ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENT REPORT FOR THE PROPOSED NYABUNDE SMALL HYDROPOWER STATION ON GUCHA RIVER, SENGERA LOCATION, BOMACHOGE CONSTITUENCY, KISII COUNTY

Proponent

Kenya Tea Development Agency Limited,
KTDA Farmers Building

P O BOX 30213 - 00100

Nairobi.
Email: info@ktdateas.com

Consultants

Eng. Stephen M. Mwaura
Beatrice Njoki Karanja
Esther Ngoiri Ndung'u

List of Abbreviations

AEZ	Agro-ecological Zones
BOD	Biological Oxygen Demand
DEO	District Environmental Officer
DO	District Officer
DRSRS	Department of Resource Surveys and Remote Sensing
EIA	Environmental Impact Assessment
EA	Environmental Audit
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
EHS	Environmental Health and Safety
GOK	Government of Kenya
KPLC	Kenya Power and Lighting Company
KRA	Kenya Revenue Authority
KTDA	Kenya Tea Development Agency
LH	Lower Highland
LM	Lower Midlands
NEMA	National Environment Management Authority
NEAP	National Environmental Action Plan
MoE	Ministry of Energy
NGO	Non-Governmental Organization
NPEP	National Poverty Eradication Plan
OHS	Occupational Health and Safety
PRSP	Poverty Reduction Strategy Paper
PEC	Poverty Eradication Commission
UH	Upper Highland
UM	Upper Midland
TOR	Terms of Reference
KWS	Kenya Wildlife Service
MEWNR	Ministry of Environment Water and Natural Resources

Table of Contents

ACKNOWLEDGEMENT

The EIA Experts wish to convey their gratitude to the project Proponent for commissioning us to conduct this EIA in response to the proposed project. We would like to further acknowledge with great appreciation all the neighbours and individuals who participated in the consultative public consultation process for their cooperation in the exercise.

We further acknowledge the support, either directly or indirectly, from the various parties who assisted the EIA/EA team towards the successful completion of the project.

SUBMISSION

This Environmental Impact Assessment project report has been prepared by EHS Management Consultants Ltd, a NEMA accredited EIA/EA firm of experts. We, the undersigned, wish to certify that the particulars in this report are correct and true to the best of our knowledge.

PROPONENT:

Designation: .....

Name: .....

Signature: .....

Date: .....

EIA/EA LEAD EXPERT

Eng. Stephen Mburu Mwaura

NEMA Reg. No.7284

Signature: .....

Date: .....

Executive Summary

Kenya Tea Development Agency (KTDA) is proposing to construct a Small-Hydropower station within Kisii Tea Zone. The Small-Hydropower station will process the neighboring tea factory green leaf and also supply power to the local community in the County. The proposed Small-Hydropower station is expected to supply energy within Kenya Tea Development Agency (KTDA) factories while enabling them to achieve self-reliance. The Small-Hydropower station is also envisaged to serve the surrounding communities as well as provide employment which will improve the socio-economic status of the local communities. In conformity with the Environmental Management and Coordination Act (EMCA) of 1999, such a project is subject to an Environmental Impact Assessment (EIA) before commencement. The purpose of the EIA study was to investigate potential impacts of the proposed Small-Hydropower station on the biophysical, social and natural environment in Sengera location in particular and Kisii country in general. The study has proposed mitigation measures, including an Environmental and Social Management Plan (ESMP).

The EIA study employed several methods and techniques in data collections including:

- Literature review
- Consultations with Ministry of Energy management in Nairobi and its field management.
- Consultations and Public Participation (CPP) using key informants and meeting with the affected parties.
- Observations and photography

The small hydro power project on Gucha River will have numerous positive impacts including cheap power supply to the local community, creation of employment, gains to local national economy, improved security, and growth of informal sector (Jua-Kali) among others. The negative environmental impacts of the project which include vegetation clearance, accident to workers and associated hazards, hydrology water quality degradation, oil spills among others can however be mitigated. The proponent of the proposed project shall be committed to putting in place several measures to mitigate the negative environmental, safety, health and social impacts associated with the life cycle of the project. As per the analysis of the aspects of both positive and negative environmental impacts of the project's development, we, the Experts found no significant negative impacts that could pose adverse effects to the extent that the proposed project should not be implemented. The local community has an overwhelming support for the project and they are very well informed. There is a high expectation of employment for the youths and improvement in the household incomes, infrastructure and general delivery of social services. The community expects the proposed Small-Hydropower station to reduce losses related to frequent power blackouts at the nearby Itumbe tea factory. It is also recommended that the positive impacts that emanate from such activities shall be maximized as much as possible. It is expected that these measures will go a long way in ensuring the best possible environmental compliance and performance standards.

It is therefore concluded that the proposed small hydro-power project will not compromise the well-being of surrounding families as they are also all well being adequately compensated by the proponent at a rate of Kshs. 800,000 per acre as well as compensation for any developments thereof and crops at the prevailing Agricultural rates as agreed during the Public Participation

and Consultation meeting on Thursday 17th July 2014, ecological and environmental conditions and will be of benefit to the surrounding community as well as to the proponent.

It is therefore recommended that the proposed project be approved subject to the following recommendations:-

- Proponent to ensure implementation of the proposed mitigation measures and compliance with EMP during construction, commissioning and operational phases of the small hydro-power plant.
- Annual Audit from the start of operations of the plant, consistent with NEMA requirements.

