areas for stockpiles, material storage, site compound / facilities, pedestrian / vehicle routes etc. • Access controlled to site via supervised gated access, manned 24/7. • Temporary building constructed for Engineers / Sub-contractors, with adequate parking. Suitable shelters provided for construction workers • Site and / or site compound shall be fenced and fully maintained during construction. • Preparation and strict adherence to a site specific health and safety plan • Use of skilled labour and appropriate training given to construction workers • Construction workers to be provided with, an use, appropriate personal protective equipment (PPE) • Where practical, use of vibratory hand operated equipment to be minimized to reduce long term risk to operators	Contractor
Geology and Physiography	• Civil Works: Site clearance, Setting out and Excavations/Trenching • Improper handling of Solid and Liquid wastes during operations	• Ensure trenching/excavations are only done where necessary • Ensure backfilling of excavations, reinstatement of disturbed ground and general restoration of site • Clear all waste from site • Maintain proper handling of solid and liquid waste during construction	Contractor/ Representative
Soil	• Spillage of chemicals, oils and fuels from construction	• Minimal earthworks should be undertaken during construction • Excavated soil should be used in landscape design of the project site rather than stockpiling	Contractor

Parameters	Impact	Mitigation measures	Responsibility
	equipment and vehicles • Runoff erosion resulting in sedimentation problems. • Soil contamination from hazardous material spills during construction, excavations and backfilling activities. • Compaction of soils in the construction areas and access ways changing percolation rates and drainage patterns. • Disturbance of soil through construction, excavations and backfilling activities.	• Construction equipment and vehicles should be well-maintained, checked and promptly repaired • Avoid deep excavations in areas sensitive to erosion; • Carry out construction works in the dry season; • Stabilize the soils in order to reduce potential erosion after project construction phase is over; • Restore all the sites that were damaged during construction; and • At the end of construction works, level off the soils and facilitate vegetation regeneration; and.	
Terrestrial (Flora and Fauna)	• Vegetation loss and habitat modification • Introduction of invasive plant species.	• Educate contractors on the importance of flora and fauna in the area, including the appropriate regulatory requirements to preserve fauna and flora. • Minimize vegetation clearance and demarcate areas of construction. • Restrict foreign material export to and from the site to curtail spread of invasive species.	Contractor
Water Quality	• Discharge of untreated effluent to surface water sources/bodies	• Earthworks shall be halted when rain conditions are such that excessive erosion and silt loaded run-off can be expected. • The construction programme will avoid excessive exposure	Contractor

Parameters	Impact	Mitigation measures	Responsibility
		of bare earth surfaces which may be more prone to erosion. • If appropriate, settlement lagoons to be used to allow silts to be retained prior to discharge of run-off to the existing drainage channels or direct to sea (through the rock revetment) • Consideration will be given to undertaking routine maintenance of plant and vehicles off-site in a properly equipped cabro workshop with oil interceptors. • Avoidance of water accumulation and stagnation • Existing drainage channels to be cleared of silt / debris and trash screens installed if appropriate.	
Solid Waste	• Pollution of surface water body "Indian Ocean" • Clog drainage systems. • Harbour rodents and reptiles. • Creates visual impairment	• The contractor shall put in place a waste management plan aimed at minimising the production of all wastes. • Where possible measures will be put in place to recycle materials such as metal off-cuts, some plastics and clean paper/cardboard utilising existing specialist recycling firms in Kenya. • A suitable location within site for placing excess concrete and washing down equipment will be agreed to reduce visual impact. • Non-recyclable materials will be stored in plastic bins, collected and disposed of through the municipal waste system. • Potentially hazardous wastes shall be stored separately, i.e. hydrocarbon containers, used batteries and collected by registered hazardous waste handler. • Enforce regular collection and disposal of garbage by the project contractor through licensed NEMA waste handler • Clean storm water drains to minimize clogging.	Contractor
Noise and vibration	• Disturbance to workers within the site and personnel on adjacent properties close to	• Construction workers should be provided with appropriate ear protection • Use of vibratory hand operated equipment should be minimised • Noisy operations should be restricted to daytime operation	Contractor

Parameters	Impact	Mitigation measures	Responsibility
	the site. • Health risks	• Power generator and other equipment should be state-of-the-art and equipped with silencers/mufflers where necessary. • Effect a noise regulation policy for all operations in accordance with the Environmental management and Coordination (Noise and Excessive vibration pollution) Regulation. • Construction plant should be maintained in good running order; all vehicles should comply with the requirements of Road Traffic Act. • The measurement of noise levels should be carried out in accordance to the Environmental management and Coordination (Noise and Excessive vibration pollution) Regulation.	
Air Quality	• Pollution from exhaust gases from the operation of heavy plants • Pollution from dust generated during the earthworks and traffic on roads	• For potentially dusty earth works operations, construction workers to be enclosed within ventilated cabs or provided with facemasks for potentially dusty earth works operations. • Where appropriate water damping to be used to control dust. Particular attention to be paid when the wind is from the south or west. • Limit traffic speed and restrict movement of vehicles as to minimize dust generation • Construction plant will be maintained in good running order; all vehicles should comply with the requirements of Road Traffic Act and its subsequent regulations for emission control.	Contractor
Water Usage	• Localized contamination of Seawater/thermal pollution • Depletion of water resources	• Install and properly manage site sanitation facilities/ recycle waste water on site • Turn off taps when not in use • Install water conserving taps that turn off immediately when not in use • Install water metre to monitor water usage and bills.	Contractor
Energy Usage	• Noise disturbance to workers within the	• Ensure that all lighting system are switched off when not in use	Contractor

Parameters	Impact	Mitigation measures	Responsibility
	site from generator • Health risks	• Install energy saving bulbs • Design the office infrastructure to maximise the use of natural light. • Install metering system for monitoring	
Road Traffic	Disturbances to other road users Noise from Heavy Good vehicle movements	• Deliveries will be made to site outside of the periods of high congestion on the public road system (i.e. early morning, late afternoon). • Materials haulage companies to use competent drivers and ensure that shift patterns do not result in excessive working hours resulting in compromised road safety • All haulage vehicles shall be maintained in good running order and should comply with the requirements of Road Traffic Act. • Where feasible, and to limit the number of movements of haulage vehicles to and from the Port area, it is anticipated that bulk materials will be shipped to Port and moved directly to site (i.e. steel reinforcement, geogrid, etc. subject to appropriate port clearance).	Contractor
Occupational Health and Safety	• Accidents as a result of poor handling of equipment, use of faulty equipment, improper signing of equipment, • Injuries to workers, visitors and area residents arising from project operations related to motor vehicles, strains, sprains, bruises, lacerations, and triple fall equipment.	• Construction workers safety should be in accordance with clients' prepared site specific health and safety plan that identifies site specific risks, safety equipment, decontamination procedures, action plans, and emergency response plans; • Daily site inspections should be done to ensure safe work practices are adhered; • Toolbox talks to be conducted on daily basis; • All workmen should be provided with Personal Protective Equipment • Maintain safe workplaces and work systems; and • Provide information, instruction and training enabling employees to work without hazards.	Contractor

Parameters	Impact	Mitigation measures	Responsibility
	• Fire hazard • Exposure to nuisance in the form of noise, dust, vibrations and emissions. • Other health risks		
Cultural and historical heritage	• Damage to immovable/fixed objects or features. • Erosion of local communities' way of life, cultural norms and practices.	• The contractor should appraise themselves with the local culture and traditions as well as seek the guidance of local elders before construction activities commence.	Contractor
Operation Phase			
General	Occupational Accidents	**Standard Operation Procedure** • Site specific Standard Operating Procedures to be agreed with LPG carriers, and downstream filling operators in accordance with international regulations and good practice. Measures to be put in place to ensure that the Standard Operating Procedures are adhered to. • All members of staff to be appropriately skilled and receive appropriate training. • Inspections and reviews of Standard Operating Procedures undertaken by the Promoters environmental health & safety officer **Emergency Response Plan** • Site specific Emergency Response Plan to be agreed with the KPA. • All members of staff to receive appropriate training on the implementation of the Emergency Response Plan **Occupational Health and Safety** • Hazardous Area Classification shall be conducted and the	Proponent