CHAPTER ONE

Introduction

Brief Introduction

The Ministry of Energy in Kenya envisages an energy sector that is well supplied with adequate and quality energy services. To meet these very broad energy policy objectives calls for delivery of cost effective and environmentally sound energy service to all sectors of the economy. In endeavoring to provide clean energy services then, security of supply, affordability and sustainability are considered as pivotal pillars for an energy system development.
It is within this conceptual framework that the Ministry of Energy undertook to promote wider use of small hydro power as an important source, yet widely untapped form of energy. The small hydropower projects are classified as those with an installed capacity of less than 10 MW and are increasingly becoming economically viable as the large scale (i.e. over 30 MW sites dwindle and the relative cost of other forms of energy especially the thermal derived ones rise. It is with this in mind that the Ministry of Energy commissioned in August 2009 consultancy services for feasibility studies on small hydro power development for twelve tea factories spread in Kenya on rivers near KTDA tea factories – see Ministry of Energy letter on this in the Appendix. The feasibility studies were done and the sites found viable to produce hydro-electric power in an environmentally friendly way. It is in this light that KTDA has now sanctioned firms of experts to carry out comprehensive Environmental and Social Impacts Assessments towards obtaining EIA licenses for the construction works of the identified sites to commence.

It has also been recognized that small hydro power which is relatively widely distributed geographically provide an opportunity for delivering modern energy services to areas currently underserved or are outside the current supply main-grid chain. The small hydropower development would also further other objectives of the National Energy Policy and to a great extent the developmental agenda of the country. In this regard a number of driving objectives behind the small hydro power development agenda are fourscore.
i. Small hydropower projects provide an opportunity to utilize energy as a tool to accelerate economic empowerment for largely poorly developed rural areas, where the bulk of the population lives.
ii. The development of small hydropower projects at a scale that will impact on domestic economy with a view to raise the access rate to affordable energy services especially electricity in the country.
iii. The small hydropower projects where possible will enhance the security of supply especially of the national grid.
iv. The development of the small hydro power schemes will positively promote use of a hitherto under developed indigenous energy renewal with considerable benefit to the local economy.

It is within this policy framework that the Ministry of Energy decided to support detailed feasibility studies for small hydro power schemes targeting rural consumption nodes starting with tea growing areas where tea factories are a relatively large rural based demand loads. With this support from the Ministry of Energy coupled with the Ministry effecting feasibility studies to be carried out on twelve sites, KTDA has embarked on developing the identified sites after the feasibility studies proved them to be economically viable and environmentally friendly. Such a

site is on Gucha River in Sengere Location, Bomachoge Constituency, Kisii County. In conformity with the Environmental Management and Coordination Act (EMCA) of 1999, such a project is subject to Environmental Impact Assessment (EIA) before commencement. The purpose of the EIA study was to investigate potential impacts of the proposed Small-Hydropower station on the biophysical, social and natural environment in Itumbe area in particular and the county in general. The study has proposed mitigation measures, including an Environmental and Social Management Plan (ESMP).

• Project Objective

The main objective of the small hydropower project is to generate power in a sustainable and environmentally friendly way. This will generate income and also create employment in the area.

• The Purpose of the Proposed Project Report

The purpose of this EIA report is first to ensure adequate identification of potentially negative environmental impacts. Secondly to propose workable mitigation measures and thirdly to formulate the EMP articulating envisaged impacts. The EMP outlines the implementation of the mitigation measures, responsible persons, required resources and time frame. The overall objective of the study on the other hand is to ensure that all environmental concerns are integrated in all the development activities in order to contribute to sustainable development.

Specifically, the objectives are: -

- To identify potential environmental impacts, both direct and in direct.
- To assess the significance and magnitude of these impacts.
- To propose preventive mitigating and compensative measures for the significant negative impacts of the project on the environment including compensation and resettlement action plans.
- To generate baseline data for monitoring and evaluation of how well the mitigating measures are being implemented during the project cycle.
- To present information on the impacts of alternatives to the proposed project
- To present the results of the EIA that can guide informed decision making
- To prepare the Environmental Management Plan for the proposed project.
- To ensure compliance with the provisions of the EMCA 1999, and Environmental (Impact Assessment and Audit) Regulations 2003 as well as other regulations or statutory requirements.
- To ensure that the project activities are clearly understood with a view to isolate envisaged potential impacts and
- To ensure that the proposed project does not compromise the well-being of the neighboring community. Public participation and consultation was carried out involving the affected families and key stakeholders
- To explain the procedures and requirements during decommissioning phase

The EIA study employed several methods and techniques in data collections including:

- Literature review – Mainly the Feasibility Study by Q-Energy commissioned by the Ministry of Energy, Government of Kenya that found the project economically and financially viable.

- Consultations and public Participation (CPP) using key informants and representatives of the affected families.
- Discussions with key stakeholders.
- Observations and photography.

This is also in line with the Electric Power Act No. 11 enacted in 1997 which deals with generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated with these purposes. In this respect, the following environmental issues should be considered.

- The need to protect and manage the environment and conserve natural resources.
- Ability to operate in a manner designated to protect the health and safety of the project, employees; the locals and other potentially affected communities.

Terms of Reference for the ESIA

- Baseline information about the small hydro power project.
- Description of the nature of proposed project and activities that shall be undertaken in establishing the Small-Hydropower station.
- Identify the possible environmental, physical, biological and social impacts of establishing the proposed Small-Hydropower station.
- Location of project including physical area that may be affected by projects activities
- Propose mitigation measures for the predicted impacts

Project Scoping

Scoping is the process of identifying the issues/impacts to be addressed prior to an EIA. Scoping is primarily based on information provided by the developer and his team, however, good practice dictates that the views of other participants in the process such as the local community and statutory stakeholders should be also incorporated. This contributes to the process and meeting stakeholder expectations as well as good practice standards. In this project, all the key stakeholders have been incorporated as well as the surrounding community. Comprehensive Public Participation and Consultation (PPC)was done with the affected families in the form of a meeting and documentation on this as well as the questionnaires that were filled are all in the Appendix. The listing of all those who attended the PPC and their signatures is attached in the Appendix as well. The public Participation and Consultation was held at Itumbe Tea factory on 17th July 2014. The affected families were given an opportunity to air their views and express their opinions regarding the project. From the questionnaires filled, the affected families welcome the project. Through the discussions, amounts of compensation were agreed upon for the affected land owners. .

Figure 1: Public Participation & Consultation Baraza of the affected families held at Itumbe Tea Factory on July 17th^{h}, 2014 presided over by Itumbe Factory board members, KTDA Senior Management and community elders.