Parameters	Impact	Mitigation measures	Responsibility
		findings implemented • A flammable gas detection system will be installed at sensitive locations across the site. Records shall be maintained of all instances of detection and course of action. A preventative maintenance programme shall be implemented. • Public access to the undeveloped areas immediately adjacent to the facility shall continue to be controlled and monitored by the KPA, and kept to a minimum.	
Soil	• Surface run-off from the site paved areas • Possibility of enhanced gullying and erosion (wind and water) in constructed areas and access roads; • Risk of soil contamination from littering. • Possible caving in of soil in waste pits (near surface competence that bear on load capacity) due to soil stability factors. • Soil destabilisation as a result of deep excavations	• Minimal excavations should be undertaken during rehabilitation activities; • Establish spill contingency measures on site; • Restore all the sites that are damaged during rehabilitation; • Develop Soil Sedimentation and Control Management Plan and implement; and • Raise waste pits to avoid run-off from the same.	Proponent
Water Quality	• Pollution of surface water body caused	• Install trash screens and silt traps and to be regularly inspected / maintained, particularly after cyclonic	Proponent/contractor

Parameters	Impact	Mitigation measures	Responsibility
	by discharge or leakage of raw effluent. • Accidental Oil spill pollution	conditions when the system may be put under stress. • Conduct Regular inspection / maintenance of the oil interceptor (min. twice per year). • Conduct Sampling and analysis of storm water discharge from site outfalls by an accredited laboratory (min. twice per year) • Conduct inspections for sewer pipe blockages or damages and fix them. • Empty septic/sludge tanks whenever they are full to prevent overflow thus "pollution" by a licensed exhauster services.	
Solid waste	• Domestic foul smell • Pollution of surface water bodies "Indian Ocean" • Clogging storm drainage systems.	• If feasible measures to be considered to recycle materials such as plastics and clean paper/cardboard utilising existing specialist recycling firms in Kenya. • Provide suitable facilities/cubicles for the collection, segregation, and safe disposal of the wastes. • Ensure regular de-sludging of the septic tank is done (inspections – min. twice per year) • The site should have waste receptacles with bulk storage facilities at convenient points to prevent littering during occupation. • Quantity and composition of waste shall be monitored and records maintained for purposes of monitoring. • Waste shall be stored in plastic bins, collected and disposed of through the municipal waste system licensed by NEMA.	Proponent
Terrestrial (Flora and Fauna)	• Disturbance to flora and fauna.	• Educate contractors on the importance of flora and fauna in the area, including the appropriate regulatory requirements to preserve fauna and flora. • Avoid feeding faunal species within the project site to prevent stomach upset. • The flora and fauna should be restored after construction by landscaping and maintaining the introduced plants to the site.	Proponent
Noise and vibration	• Disturbance to workers within the site and personnel on adjacent	• The measurement of noise levels should be carried out in accordance to the Environmental management and Coordination (Noise and Excessive vibration pollution) Regulation.	Proponent

Parameters	Impact	Mitigation measures	Responsibility
	properties close to the site. • Health risks •	• Ensure that all workers are provided with appropriate ear protection equipment • Noisy operations will be restricted to daytime operation • Power generator and other equipment should be state-of-the-art and equipped with silencers/mufflers where the option is available • Effect a noise regulation policy for all operations in accordance with the Environmental management and Coordination (Noise and Excessive vibration pollution) Regulation. • Ensure that all vehicles should with the requirements of Road Traffic Act.	
Air Quality	• Pollution from exhaust gases from the operation of heavy plants • Pollution from dust generated by traffic on roads	• Where appropriate water damping to be used to control dust. Particular attention to be paid when the wind is from the south or west. • Limit traffic speed and restrict movement of vehicles as to minimize dust generation • Ensure all vehicles have complied with the requirements of Road Traffic Act and its subsequent regulations for emission control.	Proponent
Water Usage	• Localized contamination of Seawater/thermal pollution • Depletion of water resources	• Turn off taps when not in use • Install water conserving taps that turn off immediately when not in use • Install water metre to monitor water usage and bills. • The site distribution network and connection to the CWSB supply will be designed and constructed to industry standard specifications to ensure losses within the new network are reduced to a minimum. • Where appropriate, water efficient fittings will be used, i.e. wash hand basins, showers etc.	Proponent
Energy Usage	• Noise disturbance to workers within the site from generator • Health risks	• Install energy saving bulbs • Design the office infrastructure to maximise the use of natural light. • Install metering system for monitoring • The facility will be provided with LPG fuelled generators to provide operational back-up should the KENYA POWER supply	Proponent

Parameters	Impact	Mitigation measures	Responsibility
		be interrupted. • Where appropriate, energy efficient fittings will be used, i.e. lighting, controls etc.	
Fire and safety	• Gas leakage and explosion	• In the event of fire, fire management plan should be implemented. • Install automatic shut off and gas leakage detectors • The entire plant should be networked with pressurised fire hydrants lines which should have fire hydrant, long range monitors and deluge valve at strategic locations.	Proponent
Road Traffic	• Disturbances to other road users • Noise from Heavy Good vehicle movements	• Ensure that outward distributions are made outside of the periods of high congestion on the public road system (i.e. early morning, late afternoon). • Materials haulage companies to use competent drivers and ensure that shift patterns do not result in excessive working hours resulting in compromised road safety • All haulage vehicles shall be maintained in good running order and should comply with the requirements of Road Traffic Act.	Proponent
Marine Traffic	• Disturbance to other shipping operating activities within the vicinity harbour • Congestion along the port during berthing and offloading.	• KPA to control and regulate shipping movements within the port area, • KPA to have adequate controls enforced to ensure the safety of ship movements and berthing operations, and that this includes the avoidance and mitigation of potential negative environmental impacts. • Put in place good marine traffic plan • Work in collaboration with KPA to ensure the safety of ship movement and berthing operations.	Proponent
Occupational Health and Safety	• Injuries to workers, visitors and area residents arising from project operations • Fire hazard • Exposure to nuisance in the form of noise, dust, vibrations and emissions	• Plan for regular maintenance and replacement of equipment and ensure site safety; • All operations will be conducted in compliance with proponents EHS policy, international best practices and Kenya Government requirements (as set out in the Occupational Health and Safety Act and the Public Health Act); • Provision of an Emergency Response and Evacuation Plan; • Adequate warning or cautionary signage should be posted as	Proponent

Parameters	Impact	Mitigation measures	Responsibility
	• Other health risks	required; • Job-specific Personal Protective Equipment to be provided to the workers, training should be given, and their use made mandatory in designated areas; • Appropriate and well-stocked first aid kits and fire-fighting equipment should be available at the site, and specific members should be trained on first aid administration and handling of fire-fighting equipment; • Ensure all work procedures are undertaken without exposing workers to hazards; • All electrical equipment should be properly installed, grounded and regularly inspected; and • Consult with employee-elected health and safety representatives and/ or other employees about occupational health, safety and welfare;	
Security and Public Safety	• Improvement in security due to security enhancement for project activities • Petty crimes	• MGT should liaise with Mombasa County government and County Administrations during the mobilization phase; • Ensure that all workers can be identified by staff uniform and badges at the site; • Adequate security measures should be provided, e.g. perimeter fencing and security manning at the site • Journey management policy and monitoring to be enforced; • Smoking will only be permitted in designated areas; no litter will be left along the construction sites; there will be no collecting of vegetation or firewood • Barriers and guards should be installed as necessary to protect employees and visitors from physical hazards and criminal activity.	Proponent
Socio-economic welfare	• Possible increase in the number of students dropping out of school in search of jobs. • Friction between the local community and immigrant workers. • Friction among	• The contractor should promote dialogue with the local community, especially community involvement in the project activities through employment; • Effectively plan for their transport of gas without interfering with the areas traffic • Inform the local community on the project activities through their local leaders; • Resolve conflicts mutually and immediately they occur;	Proponent

Parameters	Impact	Mitigation measures	Responsibility
	various clans in the project area and outsiders.	• The contractor to ensure their vehicles are driven at considerable speed to lower risk of accidents; • The contractor to put down measures to minimise movement of their staff after operation hours; • The discretion of local community leaders should be used when offering employment; • The contractor should consult with chiefs and elders in communities to ensure equity in employment	

10.10 Environmental Monitoring Plan

This section sets out the mitigations measures identified in the ESMP above, together with the proposed monitoring plans and controls for both the construction and operation stages.