CHAPTER TWO

Description of the Project

Project Location

The proposed Small-Hydropower station is located approximately 10 Kilometers from Ogembo town. It is located at Kineni Sub-location, Sengera Location, Ogembo Division, Bomachoge in Gucha. In close proximity to the proposed Small-Hydropower station is Ogembo tea factory located 5 Kilometers away. The river has three-water falls that will produce power namely Ogembo, 2nd intake and Powerhouse. The intake site is situated about a kilometer and a half downstream of the bridge on River Gucha along the Igare-Itumbe road with the predominant land use in the being Agriculture.

Figure 2: Location of the Proposed Project Area.

Climate and Topography

Kisii area receives bimodal rainfall; Short (September-November) and Long (February-June), of over 1500mm per annum with temperature ranging from 16-27C. Most of Kisii highlands are generally wet and moist throughout the year receiving more than average rainfall per annum. This scenario would greatly favour dammed flow power regimes as a lot of flood water is generated. The rainfall increases from the South West to the North East across the general direction obtained by River Gucha. The variation is largely due to relief and the related adiabatic conversion associated with the daily rise and fall of the Lake Victoria moisture. Kisii rainfall is usually accompanied with lighting and thunderstorms.

Most parts of the county have red volcanic soils (nitsols) which are deep and rich in organic matter. The rest have clay soils which are poorly drained especially in swamps and valleys. The district can be divided into three agro-ecological regions, the Upper Land, the Lower Highland and the Lower Midland.

Livelihoods and the Economy

The entire catchment area of the proposed Gucha- Nyabunde hydro-power plant is complimented by tea growing with some supplementary farming being practised. Tea growing is by small scale farmers and the 485 or so square catchment area has 6 factories and a number of satellite factories. Dairy cattle and food crops especially maize does well in the region.

Majority of land owners have tea plots and the suitability of the soils have influenced the social set up of the community. Within the project area are a number of institutions like schools and health facilities and water supply projects.

Figure 3: Small scale tea growing along Gucha River

Site Geology

Kisii area is bounded on the west by scarps of the Kisii quartzite with a general elevation of 6,400 feet and within the quartzite rim; the county is deeply dissected into steep ridges separated by deeps. The northern section of the highlands is drained by tributaries of South Awach and the central section by Gucha River where it flows is a steep sided gorge.

Kisii series make up Kisii highlands where porphyritic basalts are widely distributed. Non-porphyritic salts follows and are largely distributed. Overlying the basalt is a quartzite band of upto 400feet thick. Younger than quartzite is composed of thick masses of andesites, felsites and rhyolites with associated tuffs and towards the top on the eastern area are felspathic sandstones and conglorometes. 'Kisii soapstone' occurs as patches close to the junction of basalts and quartzite.

Hydrology-Description of the river

Gucha River traces its origin to the high rise of the Kisii highlands below Chamonyero village on the breaching the quartzite escarpment near Venjo where it flows in a steep sided gorge of the Kisii highlands near Mokomoni area at around 6900 feet above the sea level near Nyaramba and the swamps below Gesima in Bonyamondo area near Gucha and Nyamira districts. The river rises at the Kisii escarpment on the south western drainage to the Lake Victoria and up to the proposed power scheme intake point the river drains an area of 480.64 square kilometers with an exceptionally large number of tributaries joining it upstream of the proposed intake. The river is on record for experiencing serious floods at least once in every 10-20 years which is attributed to Kisii highlands with their high rainfall.

Flora and Fauna

The vegetation of Kisii County is determined by altitude, soil and amount of rainfall. However, it has been modified greatly by human activity and settlement. In the lower altitudes, natural flora is scarce and dominated mostly by the food and cash crops grown by the farmers. Some of the tree species found in Gucha are Markhamialutea, Pinusspp., Grevillea robusta (Mukima), Eucalyptus spp.(Mutimbao), Acacia mearnsi. There are also shrubs, ferns, napier grass and fruit tress like Avocado. The kind of crops grown varies depending on the ecological zones which vary in terms of precipitation, temperature and soils. The main cash crop in Gucha area is Tea whereas food crops grown in the highlands include maize, sugarcane, bananas, Sorghum, Millet, yams and cassavas. Livestock reared include cattle, sheep, rabbits, chicken and goats.

Small Hydro Power Generation - Project Layout and Plan

It is proposed that a design flood of 4.3 Cumecs will be abstracted at a point marked by coordinates 37m 700257 and UTM 9913049 where contour line 1698 crosses the river. The water will be raised to 1706 by weir and conveyed via a lined gravity canal stepping at 1:1000V:H for a distance of 2700 meters to create a gross head of 50.3 meters. A de-siltation tank also called a sand trap will be built at 0+1200meters to empty back into the main river.

A penstock of length 248m will convey water into the power house situated at the edge of the river where contour 1653 masl crosses the river. The proposed power house floor level is about 2 meters above normal flood level of the river during hydrology. It is proposed that all water

conveyance structures will be of concrete base and masonry walls. The reasons for this are two fold, one, to ensure that water losses during conveyance are avoided and reduce significantly the probability of water breaching the walls and causing major environmental catastrophe and of course affect productivity for local people.

The specific structure and components of the proposed scheme are detailed here.

Intake weir

The intake weir proposed and dimensioned is a free standing gravity dam ogee crested concrete type designed to abstract the desired floods of 4.36 cumecs and it incorporates a spiral way that will dissipate a two hundred year return flood estimated at 909 cumecs. Reinforcement for this structure is necessary as heavy abrasion is expected. The amount of reinforcement required is based on soil and rock yield for strength and this has been taken into account in the design and costing. The weir will also include an intake orifice detailed to abstract the design floods and maintain a predetermined velocity to operate properly. Wing walls will form the barrier structure for the spillway and protect the land near the intake from any damage during floods. Placement of gabions as support structures can add extra stability to the site soils. On the same weir an intake orifice will be created to allow water into the power canal. The intake orifice will be a square hole specified in the design structure and will include a control gate preferably a gear operated sluice gate of 2840 mm x1000 mm. The weir crest will stand 0.3 meters above the inlet orifice to discharge the desired flow and maintained an initial velocity of water of not less than 3.132 meters per second. The same weir will incorporate a spillway to discharge abnormal floods as necessary. The scheme has been designed with a 200 year return period. The spillway will be 80 meters wide with an Ogee crest at 1706 masl level while its wings walls should not be less than 3.17 meters high to accommodate the anticipated floods.