It will be the responsibility of the project proponent to ensure that the environmental control measures presented in this plan are adhered to and that work is progressed in compliance with all relevant environmental regulations and international standards.

10.11 Emergency Planning

The proponent will prepare a site specific Emergency Response Plan which shall be agreed upon with the Kenya Ports Authority (KPA) and corresponds with the KPA's overall Port Emergency Plan. All members of staff will need to receive appropriate training on the implementation of the Emergency Response Plan. The Emergency Response Plan forms part of the Environmental Monitoring Plan.

10.12 Construction Phase Environmental Monitoring Plan

It is envisaged that monthly construction stage environmental monitoring reports will be prepared by the Contractor (or Promoter's representative).

Table 10:3 Environmental Monitoring Plan

Construction Stage Environmental Monitoring Plan			
Indicators	**Approach**	**Mitigation / control measures**	**Responsibility**
General	Site organisation	• MGT facility will be built to be fully compliant with the International Convention for the Safety of Life at Sea (SOLAS), the International Ship and Port Facility Security (ISPS) Code, KPA measures implemented after the introduction of the ISPS code in 2001 and will ensure strict adherence to the Kenya Merchant Shipping Act (2012 edition) ('KMSA'). MGT will continuously update the Threat and Risk Analysis Matrix ('TRAM'). • Site plan to be developed showing areas for stockpiles, material storage, site compound / facilities, pedestrian / vehicle routes etc • Access controlled to site via supervised gated access, manned 24/7. • Temporary building constructed for Engineers / Sub-contractors, with adequate parking. • Suitable shelters provided for construction workers	Contractor
	Site security	• Site and / or site compound shall be fenced and fully maintained during construction	Contractor
	Avoidance of health and safety incidents	• Preparation and adherence to a site specific health and safety plan • Use of skilled labour and appropriate training given to construction workers • Construction workers to be provided with, an use, appropriate personal protective equipment (PPE) • Where practical, use of vibratory hand operated equipment to be minimised to reduce long term risk to operators	Contractor
Noise and Vibration	Avoidance of nuisance	• Maintain reasonable site working hours (daylight hours), particularly during potential noisy operations such as piling • Construction plant will be maintained in good running order; all vehicles should comply with the requirements of Road Traffic Act	Contractor
Air Quality	Avoidance of dust nuisance	• For potentially dusty earth works operations, construction workers to be enclosed within ventilated cabs or provided with face masks for potentially	Contractor

Construction Stage Environmental Monitoring Plan			
Indicators	**Approach**	**Mitigation / control measures**	**Responsibility**
		dusty earth works operations. • Where appropriate water damping to be used to control dust. Particular attention to be paid when the wind is from the south or west.	
	Avoidance of unreasonable exhaust emissions	• Plant operated by skilled operators and regularly maintained	Contractor
Water	Efficient water usage	• Measures in place to ensure efficient on site use of potable / fresh water commensurate with good construction practices	Contractor
Energy	Efficient energy usage	• Measures in place to ensure efficient on site use of electricity and fuel commensurate with good construction practices	Contractor
Traffic	Minimise impact of increased road traffic	• Deliveries will be made to site outside of the periods of high congestion on the public road system (i.e. early morning, late afternoon). • Materials haulage companies to use competent drivers and ensure that shift patterns do not result in excessive working hours resulting in compromised road safety • All haulage vehicles shall be maintained in good running order and should comply with the requirements of Road Traffic Act. • Should the surface materials at site generated by preliminary earthworks and piling be of suitable quality these materials shall be deployed and the volume of imported materials diminished. • Where feasible, and to limit the number of movements of haulage vehicles to and from the Port area, it is anticipated that bulk materials will be shipped to Port and moved directly to site (i.e. steel reinforcement, geogrid, etc subject to appropriate port clearance).	Contractor
	Construction plant and equipment in good working order	• Construction plant will be maintained in good running order; all vehicles should comply with the requirements of Road Traffic Act and its subsequent regulations for emission control. • Plant operated by skilled and appropriately trained operators	Contractor

Construction Stage Environmental Monitoring Plan			
Indicators	**Approach**	**Mitigation / control measures**	**Responsibility**
	Avoidance of mud on public access roads	• Minimise working in wet conditions. • Drive vehicles on firm part of site, if possible, to release excess mud from wheels, or clean excess mud off wheels before reaching road • If mud is transferred to roads, use sweeper / bowser to remove excess mud from road	Contractor
Water Quality	Avoid poor quality discharge of storm water	• Earthworks shall be halted when rain conditions are such that excessive erosion and silt loaded run-off can be expected. • The construction programme will avoid excessive exposure of bare earth surfaces which may be more prone to erosion. • If appropriate, settlement lagoons to be used to allow silts to be retained prior to discharge of run-off to the existing drainage channels or direct to sea (through the rock revetment) • Care will be taken to avoid excessive mud being transferred by construction plant to the access roads and public highway. Where this is likely to become a nuisance it will be cleared by the Contractor. • Consideration will be given to undertaking routine maintenance of plant and vehicles off-site in a properly equipped workshop. • Avoidance of water accumulation and stagnation • Existing drainage channels to be cleared of silt / debris and trash screens installed if appropriate.	Contractor
	Avoidance of hydrocarbon spills	• Fuel stored with containment wall • Refuelling / servicing area with hydrocarbon trap • Equipment in good working condition • Used oil disposed of by approved practises	Contractor
	Avoidance of contamination during hydro-testing	• Pressure vessels to be carefully inspected internally and any residues removed through pressure washing prior to hydro-testing using sea water.	Contractor

Construction Stage Environmental Monitoring Plan			
Indicators	**Approach**	**Mitigation / control measures**	**Responsibility**
Waste Management	Minimisation of solid waste production	• The contractor shall put in place a waste management plan aimed at minimising the production of all wastes. • Where possible measures will be put in place to recycle materials such as metal off-cuts, some plastics and clean paper/cardboard utilising existing specialist recycling firms in Kenya. • A suitable location within site for placing excess concrete and washing down equipment will be agreed with no discernable impact. • Non-recyclable materials will be stored in plastic bins, collected and disposed of through the municipal waste system. • Potentially hazardous wastes shall be stored separately, i.e. hydrocarbon containers, used batteries	Contractor
	Site is to be kept tidy and free of litter at all times	• Waste bins to be provided at toilet blocks, changing areas and other key locations • Inspections to be made of site and surrounding area, including the revetment, to remove litter. • All wastes collected and disposed of regularly by a licensed carrier	Contractor
	Adequate toilet facilities must be provided	• No. and location of toilet / shower blocks to be adequate for peak no. of construction workers, facilities to be regularly cleaned • Foul effluents to be collected on-site and arrangements will be put in place for regular emptying and disposal using a licensed carrier. If a septic tank is to be used then a properly designed leaching field shall be installed. • Measures to be enforced to ensure that construction workers do not foul areas surrounding the site.	Contractor

10.13 Operational Phase Environmental Monitoring Plan

It is envisaged that quarterly operational stage environmental monitoring reports will be prepared by the Promoter (or operator).