Head race canal

The head race canal will convey water to the forebay some 2700 meters generally along the 1706/1703 contour line but loosing head by 1 meter in 1000 meters to maintain the desired channel speeds. The proposed canal as earlier indicated will be concrete base using class 15 concrete with a mix ratio of 1:3:6 and reinforced with BRC mesh. The 2.70 km will be provided with expansion joints not less than 750mm in total to accommodate radical expansion expected during the hottest day and the canal being empty at the time of the episode. Allowing for 2mm thick felts it is important to fix an expansion joint every 7 meters of the canal length.

The excavation and civil works will be to engineer's detail. This is important considering the expected uplifting of the canal when empty. Provision for reinforcement has been made in the design. Appropriate culverts will be provided at every crossing of the canal by other feeder springs not emptying in to the canal and any path or road crossing.

De-siltation Tank (Sand Trap)

The de-siltation tank will be provided at 0 + 1000 meters along the power canal and is a specially designed tank to trap sand and other sediments to avoid cavitations in the turbines. It is placed where flushing out trapped sediments will be convenient and can be cleaned regularly. The

minimum silt retention capacity designed is 2895 cubic meters targeting particle sizes of 0.1 mm and particle vertical velocities of 0.02 m/sec.

Forebay

The forebay will function as the surge tank before the water plunges the penstock. It is also intended to be a final de-siltation facility with a provision for emptying the silt into a nearby sand holding pond as the waste water seeps into the ground. The penstock entry point into the forebay will be 6.75 m from the water level to reduce possibility of sucking air during the penstock operation. The construction will be to engineers' detail and safety and operational hazards must be taken into account.

Penstock

The penstock will convey 4.36 Cumecs water to the turbine at a gross head of 50.3 m. It must be able to withstand maximum pressure of 4.931 bars and will be 248 meters long. Due to the steep valley sides and to minimize lateral movements, head thrust blocks will be provided at every point of moment and anchor blocks provided to keep the pipe in place as predetermined and included in this report. Sliding blocks will however be provided at least one for every pipe section of 12 meter length. The optimal internal diameter determined for this project will be 1400 mm and be able to convey water at an average velocity of 2.8m/sec. It is proposed that a spiral welded mild steel pipes epoxy coated both inside and outside will be the best option. Expansion joints for the penstock will need to be provided in the penstock assemblage. This penstock will require at least 82 mm expansion space which will be evenly distributed along the penstock. The penstock will be bi-furcated to two pipes each carrying 2.18 Cumecs at least 10 meters from power house.

Powerhouse

The proposed power house measures 116 meters square surface area. This is considered adequate for the two turbines proposed for this site and has room for serving the equipment.
It will have enough space to accommodate the electro mechanical and the control equipment. The proposed structure will be 30 by 11.4 meters concrete floor and high masonry walls. It is important to cast the turbine and generator plinth floor separately and raise it by 200 mm above ground level to minimize tangential and reflective vibrations form the moving parts.

Tail Race

The tail race will comprise a short distance canal below the draft of the turbines and will lead water back to the river. The combined tail race will be not less than 5.0 meters wide and zero slope to reduce the exit velocity of water to equal to the mid-stream velocity of water in the river.

CHAPTER THREE

Policy, Institutional & Regulatory Framework

Environmental Policy Framework

The Kenya Government's environmental policy is geared towards sound environmental management for sustainable development. This is envisaged in the principle of prudent use, which requires that the present day usage should not "compromise the needs of the future generations. The Kenya Government's environmental policy aims at integrating environmental aspects into national development plans. The broad objectives of the national environmental policy include:

- Optimal use of natural land and water resources in improving the quality of human environment;
- Sustainable use of natural resources to meet the needs of the present generations while preserving their ability to meet the needs of future generations;
- Integration of environmental conservation and economic activities into the process of sustainable development; and
- Meet national goals and international obligations by conserving bio-diversity,
- Arresting desertification, mitigating effects of disasters, protecting the ozone layer and maintaining an ecological balance on earth.

An Environmental and Social Impacts Assessment (ESIA) critically examines the effects of a Project on the environment. An ESIA identifies both negative and positive impacts of any development activity or Project, how it affects people, their property and the environment. ESIA also identifies measures to mitigate the negative impacts, while maximizing on the positive ones. ESIA is basically a preventive process. It seeks to minimize adverse impacts on the environment and reduces risks. If a proper ESIA is carried out and implemented, then the safety of the environment can be properly managed at all stages of a Project-planning, design, construction, operation, monitoring and evaluation as well as decommissioning, as and when required, if at all. The assessment is required at all stages of Project development with a view to ensuring environmentally sustainable development for both existing and proposed public and private sector development ventures. The National Environmental (Impact Assessment/Audit) Regulations, 2003 were issued in accordance with the provisions of Environmental Management and Coordination Act (EMCA) of 1999. The regulations must be administered, taking into cognizance provisions of EMCA, 1999 and other relevant national laws.

National Environment Action Plan (NEAP)

The NEAP for Kenya was prepared in mid 1990s. It was a deliberate policy effort to integrate environmental considerations into the country's economic and social development. The integration process was to be achieved through a multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources are an integral part of the societal decision-making.

National Water Policy, 2000

The National Policy of Water which was promulgated in April 1999 as sessional Paper No. 1 of 1999 calls for decentralization of operational activities from the central government to other sectors, including local authorities, the private sector and increased involvement of communities

in order to improve efficiency in service delivery. It also tackles issues pertaining to water supply and sanitation facilities development, institutional framework and financing of the sector. According to the policy, in order to enable sustainable water supply and sanitation services, there is need to apply alternative management options that are participatory through enhanced involvement of others in the provision of these services but particularly the private sector. The overall objective of the National Water Policy is to lay the foundation for the rational and efficient framework for meeting the water needs for national economic development, poverty alleviation, environmental protection and social well-being of the people through sustainable water resource management.

The National Poverty Eradication Plan (NPEP)

The NPEP has the objective of reducing the incidence of poverty in both rural and urban areas by 50% by the year 2015, as well as strengthening the capacity of the poor and vulnerable groups to earn income. It also aims to narrow gender and geographical disparities and create a healthy, better-educated and more productive population. This plan has been prepared in line with the goals and commitments of the World Summit for Social Development (WSSD) of 1995. The plan focuses on the four WSSD themes of poverty eradication, reduction of unemployment, social integration of disadvantaged people and the creation of an enabling economic, political and cultural environment. This plan is to be implemented by the Poverty Eradication Commission formed in collaboration with Government ministries, community based organizations and private sector. The proposed development will create employment opportunities for Kenyans, hence contributing to poverty eradication.

The Poverty Reduction Strategy Paper (PRSP)

The PRSP has the twin objectives of poverty reduction and economic growth. The paper articulates Kenya's commitment and approach to fighting poverty, with the basic rationale that the war against poverty cannot be won without the participation of the poor themselves. The proposed project during and after implementation, will offer jobs to many Kenyans as a way of contributing to this noble objective of reducing poverty in the nation.

Institutional Framework

Environmental Management and Co-ordination Act No. 8 of 1999 provide a legal and institutional framework for the management of environment related matters in Kenya. It is the framework law on environment, which was enacted on the 14thJanuary 1999 and which commenced in January 2002. Topmost in the administration of EMCA is National Environment Council (NEC), which formulates policies, set goals, and promotes environmental protection programs. The implementing organ is National Environment Management Authority (NEMA). EMCA comprises of parts covering all aspects of the environment.

National Environment Management Authority (NEMA)

In 2002 the government created the National Environmental Management Authority (NEMA) as the supreme regulatory and advisory body on environmental management in Kenya. NEMA is required to coordinate and supervise the various environmental management activities being undertaken by statutory organs with a view to promoting their integration into development

policies, programmes, plans and projects that provide sustainable development and a safe and healthy environment for all Kenyans.

The key functions of NEMA through the National Environment Council include responsibility for policy formulation and direction for the purposes of the Act, setting national goals and objectives and determining policies and priorities for the protection of the environment, promotion of cooperation among public departments, local authorities, private sector, non-governmental organizations and such other organizations engaged in environmental protection programmes, and performing such other functions as are assigned by the Act.

NEMA will remain in charge of coordinating all activities related to environmental management in the project area such as enforcement of environmental impact assessments, as well as environmental audits.

Ministry of Land, Housing and Urban Development

The Department of Urban Development within the Ministry of Land Housing and Urban Development is among the lead agencies in urban development. The department is responsible for initiating and coordinating all key development projects in all county governments in Kenya. Through the Director of Urban Development, the lead agency is equally responsible for monitoring all development projects in the affected county governments.

Neighborhood Associations and/or General Public

The proposed development is likely to attract the interests of the area's neighborhood association(s)/general public. An extensive public participation process will therefore form a major component of the project. From the foregoing, particular reference is made to Section 17 of the Environmental (Impact Assessment and Audit) Regulations, 2003, which states that:
".....The Proponent shall in consultation with the authority seek the views of persons who may be affected by the project....."

The above expression clearly underscores the concept of "participatory environmental planning and management" in the context of urban development. The Consultant distributed questionnaires to the neighbours regarding the proposed development. The Proponent is keen to observe any set regulations by the neighborhood association.

Legal Framework

Environmental Management and Coordination Act (EMCA), 1999

Environmental Management and Co-ordination Act No. 8 of 1999, provide a legal and institutional framework for the management of the environmental related matters. It is the framework law on environment, which was enacted on the 14th of January 1999 and commenced in January 2002. Topmost in the administration of EMCA is National Environment Council (NEC), which formulates policies, sets goals, and promotes environmental protection programmes. The implementing organ is National Environment Management Authority (NEMA). EMCA comprises of the parts covering all aspects of the environment. The Second Schedule to the Act specifies the projects for which an EIA and environmental audit must be carried out. According to the Act, Section 68, all projects listed in the Second Schedule of the Act must undertake an environmental audit, keep accurate records and make annual reports to

NEMA or as NEMA may, in writing, require. The Environmental (Impact Assessment and Audit) Regulations, 2003, provide the basis for procedures for carrying out Environmental Impact Assessments (EIAs) and Environmental Audits (EAs).
The main objectives of the Act are to:

- Provide guidelines for the establishment of an appropriate legal and institutional framework for the management of the environment in Kenya;
- Provide a framework legislation for over 70 statutes in Kenya that contain environmental provisions;
- Provide guidelines for environmental impact assessment, environmental audit and monitoring, environmental quality standards and environmental protection orders.

The Environmental (Impact Assessment and Audit) Regulations, 2003

The Environmental (Impact Assessment and Audit) Regulations, 2003 state in Regulation 3 that "the regulations shall apply to all policies, plans, programmes, projects and activities specified in Part IV, Part V and the Second Schedule of the Act". Regulation 4(1) further states that: ''…no proponent shall implement a project:

(a) Likely to have a negative environmental impact; or
(b) For which an environmental impact assessment is required under the Act or these Regulations; unless an environmental impact assessment has been concluded and approved in accordance with these Regulations…''

Water Quality Regulations, 2006

Regulation 8 of these regulations provides for compliance with water quality standards. It states that all operators and suppliers of treated water, containerized water and all water vendors shall comply with the relevant quality standards in force as may be prescribed by the relevant lead agencies. Regulation 9 of these regulations provides for water quality monitoring. It states that the Authority in consultation with the relevant lead agency, shall maintain water quality monitoring for sources of domestic water at least twice every calendar year and such monitoring records shall be in the prescribed form as set out in the second schedule to these regulations.