Operational Stage Environmental Monitoring Plan			
Indicator	**Approach**	**Mitigation / control measures**	**Responsibility**
General	Standard Operation Procedures	• Site specific Standard Operating Procedures to be agreed with LPG carriers, and downstream filling operators in accordance with international regulations and good practice. Measures to be put in place to ensure that the Standard Operating Procedures are adhered to. • All members of staff to be appropriately skilled and receive appropriate training. • Inspections and reviews of Standard Operating Procedures undertaken by the Promoters environmental health & safety officer	Promoter
	Emergency Response Plan	• Site specific Emergency Response Plan to be agreed with the KPA. • All members of staff to receive appropriate training on the implementation of the Emergency Response Plan.	Promoter
	Occupational Health & Safety	• Hazardous Area Classification shall be conducted and the findings implemented	Promoter
		• A central dual mode redundant Safety Instrumented System (SIS) designed to SIL2 shall be deployed on a second Hima H51q platform with approximately 200 I/O (input/output) housed in a separate area of the cabinet suite with field cabling for safety loops segregated from PCMS wiring. • A flammable gas detection system will be installed at sensitive locations across the site. Records shall be maintained of all instances of detection and course of action. • A preventative maintenance programme shall be implemented. • The number of mechanical joints should be kept to minimum, replace mechanical joints by welded joints where practicable. This shall be of help in reducing the leaks from flanges. • Deployment of a local firewall around the equipment found on top of the mound to eradicate any potential fire radiation impact onto the roof of the	Promoter

Operational Stage Environmental Monitoring Plan			
Indicator	**Approach**	**Mitigation / control measures**	**Responsibility**
		building. • Flammable gas detection system should be fitted across the site, including in the vicinity of the building. • Ensure that upon flammable gas detection local to the HVAC intake duct, the building air HVAC is tripped to prevent gas ingress into the building • Building should be constructed in-line with International standards, guided by the purpose of its usage. • Hazardous Area Classification should be conducted and findings to be implemented. • Active fire protection system should be designed in line with relevant international codes/ standards. • Suitable standard operating procedures and Preventative maintenance programmes should be prepared and implemented. • Site specific Emergency Response Plan shall be prepared. • Any inspection and maintenance undertaken within the pressure vessels should be undertaken by personnel trained in confined spaces. • All LPG liquids and vapours will be removed from the system using the dedicated compressors / recovery system, prior to entry. • Public access to the undeveloped areas immediately adjacent to the facility shall continue to be controlled and monitored by the KPA (in liaison with the operational staff), and kept to a minimum. • In the event of a cyclone the facility will be placed in Shutdown Mode with all ESD valves isolated. The control room will remain manned by a security guard. The existing rock revetment is approximately 4.0m above mean sea level (AMSL) and affords a first line of defence to storm surge and waves. The building will be constructed at an appropriate level AMSL to reduce the risk of flooding from storm surge to a minimum. Appropriate freeboard and slopes will be afforded around the building to avoid potential flooding due to surface water run-off. The building structure will be designed to resist wind gusts imposed during severe cyclones. Therefore the risk to the security guard	

Operational Stage Environmental Monitoring Plan			
Indicator	**Approach**	**Mitigation / control measures**	**Responsibility**
		during the cyclone will be similar to any well designed modern building. • Applicable Occupational Health and Safety mitigation measures as outlined in construction phase will be implemented	
		• Public access to the undeveloped areas immediately adjacent to the facility shall continue to be controlled and monitored by the KPA, and kept to a minimum.	MPA (but in close liaison with the Promoter)
	Site maintained in tidy appearance	• Regular inspection and tidying of site, including maintenance of any landscaped areas.	Promoter
Water	Minimise consumption	• Water usage to be recorded monthly. Opportunities for improved water efficiency during operations to be considered.	Promoter
Energy	Minimise consumption	• Electricity usage to be recorded monthly. Opportunities for improved energy efficiency during operations to be considered.	Promoter
LPG Carriers	Control of shipping movements	• The KPA is responsible for the control and regulation of shipping movements within the port area. Adequate controls need to be enforced, in compliance with the MPA's rules and regulations, to ensure the safety of ship manoeuvres and berthing operations including the avoidance and mitigation of any potential negative environmental impacts. • MGT will have a dedicated KPA team at the site at all times to coordinate vessel planning, etc.	MPA (but in close liaison with the Promoter)
	Use of appropriate vessels	• Only appropriately equipped, well maintained and licensed vessels will be used for import and export operations in accordance with ISPS and SOLAS codes. • All deliveries to be coordinated with the KPA	Promoter
Water Quality	Avoidance of hydrocarbon contamination from vehicles	• Regular inspection / maintenance of the oil interceptor (min. twice per year)	Promoter
	Avoidance of litter /	• Trash screens and silt traps prior to be regularly inspected / maintained,	Promoter

Operational Stage Environmental Monitoring Plan			
Indicator	**Approach**	**Mitigation / control measures**	**Responsibility**
	silt being washed into the sea	particularly after cyclonic conditions when the system may be put under stress.	
	Avoidance of miscellaneous contamination from storm water system	• Sampling and analysis by an accredited test house of storm water discharge from site outfalls (min. twice per year)	Promoter
Waste Management	Minimisation and disposal of solid wastes	• Quantity and composition of waste to be monitored and records maintained • Waste to be stored in plastic bins, collected and disposed of through the municipal waste system. • If feasible measures to be considered to recycle materials such as plastics and clean paper/cardboard utilising existing specialist recycling firms in Kenya.	Promoter
	Disposal of 'domestic' foul effluents	• Regular de-sludging of the septic tank (inspections – min. twice per year)	Promoter

11. CONCLUSION AND RECOMMENDATION

The proposed project will have both positive and negative impacts however; the ESMP designed has integrated mitigation measures with a view to minimize the envisaged negative impacts while maximizing on the positive ones. This will ensure compliance with all the applicable laws, standards and procedures. The proposed project will be implemented to the approvals by among others, the Physical Planning Department (Mombasa City County), Kenya Ports Authority and NEMA. During project implementation, Environmental and Social Management Plan (ESMP) will be ensured through avoiding inadequate/inappropriate use of natural resources, conserving nature sensitively and guaranteeing a respectful and fair treatment of all people working on the project, the general public and residents of the project area.

It is our recommendation that the project be licensed to proceed provided the outlined mitigation measures are adhered to in order to ensure that the project remains environmentally and technically friendly throughout its course. Major efforts should be focused towards minimizing the occurrence of impacts that would adversely affect port operations (including the channel), other businesses, local residents and the environment.

This will be achieved through implementation of the Environmental and Social Management and Monitoring Plans (ESMPs).

11.1 Recommendation

Recommendations for the prevention and mitigation of adverse impacts are as follows;

1. MGT must design the proposed terminal and associated infrastructure to the ISPS standards and be properly installed and commissioned by competent persons.
2. MGT must have a dedicated Environmental Health and Safety Officer on-site always.
3. The terminal must be fitted with adequate safety and monitoring control devices e.g. Safety Instrumented System (SIS) and operated by competent persons;
4. MGT to put in place suitable programme of maintenance and testing by competent persons
5. There should be a continuous stakeholder consultations and public awareness creation about the project, its activities and scheduling, and potential impacts in order to prevent conflict with the residents;
6. The proponent should follow the guidelines as set out by relevant lead agencies to safeguard and visualise environmental management principles during construction and operation/occupation phases of the proposed project
7. All solid waste materials and debris resulting from construction activities should be disposed-off at approved dumpsites
8. Once earthworks are complete, restoration of the worked areas should be carried out immediately by backfilling, landscaping/ levelling and planting of suitable native tree species in the project area.
9. MGT should provide elaborate treatment for active gaseous waste, active liquid and solid waste before any discharges.