Fossil Fuel Emission Control Regulations, 2006

These regulations came into operation of 1st February 2007. Regulation 4 (1) states that any internal combustion engine is subject to inspection under these regulations and shall, as a condition of compliance with the inspection, pass such tests as may be required to demonstrate that the internal combustion engine complies with any standards and requirements for the control of air pollution or contamination as may be prescribed. Regulation 4 (2) further states that the emission standards to be complied with by any internal combustion engine shall be those set out in the First Schedule to these regulations. Regulation 5 of these regulations provide for Environmental Inspectors. It states that the Authority may appoint such number of environmental inspectors as it may deem appropriate for purposes of carrying out emissions inspection under these regulations and may, without prejudice to the foregoing, appoint any employee of a lead agency conducting inspection of internal combustion engines on behalf of the Government. Regulation 7 (1) states that the Authority may approve any substance to be used as a fuel catalyst if, in the opinion of the Authority, the substance improves fuel economy, enhances combustion

and reduces harmful emissions that adversely affect human, animal and plant health and degrade the environment.

Water Act, 2002

According to Section 5 of this Act, the right to use of water from any water resource is hereby vested in the Minister, except to the extent that it is alienated by or under this Act or any other written law. Section 4 (1) of the same Act states that the Minister shall have and may exercise control over every water resource in accordance with this Act. Subsection 2 states that it shall be the duty of the Minister to promote the investigation, conservation and proper use of water resources throughout Kenya and to ensure the effective exercise and performance by any authorities or persons under the control of the Minister of their powers and duties in relation to water. Subsection 3 further states that the Minister shall be assisted in discharge of his duties under this Section by Director of Water. Section 25 (1) of this Act states that a permit shall be required for any of the following purposes:

- any use of water from a water resource, except as provided by Section 26;
- the drainage of any swamp or other land;
- the discharge of a pollutant into any water resource; and
- Any purpose, to be carried out in or in relation to a water resource, which is prescribed by rules made under this Act to be a purpose for which a permit is required.

Part II, Section 18, of this Act provides for national monitoring and information system on water resources. Following on this, Sub-section 3 of the same Section, allows the Water Resources Management Authority (WRMA) to demand from any person or institution, specified information, documents, samples or materials on water resources. Under these rules, specific records may be required to be kept by a facility operator and the information thereof furnished to the Authority. Section 23 (1) of the Act states that the Authority shall not approve any community project unless:

- the proposed project is approved by the persons owning or occupying at least two-thirds of the particular area concerned in the project; and
- Provision is made by the project for adequate alternative supply of water to be supplied to permit holders likely to be adversely affected and unable to benefit from the scheme.

Sub-section 2 further states that no permit for the community project shall be cancelled or verified except with the consent of the Minister. The Ministry of Water and Irrigation has its fundamental goal and purpose as conserving, managing and protecting water resources for socio-economic development. Its aim is to improve the living standards of people by ensuring proper access to available water resources. The Ministry was created in 2003 following a separation of the Ministry of Environment and Ministry of Natural Resources. The split was aimed at consolidating the responsibility for the management and development of water resources under a single Minister. The Water Act, 2002 provides for establishment of three levels of institutions for the provision of services. These are described as follows;

- **Water Services Regulatory Board**

The Board regulates the provision of services by registered Water Services Providers through the proposed Water Services Boards.

- **Water Services Boards**

The country has been divided into economically viable Water Services Boards which ensures that every part of the country is provided for. Each Service Board is responsible for the efficient and economical provision of water services within its area of jurisdiction.

- **Water Service Providers**

Water services providers shall enter into an agreement with a Water Service Board in writing for the purpose of providing water services in specified areas.
The Act sets out these institutions based on the principles of:

- Separation of water resources management from water services provision;
- Separation of policy, regulation and implementation functions within the water supply and sanitation sector in order to streamline the role of the various actors in the sector;
- Devolution of responsibilities for water services provision to WSPs, who shall include the private sector, communities and companies formed by Local Authorities;
- Human resource redeployment and development leading to more effective and efficient institutions;
- The need to give full autonomy to water service providers to enable them perform without adverse interference or influence; and
- Improved delivery of services to customers.

The Way leaves Act (Cap. 292)

According to the Way leaves Act Cap 292 Section 2, private land does not include any land sold or leased under any Act dealing with Government lands. Section 3 of the Act states that the Government may carry any sewer, drain or pipeline into, through, over or under any lands whatsoever, but may not in so doing interfere with any existing building. Section 8 further states that any person who, without the consent of the Permanent Secretary to the Ministry responsible for works (which consent shall not be unreasonably withheld), causes any building to be newly erected over any sewer, drain or pipeline the property of the Government shall be guilty of an offence and liable to a fine of one hundred and fifty shillings, and a further fine of sixty shillings for every day during which the offence is continued after written notice in that behalf from the Permanent Secretary; and the Permanent Secretary may cause any building erected in contravention of this section to be altered, demolished or otherwise dealt with as he may think fit, and may recover any expense incurred by the Government in so doing from the offender.

The Registration of Titles Act (Cap. 281)

Section 34 of this Act states that when land is intended to be transferred or any right of way or other easement is intended to be created or transferred, the registered proprietor or, if the proprietor is of unsound mind, the guardian or other person appointed by the court to act on his/her behalf in the matter, shall execute, in original only, a transfer in form F in the First Schedule, which transfer shall, for description of the land intended be dealt with, refer to the grant or certificate of title of the land, or shall give such description as may be sufficient to

identify it, and shall contain an accurate statement of the land and easement, or the easement, intended to be transferred or created, and a memorandum of all leases, charges and other encumbrances to which the land may be subject, and of all rights-of-way, easements and privileges intended to be conveyed.

The Land Titles Act (Cap. 282)

The Land Titles Act Cap 282 Section 10 (1) states that there shall be appointed and attached to the Land Registration Court a qualified surveyor who, with such assistants as may be necessary, shall survey land, make a plan or plans thereof and define and mark the boundaries of any areas therein as, when and where directed by the Recorder of Titles, either before, during or after the termination of any question concerning land or any interest connected therewith, and every area so defined and marked shall be further marked with a number of other distinctive symbol to be shown upon the plan or plans for the purposes of complete identification and registration thereof as is herein after prescribed.

Electricity Power Act No. 11 of 1997

The Electric Power Act No. 11 enacted in 1997 deals with generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated with these purposes. In this respect, the following environmental issues will be considered before approval is granted:

- The need to protect and manage the environment, and conserve natural resources;
- The ability to operate in a manner designated to protect the health and safety of the project employees; the local and other potentially affected communities.

Under Schedule 3 of the Electric Power (licensing) Regulations 2003, it is a requirement to comply with all safety, health and environmental laws. Moreover, Schedule 2 (regulation 9) of the Electric Power (licensing) Regulations 2003 stipulates that licensing and authorization to generate and transmit electrical power must be supported by the following documents which are approved by NEMA:

- Environmental Impact Assessment Report (EIA) or
- Initial Environmental Audit Report (IEA) and
- Environmental Management Plan (EMP)

The Occupational Safety and Health Act, OSHA 2007

This is an Act of Parliament to make provision for health, safety and welfare of persons employed in factories and other places, and for matters incidental thereto and connected therewith.

Building Operations and Works of Engineering Constructions

The provisions of the Factories and Other Places of Work Act relevant to engineering construction works are contained in the Abstract of the Act for Building Operations, and Works of Engineering Construction Rules. These are summarized below.

- General Requirements

Give notice of particular operations or works: Notice should be sent in writing to the Occupational Health and Safety Officer, not later than seven days after commencement of

construction and building works except where the construction works will be complete in less than six weeks or notice had already been given to the Occupational Health and Safety Officer (Section 60 of the Act).

- General Register:

A general register of every person undertaking building operations or construction works is kept in adherence to the prescribed form. This register is kept at the site of operations or at the office of the person undertaking the operations or works. The register should contain:

- The certificate of registration of the workplace;
- Every other certificate issued by the Chief Inspector under this Act;
- The prescribed particulars as to the finishing (washing, white washing, colour washing ,painting or varnishing) of the facility;
- The prescribed particulars as to every accident and case of occupational disease occurring in the workplace of which a notice is required to be sent to a labour officer under the provisions of any law for the time being in force;
- All reports and particulars required by any other provision of this Act to be entered in or attached to the general register;
- Such other matters as may be prescribed (Section 62 of the Factories and Other Places of Work Act).
- Special rules and welfare: Printed copies or prescribed abstracts of the Factories and Other Places of Work Act must be kept posted at the site of operations or works (Section 61 of the Factories and Other Places of Work Act).

- Safety Requirements

Air receivers - These should be of sound construction and be properly maintained. They should be thoroughly examined by a competent person at intervals of 24 months and the reports of such examinations attached to the General Register (Section 39 of the Factories and other Places of Work Act).

Cylinders for compressed, liquefied and dissolved gases - Such cylinders should be of good construction, sound material, and adequate strength and free from patent defect. The cylinders should conform to standards specified under the Standards Act or to a prescribed standard specification, approved in writing, by the Director, Kenya Bureau of Standards. They should be thoroughly examined by a competent person at regular intervals and a maintenance register kept (Section 39A of the amendment of the Factories and Other Places of Work Act).

Notification of accidents - The particulars of an accident causing death or disablement of a worker for more than three days from earning full wages at the work place where he was employed must be sent in the prescribed form to the Occupational Health and Safety Officer and entered in the General Register. Certain dangerous occurrences must also be reported whether or not they cause disablement (Section 62 of the Factories and Other Places of Work Act).

Health Requirements - Sanitary accommodation: Sufficient and suitable sanitary conveniences must be available for persons employed. These must be kept clean and well lit (Sections 16 and 18 of the Factories and Other Places of Work Act).

Miscellaneous Requirements - Prohibition of deduction from wages - The occupier must not make a deduction from wages in respect of anything he has to do or provide in pursuance of the Factories Act or permit any person in his employment to receive payment from other employees for such services (Section 66 of the Factories and Other Places of Work Act).

Duties of persons employed - An employee must not willfully interfere with or misuse any means, appliance, convenience or other thing provided in pursuance of the Act for securing health, safety or welfare provided for his use under the Act. He must not willfully and without reasonable cause do anything likely to endanger himself or others (Section 65 of the Factories and Other Places of Work Act).
Inspection - The Occupational Health and Safety Officer has the power to inspect every part of the premises by day or by night. He may require the production of registers, certificates and other papers. May examine any person alone or in the presence of any other person as he thinks fit and may require him to sign a declaration of truth of the matters about which he is examined. Every person obstructing an Occupational Health and Safety Officer is liable to a penalty (Section 69 of the Factories and Other Places of Work Act).

Medical Examination Rules

These are described in Legal Notice No. 24 of the Kenya Gazette Supplement No. 22 of April 2005. The Medical Examination Rules apply to all those employees in employment or who have been in employment in every workplace to which the provisions of the Factories and Other Places of Work Act (Cap 514) apply. The Rules describe the following:

- Occupations requiring medical examination;
- Duties of employer and employees with regard to medical examination;
- Reports on examination;
- Certificate of redeployment;
- Certificate of fitness;
- Notification of occupational diseases; and
- Offences and penalties.