10. MGT should adopt an onsite recycle/reuse potential of treated water for dust suppression at sites, damping and/or flushing of toilets.
11. Septic tanks at the construction site should be designed in accordance with the relevant EHS standards.
12. MGT to construct barriers such as acoustic covering to reduce noise pollution.
13. MGT should provide protective gadgets to all workers/staff on site.
14. A full offloading and installation methodology should be developed, with supporting engineering design and checks, to ensure the safety of the offloading, delivery and installation operation.
15. MGT should consider implementing social and community welfare measures aimed at improving infrastructural facilities including road, education, and health in the project area as part of CSR.
16. MGT should develop and implement a traffic management plan in consultation with the Mombasa County Government, KURA, KeNHA and the Traffic Police to aid the movement of HGV in and from the site to avoid blocking the roads from local use.
17. MGT should put a waste management plan aimed at minimising production of hazardous wastes.
18. All project activities should be restricted from ocean shoreline to prevent damage to sea grass beds, coral reef areas, productive shallow water areas and any other environmentally sensitive area.
19. LPG must be stored in adequate location wherein vessels or cylinders are suitably positioned having regard to the relevant codes of practice
20. Plant must be identifiable and accessible for maintenance
21. Records of maintenance and tests must be kept
22. Precautions must be taken to prevent fire and explosion including appropriate protection of storage vessels
23. Installations must have appropriate security measures to prevent deliberate interference
24. Incidents involving fire or explosion or a significant release of LPG must be reported to the Authority and records of such incidents must be kept

12. REFERENCES

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11) Sombroek WG, Braun HMH, van der Pouw BJA (1982) 'Exploratory soil map and agro-climatic zone map of Kenya. Scale 1:1 000 000. Exploratory Soil Survey Report No. E1.' (Kenya Soil Survey)
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13) World Bank (April 2017), Environmental, Health, And Safety Guidelines For Liquefied Natural Gas Facilities www.ifc.org/ehsguidelines.
14) www.bbc.com/news/world-africa
15) www.imo.org "International Convention for the Safety of Life at Sea, 1974 (SOLAS) (as amended).
16) International Ship and Port Facility Security Code (ISPS Code).
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13. APPENDICES

13.1 Certificate of Incorporation

No. CPR/2015/212258

CERTIFICATE OF CHANGE OF NAME

I hereby CERTIFY, that -

MOMBASA OIL TERMINAL LIMITED

having, with the sanction of a **Special Resolution** of the said Company, and with the approval of the REGISTRAR OF COMPANIES, changed its name, and is now called:-

MOMBASA GAS TERMINAL LIMITED

and I have entered such new name in the Register accordingly.

GIVEN under my hand at Nairobi this **28 th** day of **August** Two Thousand and **Seventeen**.

Registrar of Companies

13.2 KRA PIN Certificate

KENYA REVENUE AUTHORITY

www.kra.go.ke

PIN Certificate

For General Tax Questions
Contact KRA Call Centre
Tel: +254 (020) 4999 999
Cell: +254(0711)099 999
Email: callcentre@kra.go.ke

Certificate Date : 03/02/2016

Personal Identification Number

P051578678F

This is to certify that taxpayer shown herein has been registered with Kenya Revenue Authority

Taxpayer Information

Taxpayer Name	MOMBASA OIL TERMINAL LIMITED
Email Address	mombasaoilterminalltd@gmail.com

Registered Address

L.R. Number :	**Building :** 2ND FLOOR, APOLLO CENTRE, WING A
Street/Road : RING ROAD, PARKLANDS	**City/Town :** NAIROBI
County : Nairobi	**District :** Westlands District
Tax Area : Westlands	**Station :** West of Nairobi
P. O. Box : 764	**Postal Code :** 00606

Tax Obligation(s) Registration Details

Sr. No.	Tax Obligation(s)	Effective From Date	Effective Till Date	Status
1	Income Tax - Company	23/10/2015	N.A.	Active

The above PIN must appear on all your tax invoices and correspondences with Kenya Revenue Authority. Your accounting end month is December unless a change has been approved by the Commissioner-Domestic Taxes Department. The status of Tax Obligation(s) with 'Dormant' status will automatically change to 'Active' on date mentioned in "Effective Till Date" or any transaction done during the period. This certificate shall remain in force till further updated.

Disclaimer : This is a system generated certificate and does not require signature.

13.3 Title Deed/Land Lease Agreement

13.4 Firm's NEMA Practising License

FORM 7 (r.15(2))

nema
mazingira yetu | uhai wetu | wajibu wetu

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/4654
Application Reference No: NEMA/EIA/EL/6944

M/S **Earthview Geoconsultants Limited**
(individual or firm) of address

P.O. BOX 10366-00100, Nairobi

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Firm of Experts**
registration number **195**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **1/27/2017** Expiry Date: **12/31/2017**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001: 2008 Certified

13.5 Lead Expert NEMA License

FORM 7 (r.15(2))

nema
mazingira yetu | uhai wetu | wajibu wetu

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/4651

Application Reference No: NEMA/EIA/EL/6940

M/S **Prof. Norbert Opiyo Akech**
(individual or firm) of address

P.O. BOX 10366-00100, Nairobi

is licensed to practice in the capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert** registration number **146**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **1/27/2017**

Expiry Date: **12/31/2017**

Signature…..

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001: 2008 Certified

13.6 Soil Sample Laboratory Analysis

Kenya Agricultural & Livestock Research Organization
National Agricultural Research Laboratories
P. O. Box 14733, 00800 NAIROBI
Tel: 0202464435
Email: soilabs@yahoo.co.uk

SOIL TEST REPORT

Name	Earthview Geoconsultants Ltd.
Address	P. O. Box 10366 - 00100, Nairobi
Location of farm	Shimanzi, Mvita, Mombasa
Crop(s) to be grown	
Date sample received	16-06-17
Date sample reported	10-07-17
Reporting officer (through Director NARL)	A. Chek

	Soil Analytical Data							
Field	WP 282		WP 283		WP 284		WP 285	
Lab. No/2017	3825		3826		3827		3828	
Soil depth cm	top		top		top		top	
Fertility results	value	class	value	class	value	class	value	class
* Soil pH	7.92	medium alkaline	7.94	medium alkaline	8.20	medium alkaline	7.99	medium alkaline
* Total Nitrogen %	0.15	low	0.13	low	0.08	low	0.13	low
* Total Org. Carbon %	1.68	moderate	1.22	low	0.65	low	1.21	low
* Phosphorus (Olsen) ppm	0.1	low	0.1	low	0.2	low	1	low
Potassium me%	0.20	low	0.20	low	0.18	low	0.76	adequate
Calcium me%	36.5	high	36.9	high	37.7	high	35.7	high
Magnesium me%	2.56	adequate	2.76	adequate	4.30	high	2.83	adequate
Manganese me%	0.11	adequate	0.11	adequate	0.20	adequate	0.17	adequate
Copper ppm	2.53	adequate	1.00	adequate	10.6	adequate	11.0	adequate
Iron ppm	48.9	adequate	12.9	adequate	28.9	adequate	13.6	adequate
Zinc ppm	7.93	adequate	12.7	adequate	28.6	adequate	9.50	adequate
Sodium me%	0.21	adequate	0.19	adequate	0.19	adequate	0.41	adequate
Elect. Cond. mS/cm	0.25	adequate	0.20	adequate	0.2	adequate	0.33	adequate

*** ISO/IEC 17025 accredited**

Interpretation and Fertilizer Recommendation

Results forwarded.

NOTE: Test results are based on customer sampled sample(s).
Methods used: Information is given out on client's request.

Kenya Agricultural & Livestock Research Organization
National Agricultural Research Laboratories
P. O. Box 14733, 00800 NAIROBI
Tel: 0202464435
Email: soilabs@yahoo.co.uk

SOIL TEST REPORT

Name	Earthview Geoconsultants Ltd.
Address	P. O. Box 10366 - 00100, Nairobi
Location of farm	Shimanzi, Mvita, Mombasa
Crop(s) to be grown	
Date sample received	16-06-17
Date sample reported	10-07-17
Reporting officer (through Director NARL)	A. Chek

	Soil Analytical Data							
Field	WP 286		Sample 6					
Lab. No/2017	3829		3830					
Soil depth cm	top		top					
Fertility results	value	class	value	class	value	class	value	class
* Soil pH	8.17	medium alkaline	8.40	medium alkaline				
* Total Nitrogen %	0.15	low	0.05	low				
* Total Org. Carbon %	1.38	moderate	0.23	low				
* Phosphorus (Olsen) ppm	0.2	low	1	low				
Potassium me%	0.24	adequate	0.12	low				
Calcium me%	38.0	high	38.8	high				
Magnesium me%	4.30	high	1.89	adequate				
Manganese me%	0.11	adequate	0.12	adequate				
Copper ppm	1.49	adequate	1.00	adequate				
Iron ppm	25.1	adequate	12.6	adequate				
Zinc ppm	5.93	adequate	5.64	adequate				
Sodium me%	0.20	adequate	0.17	adequate				
Elect. Cond. mS/cm	0.26	adequate	0.21	adequate				

*** ISO/IEC 17025 accredited**

Interpretation and Fertilizer Recommendation

Results forwarded.

NOTE: Test results are based on customer sampled sample(s).
Methods used: Information is given out on client's request.

13.7 Water Sample Laboratory Analysis

WATER RESOURCES AUTHORITY	
TITLE: Water Sample Analytical Certificate – Physical Chemical Results	**REF. NO : F/9/1/3**
	ISSUE NO : 04
DEPARTMENT: Technical	**REV. NO : 03**
ISSUED BY: DTCM	**DATE OF ISSUE: 15th April 2013**
AUTHORISED BY : TCM	**Page** : 1 of 2

Serial No: .....

Sample No: 3041

Name of Customer: EARTHVIEW GEO CONSULTANTS

Address: .....

Purpose of Sampling: DOMESTIC

County: MOMBASA

Date Sampled: 07/06/2017

Date Received: 16/06/2017

Source: YACHT CLUB WELL WP- MYC BOREHOLE, MBARAKI.

Date Compiled: 04/07/2017

PARAMETERS	UNIT	RESULTS	WHO STANDARDS	KEBS(KS 459-1:2007) STANDARDS
pH	pH Scale	7.90	6.5-8.5	6.5-8.5
Colour	mgPt/l	<5	Max 15	Max 15
Turbidity	N.T.U	3.3	Max 5	Max 5
Conductivity (25^0 C)	µS/cm	5200	Max 2500	-
Iron	mg/l	0.1	Max 0.3	Max 0.3
Manganese	mg/l	<0.01	Max 0.1	Max 0.5
Calcium	mg/l	376	Max 100	Max 150
Magnesium	mg/l	48.82	Max 100	Max 100
Sodium	mg/l	642	Max 200	Max 200
Potassium	mg/l	48	Max 50	-
Total Hardness	mg$CaCO_3$/l	1140	Max 500	Max 300
Total Alkalinity	mg$CaCO_3$/l	320	Max 500	-
Chloride	mg/l	1460	Max 250	Max 250
Fluoride	mg/l	0.41	Max 1.5	Max 1.5
Nitrate	mgN/l	4.70	Max 10	-
Nitrite	mgN/l	0.01	Max 0.1	Max 0.003
Sulphate	mg/l	165.7	Max 450	Max 400
Free Carbon Dioxide	mg/l	8	-	-
Total Dissolved Solids	mg/l	3224	Max 1500	Max 1000
Arsenic	µg/l	-	Max 10	Max10
Others		-		

Name of Analyst JACKSON KING'ORI Signature .....

WATER RESOURCES AUTHORITY	
TITLE: Water Sample Analytical Certificate – Physical Chemical Results	**REF. NO : F/9/1/3**
	ISSUE NO : 04
DEPARTMENT: Technical	**REV. NO : 03**
ISSUED BY: DTCM	**DATE OF ISSUE: 15th April 2013**
AUTHORISED BY : TCM	**Page** : 2 of 2

Comments by Head of Laboratory

Very hard, saline water which requires treatment before domestic use.

Name: CELLINE OBUYA

FOR: ATCM-CENTRAL WATER TESTING LABORATORIES

Signature: ..... **Date:** .....

WATER RESOURCES MANAGEMENT AUTHORITY
ASSISTANT TECHNICAL COORDINATION MANAGER
CENTRAL WATER TESTING LABORATORY
Tel: 020 2344154 0726 560 112
0773 903 725
P. O. Box 45250 00100 NAIROBI

Issued by: .....

(Deputy Technical Coordination Manager)

Approved by:.....

(Technical Coordination Manager)

WATER RESOURCES AUTHORITY		
	TITLE: Water Sample Analytical Certificate – Physical Chemical Results	**REF. NO : F/9/1/3**
		ISSUE NO : 04
	DEPARTMENT: Technical	**REV. NO : 03**
	ISSUED BY: DTCM	**DATE OF ISSUE: 15th April 2013**
	AUTHORISED BY : TCM	**Page** : 1 of 2

Serial No: .....

Sample No: 3042

Name of Customer: EARTHVIEW GEO CONSULTANTS

Address: .....

Purpose of Sampling: DOMESTIC

County: MOMBASA

Date Sampled: 07/06/2017

Date Received: 16/06/2017

Source: AMOG WATER POINT W/P- 287 BOREHOLE, MBARAKI.

Date Compiled: 04/07/2017

PARAMETERS	UNIT	RESULTS	WHO STANDARDS	KEBS(KS 459-1:2007) STANDARDS
pH	pH Scale	**7.71**	6.5-8.5	6.5-8.5
Colour	mgPt/l	**<5**	Max 15	Max 15
Turbidity	N.T.U	**3.0**	Max 5	Max 5
Conductivity (25^0 C)	µS/cm	**4780**	Max 2500	-
Iron	mg/l	**0.07**	Max 0.3	Max 0.3
Manganese	mg/l	**<0.01**	Max 0.1	Max 0.5
Calcium	mg/l	**328**	Max 100	Max 150
Magnesium	mg/l	**292**	Max 100	Max 100
Sodium	mg/l	**140**	Max 200	Max 200
Potassium	mg/l	**42**	Max 50	-
Total Hardness	$mgCaCO_3/l$	**2020**	Max 500	Max 300
Total Alkalinity	$mgCaCO_3/l$	**292**	Max 500	-
Chloride	mg/l	**1400**	Max 250	Max 250
Fluoride	mg/l	**0.37**	Max 1.5	Max 1.5
Nitrate	mgN/l	**2.56**	Max 10	-
Nitrite	mgN/l	**0.4**	Max 0.1	Max 0.003
Sulphate	mg/l	**96.86**	Max 450	Max 400
Free Carbon Dioxide	mg/l	**38**	-	-
Total Dissolved Solids	mg/l	**2963.6**	Max 1500	Max 1000
Arsenic	µg/l	-	Max 10	Max10
Others		-		

Name of Analyst **JACKSON KING'ORI** Signature .....

WATER RESOURCES AUTHORITY	
TITLE: Water Sample Analytical Certificate – Physical Chemical Results	**REF. NO : F/9/1/3**
	ISSUE NO : 04
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Comments by Head of Laboratory

Very hard, saline water which requires treatment before domestic use.

Name: CELLINE OBUYA

FOR: ATCM-CENTRAL WATER TESTING LABORATORIES

WATER RESOURCES MANAGEMENT AUTHORITY
COORDINATION MANAGER
CENTRAL WATER TESTING LABORATORY
Tel: 020 2344192/0720 560 712
P. O. Box 45250 00100 NAIROBI

Signature: ..... **Date:** 04/07/17

Issued by: .....

(Deputy Technical Coordination Manager)

Approved by:.....

(Technical Coordination Manager)

13.8 Minutes of Meetings Held

MINUTES OF THE PUBLIC MEETING HELD AT BOFU MASKANI, LIKONI SUB-LOCATION ON 28/09/2017

The meeting started at 10:30am by a word of prayer from a community member. This was followed by an introduction session which was facilitated by one of the ESIA team members. The ESIA team then presented to the community the proposed project activities, anticipated impacts and possible mitigation measures. The community was then invited to give their opinions, suggestions and concerns about the proposed project.

Present

- The area Village elder
- Community members
- Earthview ESIA team

Issues raised by the community are captured below:

Nature of the issue	Issues raised	Response
Question	A community member wanted to know whether the storage tanks would be underground or on the surface.	The storage would comprise of mounded tanks.
Concern	A member of the community sought to know the reason why MOT chose the proposed site despite it being near a residential area.	The site was found ideal since it has supporting infrastructure on site: a private berth, buildings and is easily accessible by road.
Case scenario/ Suggestions/Concern	A community member narrated a case scenario where an Oil Refinery at Changamwe was originally intended to be located in the area however after investigations was relocated. He also pointed out Base Titanium company, which promised the locals employment opportunities but reneged on their pledges. He was concerned that the project may be unsafe for residents in case of leakage or explosion and recommended that MGT should consider an alternative site.	All the concerns would be shared with the proponent and adequately addressed in the ESMP section of the report. MGT to put in place adequate safety measures to prevent leakage and/or fire incidents or accidents.

Nature of the issue	Issues raised	Response
Suggestion	A community member suggested that MGT and in liaison with the Mombasa County government construct a fire station next to the proposed site for any emergency fires.	Suggestion noted.
	A member of the community encouraged MGT to go ahead and construct the LPG depot terminal while at the same time ensuring the safety of the locals is guaranteed. He also suggested that the implementation of the project should not lead to displacement of locals doing their business in the area.	Adequate measures would be put in place by the proponent to enhance safety of the public and its own workers. MGT would use only ISO certified equipment in all its operations.
Concern	A member of the community asked the various measures MGT intend to put in place to avoid oil leakage into the ocean	MGT will have oil spill kits on site and also build oil traps.
Concern	A member of the community wanted to know how they can access the ESIA report to confirm if their views are correctly captured.	Once submitted to NEMA, the ESIA report would be made available for further public participation by NEMA. The report would be available at the NEMA regional office in Mombasa as well as the NEMA website.
Request	One of the community members requested to know the size of the project site, number of employees and quantity of the gas to be stored.	The project site is 9 acres and the proponent may employ about 100-300 staffs. The quantity of the gas will be approximately 20,000 metric tonnes.
Concern	A member of the community wanted to know if MGT would be producing wastes, which are carcinogenic.	All the wastes that would be produced at the site throughout the lifecycle of the project would be handled by registered waste handlers.
Concern	A member of the community	There are similar terminals

Nature of the issue	Issues raised	Response
	wanted to know if there are similar LPG terminals in the country. He also wanted to know the standard radius required for the location of such a project and the reason why MGT should not relocate to another site.	by other investors. The difference may be in the capacity of storage facilities.
Proposal	A community member proposed that loading and offloading of the gas should be done at 6:00am and 6:00pm to avoid accidents	Proposal noted.
Concern	A member wanted to know if the local leadership was aware of the proposed project.	The entry point for the consultations is the local administration. We got permission from the area chief to consult the community on the project.
Request	The community requested that they appoint representatives to subsequent stakeholder meetings.	Request noted

The meeting ended at 12:30 pm with a vote of thanks from the ESIA team.

MINUTES OF THE PUBLIC MEETING HELD AT MIRILINI, LIWATONI VILLAGE ON 25/09/2017

The meeting began at 3:30 p.m. with a welcoming remark from the Village Elder. This was followed by brief introduction session led by the ESIA team. A presentation on the proposed project was made to the community who then invited to give their opinions, suggestions and concerns about the project.

Members Present

- Community members
- Earthview ESIA team
- Village elder

Issues raised are captured in the table below:

Nature of the issue	Issues raised	Response
Concern	A member wanted to know how their views and concerns will be addressed and the likely impacts of the project to the residents.	The community views, concerns, suggestions would form part of the report and would be very important in decision-making.
Suggestion	A member of the community requested that MGT should preserve 50% of the available job opportunities to the locals and repair the local road leading to the project site. He further suggested that MGT should avoid parking the trucks along the road and instead create a parking lot inside the site and use integrated tail tanks for gas storage in order to reduce the risks of explosions.	Suggestions noted.
Concern/Proposal	A community member stated that the proposed project site is close to residential and business areas and in cases of fire outbreak, it might lead to deaths. She proposed that MGT should relocate to alternative open and designated area for example in Dongo	Concern noted.

Nature of the issue	Issues raised	Response
	Kundu.	
Concern/Request	A community member sought to know why MGT had acquired the land without contacting public. She further requested that MGT should consider safety of residents during the construction of the LPG depot.	Noted.
Social license	A member of the community encouraged MGT to go ahead and construct the LPG terminal. She was however concerned about a possibility of displacement of the small scale traders currently doing business along the Taib Bin Nasir Road	Adequate health and safety measures to be put in place by the proponent. No displacement will take place.
Concern/ Suggestion	A member suggested that MGT should ensure it puts in place good safety measures to avoid any leakage. He further proposed that MGT should relocate the site to Mwakilunge or Mishomoroni since there are large tracks of land and therefore reducing possible risks emanating from leakage and explosions.	The ESIA team noted down the concerns.
Social license	A community member asked the other to embrace the project because it would promote the hotel business in the area and provide them with employment opportunities. The member further advised that MGT should ensure that the interests and safety of the residents prevailed.	Noted.

The meeting ended at 4:30 pm.

MINUTES OF THE PUBLIC MEETING HELD LEWATONI SECONDARY SCHOOL ON 27/09/2017

The meeting was called to order at 7:00 pm after a prayer from one of the community members. Dr. Ashraph briefed the community members present about ESIA team and the aim of the meeting. One of the ESIA members introduced the team members and went ahead to present to the community about the proposed LPG terminal. The community was then invited to give their opinions, suggestions and concerns about the proposed project.

Present

- Liwatoni Community members
- Earthview ESIA team

Matters arising:

Nature of the issue	Issues raised	Response
Concern	A community member sought to know how the community stood to benefit from the proposed project. Again, he was concerned about how MGT planned to manage wastes from the site and how safe the project would be. He further asked to know how MGT will manage traffic since the area had only one access road.	The community would benefit from CSR projects by the proponent MGT has an integrated waste management plan and would use ISO certified containers, which are very safe. MGT to develop and implement a traffic management plan to help in managing the traffic to the site.
Concern	A member of the community wanted to know how MGT would transport the gas and what safety measures they would be put in place in order to avoid any disaster	MGT is planning to use RVR and SGR for the local transport and via road. Adequate health and safety measures to be put in place.
Concern/ recommendation	The proposed project site is close to residential and business areas and in case of fire outbreak, it can lead to disaster. He recommended that MGT should relocate to alternative open and designated area for example in Shimanzi or Kipevu.	Noted.

Nature of the issue	Issues raised	Response
Concern	A member wanted to know why MGT decided to use the site yet all gasses are offloaded at AGOL	MGT is a different company from AGOL and could not use the AGOL terminal.
Suggestion/ Proposal	The community members present proposed that MGT should consider an alternative site such as ship graveyard in Shimanzi because it is an open area and maybe safer compared to the proposed site.	ESIA team noted the proposals.

The meeting was concluded by a vote of thanks from one of the ESIA members.

MINUTES OF THE STAKEHOLDER'S ENGAGEMENT FORUM HELD AT THE MOMBASA COUNTY COMMISSIONER'S BOARD ROOM ON 14/12/2017

Present

- Karisa Nzai – Kenya Ferry Services
- L. M. Mwangemi – Kenya Urban Roads Authority
- Kennedy A. Shikami – Kenya Fisheries Service
- Rashid a. Shikami – Interior
- Evans Achoki – County Commissioner, Mombasa
- Leyla Ali – Wanainchi Marine
- Mahamed Hassan – Senior Environment Officer, Kenya Ports Authority
- Lepore Kirorei – Kenya Navy
- Daniel Githinji – Kenya Ports Authority
- Captain William Ruto – Kenya Ports Authority
- Constance Ngoo - Interior

The meeting was called to order by the County Commissioner at 2:47 pm. He requested one of the stakeholders present to lead in a word of prayer. A brief self-introduction session followed immediately after the prayer. The stakeholders present were then taken through a PowerPoint presentation detailing the proposed project activities, anticipated impacts and proposed mitigation measures. In addition, the stakeholders were informed that their contribution in terms of views, suggestions and concerns about the proposed project would very important to both the proponent and decision makers.

The stakeholders raised various issues mostly touching on the site location. These have been captured in the table below:

Nature of the issue	Issues raised
Consultation	• KPA was not consulted on the MGT project site from the onset. • Kenya Ferry Services, Kenya Navy and other key stakeholders were also not involved from the initial stage of project planning. • There is need for continued consultation with all key stakeholders on the way forward for the proposed project – need for wider consultation bearing in mind the nature and siting of the proposed project.

Nature of the issue	Issues raised
Land ownership	• Land belongs to KPA and not AMOG therefore KPA must give its approval by virtue of being the landlord. • KPA did write a letter to the proponent requesting for clarification on certain issues, however instead of MGT responding, AMOG did a response letter on behalf of the proponent.
Orientations on Port Operations	• A stakeholder suggested that the Client gets an orientation on the KPA procedures. There are proper channels that must be followed while dealing with KPA.
Alternative site	• The proposed project site was unanimously agreed by the stakeholders not to be the best location for the proposed project. They thus suggested an alternative site for the project. • The proposed site is very close to the only dry-dock in east African coast. The dry-dock is a critical infrastructure to the entire region thus any slight interference with it may cripple operations of the region. The closeness of the dry-dock and the proposed project is a recipe for a serious fire outbreak • The government of Kenya is putting up terminals far away from the main entrance to the port. The proponent should also do the same
Risk of fire	• A stakeholder was concerned about risk of fire out breaks at the site. The proposed site is situated at the main entrance to the port (Channel), a fact that was said to make the proposed site very critical to the operations of the port. • LPG was said to be a very dangerous gas and thus needs special attention.
Name of the proponent	• A stakeholder from KPA raised an issue with the name of the proponent – he sought clarification as to whether the name was Mombasa Oil Terminal or Mombasa Gas Terminal?
Port Master Plan	• It was suggested that the proposed project align itself with the Mombasa Port Master Plan. Also, other ocean users need to be involved including KFS, Fisheries Department, KMA among others
Cable cars	• A stakeholder sought to know the exact location of another

Nature of the issue	Issues raised
	project “Cable Car” Project which he thought proposed to use almost the same area.
Project impact	• A stakeholder raised issues with possible impacts of the proposed project on human settlements, businesses and schools around the proposed site.

The meeting ended at 4:45 pm by a vote of thanks.

13.9 Meeting Attendance Lists

ATTENDANCE LIST FOR STAKEHOLDERS PRESENT DURING THE STAKEHOLDER CONSULTATION FORUM FOR THE PROPOSED LPG BULK STORAGE TERMINAL BY MOMBASA OIL TERMINAL LTD. IN MOMBASA COUNTY

DATE: 14/12/2017 PLACE: COUNTY COMMISSIONER'S BOARDROOM

NO.	NAME	ORGANIZATION	DESIGNATION	SIGNATURE
1.	KARISA NZAI	KENYA FERRY	SAFETY [illegible]	
2.	L.M. MWANKOMA	KURA	SNR. SUPT. PR	
3.	Kennedy A. Shikami	Kenya Fisheries Servi	PFO	
4.	RASHID A. WERE	INTERIOR	A.C.C	
5.	EVANS ACHOKI	INTERIOR	CC	
6.	Leyla Ali	Wanaimchi M	Finance	
7.	Mohamud Hassan	Kenya Ports	Emv. offic	
8.	LEPORE KIROREI	KENYA NAVY	Major	
9.	CONSTANCE NGOO	INTERIOR	SAOA	
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No.	Name	ORGANIZATION INSTITUTION	DESIGNATION	REMARKS	SIGNATURE
1	DANIEL GITHINJI	KPA	Port Environment officer	This is a good idea but requires serious study to identify a suitable site. The proposed site is not feasible in terms of safety, security and environment.	
2	CAPT. W. RUTO	KPA	HARBOUR MASTER	PROJECT IDEAL BUT THE LOCATION IS NOT SUITABLE - DUE TO SAFETY LONGSHORE ENVIRONMENTAL, SECURITY ISSUES ALREADY DISCUSSED	
3.	Mohamed A. Hassan	KPA	Snr Environment Officer		

~~STAKEHOLDERS~~
ATTENDANCE LIST FOR MEMBERS OF THE PUBLIC PRESENT DURING PUBLIC CONSULTATION FORUM

DATE 28/09/2017 PLACE: BOFU MASKANI

	NAME	SIGNATURE
1	ALI Mwakumyega	
2	MUSA S. MWAMBA	
3	KHALFAN SULEIMAN	
4	SAID H MAKOBA	
5	HAMADI KHAMISI	
6	MWINYIKOMBO H. LINZILE	
7	HINA RASHID	
8	SALEM RIZIKI	
9	YUSUF H. MUHALIA	
10	ISAAC MUSA	
11	BAKARI RASHID	
12	ABDALLA RASHID MWACHONGOLO	
13	Mohamed Rashid Mwakuzuma	
14	Mohamed Juma	
15	Juma Kamanga	
16	RIZIKI KIBWANA IHOYA	
17	RASHID. A. KARUNGU 0724090988	
18	MWINYI KOMBO HASSAN	
19	HAMISI M, MWANGA 0724019000	
20	ATHUMAN H. MATEZO 0722 310 714	
21	ZAINABU SALIM 0722906476	
22	Tabitha Odhiambo 0703180788	
23	Jamillah Abubakar - 0720879847	
24	IHOYA BAJA KAENGE 0719505338	
25	Mrimi Kamacha Maligo 0723-206926	
26	ISMAIL MUZAMIL 0755104177	
27	RASHID A. RASHID	
28	HAMISI JUMA 1291	

ATTENDANCE LIST FOR MEMBERS OF THE PUBLIC PRESENT DURING PUBLIC CONSULTATION FORUM

DATE: 25/09/2017 PLACE: Marihini (Lewatini) ~~xxx~~ Market

NO.	NAME	SIGNATURE
1.	Rashid Sulaiman	[signature]
2.	Andrew Wanga	[signature]
3.	Hussein Alwy	[signature]
4.	Alwy Hussein	[signature]
5.	Jenson Matonga	[signature]
6.	Raymond Sefari	[signature]
7.	Kirito Aronya	[signature]
8.	Katana Kahindi	[signature]
9.	Grace Achieng	A. G.
10.	Kenedy Macharia	Kennie
11.	Christine Moti	CHR
12.	Sara Awiko	[signature]
13.	Jacob Charo	[signature]
14.	Fatuma Ali	[signature]
15.	Mwanajuma Hamisi	[signature]
16.	Pamela Auma	[signature]
17.	Jane Atieno	[signature]
18.	Samwel Juma	[signature]
19.	Urbanus Mongo	[signature]
20.	Joseph Makali	[signature]
21.	Daniel Wotoni	[signature]
22.	Francis Kinsia	[signature]
23.	Jack Ombaso	[signature]
24.	Jakson M. Kithuki	[signature]
25.	Mwikali James	[signature]
26.	Roselyne Adhiambo	[signature]
27.	Peter N Ngari	[signature]
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ATTENDANCE LIST FOR MEMBERS OF THE PUBLIC PRESENT DURING PUBLIC CONSULTATION FORUM

DATE: 27/09/2017 **PLACE:** Lerecteni Secondary School

NO.	NAME	SIGNATURE
1.	ALI BAMRAGHA	
2.	IMAM HASSAN OMAR.	
3.	ABDULHAFIDH ABDALLA	
4.	ABDULAZIZ SHAFRY	
5.	BINAM ENSALE	
6.	Ramadhani Omari	
7.	Mohidin Al-amin	
8.	ADAM ROLY MUSA	
9.	BADRU MOHAMED BADRU	
10.	GEDHUBA SAKO	
11.	Huseni M. Omar	
12.	ISLAM MO	
13.	ALI MOHAMED HAMZA	
14.	Dr. ASHRAFH, GAMJ	
15.	MOHAMMED A. AL-MAAWIY	
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13.10 Questionnaires