Noise Prevention and Control Rules

These rules are described in Legal Notice No. 25 of the Kenya Gazette Supplement No. 22 of April 2005 and state the noise regulations that apply to every factory, premises, place, process and operations to which the provisions of the Factories and Other Places of Work Act (Cap 514) applies. These Rules describe the following:

- Permissible noise levels;
- Noise prevention programme;
- Noise measurements and records;
- Information on noise and training of workers;
- Noise measuring equipment;
- Engineering controls;
- Installation and maintenance of machinery or plant;
- Means of communication;
- Hearing protection;
- Noise hazard areas;
- Workers responsibility in noise hazard areas;
- Duties of the occupier;
- Medical examination and hearing tests;

- Compensation and notification of occupational hearing impairment;
- Noise programme review;
- Offences and penalties.

Land Adjudication Act (Cap. 284)

Part II of this Act Section 9 (1) states that the Adjudication Officer shall be in charge of and shall exercise general supervision and control over the adjudication. Sub-section 2 further states that the Adjudication Officer shall hear and determine (a) any petition respecting any act done, omission made or decision given by a Survey Officer, Demarcation Officer or Recording Officer; and (b) any objection to the adjudication register which is submitted in accordance with Section 26 of this Act. Section 11 of the Act states that in the course of the adjudication, the Adjudication Officer shall have the following powers:-

- He may issue to the officers subordinate to him and to committees and boards such general or particular directions as he thinks necessary for carrying out the provisions of the Act which relate to the procedure for demarcation, recording of title and survey within the adjudication area;
- At any time before the adjudication register is completed, he may correct any error or supply any omission occurring in the adjudication register;
- He may make claims or otherwise act on behalf of a person who is absent or under a disability if he considers it necessary to avoid injustice.

Part III of this Act Section 13 (1) states that every person who considers that he has an interest in land within an adjudication section shall make a claim to the recording officer, and point out his boundaries to the demarcation officer in the manner required and within the period fixed by the notice published under Section 5 of this Act. Section 14 of the Act states that not less than seven clear days before the demarcation of an adjudication section is begun, the demarcation officer shall give warning of the intended demarcation and recording of claims, and of the time and place at which it will begin, in such manner as the adjudication officer considers most likely to bring the matter to the knowledge of the persons who will be affected by the demarcation and recording. Section 17 of the Act states that in the performance of their respective duties, the demarcation officer and the survey officer may each enter at any reasonable time upon any land within the adjudication area for the purpose of demarcating or surveying any parcel therein, and may summon any person who can give information regarding the boundaries of a parcel to point out the boundaries.

Public Health Act (Cap. 242)

Part IX, section 115, of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 as waste pipes, sewers, drainers or refuse pits in such state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into the public street or into the gutter or side

channel or watercourse, irrigation channel, or bed not approved for discharge is also deemed as nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbor rats or other vermin. On responsibility of the Local Authorities Part XI, section 129, of the Act states in part "It shall be the duty of every Local Authority to take all lawful, necessary and reasonably practicable measures for preventing any pollution dangerous to health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes. Section 130 provides for making and imposing regulations by the Local Authorities and others the duty of enforcing rules in respect of prohibiting use of water supply or erection of structures draining filth or noxious matter into water supply as mentioned in section 129. This provision is supplemented by section 126A that requires Local Authorities to develop by laws for controlling and regulating among others private sewers, communication between drains and sewers and between sewers as well as regulating sanitary conveniences in connection to buildings, drainage, cesspools, etc. for reception or disposal of foul matter. Part XII, Section 136, states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitates the breeding or multiplication of pests shall be deemed nuisances and are liable to be dealt with in the matter provided by this Act.

Local Authority Act (Cap. 265)

Section 160 helps Local Authorities ensure effective utilization of the sewages systems. It states in part that municipal authorities have powers to establish and maintain sanitary services for the removal and destruction of, or otherwise deal with kinds of refuse and effluent and where such service is established, compel its use by persons to whom the services is available. However, to protect against illegal connections, section 173 states that any person who, without prior consent in writing from the council, erects a building on; excavate or opens-up; or injures or destroys a sewers, drains or pipes shall be guilty of an offence. Any demolitions and repairs thereof shall be carried out at the expense of the offender. Section 170, allows the right to access to private property at all times by Local Authorities its officers and servants for purposes of inspection, maintenance and alteration or repairs of sewers. To ensure sustainability in this regard, the Local Authority is empowered to make by laws in respect of all such matters as are necessary or desirable for maintenance of health, safety, and well-being of the inhabitants of its area as provided for under Section 201 of the Act. The Act under section 176 gives powers to Local Authority to regulate sewage and drainage, fix charges for use of sewers and drains and require connecting premises to meet the related costs. According to section 174, any charges so collected shall be deemed to be charges for sanitary services and will be recoverable from the premise owner connected to the facility. Section 264 also requires that all charges due for sewage sanitary and refuse removal shall be recovered jointly and severally from the owner and occupier of the premises in respect of which the services were rendered. This in part allows for application of the "polluter-pays-principle".

Physical Planning Act, 1999

The Local Authorities are empowered under Section 29 of the Act to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section, therefore allows for the prohibition or control of the use and development of land and buildings in the interest of proper and orderly development of an area. Section 30 states that any person who

carries out development without development permission will be required to restore the land to it original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respective Local Authority. Finally, section 36 states that if connection with a development application, Local Authority is of the opinion that the proposed development activity will have injurious impact on the environment, the application shall be required to submit together with the application an environment impact assessment EIA report. EMCA, 1999 echoes the same by requiring that such an EIA is approved by the NEMA and should be followed by annual environmental audits.

Land Planning Act (Cap. 303)

Section 9 of the subsidiary legislation (The Development and Use of Land Regulations, 1961) under this Act requires that before the Local authorities submit any plans to then Minister for approval, steps should be taken as may be necessary to acquire the owners of any land affected by such plans. Particulars of comments and objections made by the landowners should be submitted. This is intended to reduce conflict with the interest such as settlement and other social and economic activities.

Building Code 1967

Section 194 requires that where sewer exists, the occupants of the nearby premises shall apply to the Local authority for a permit to connect to the sewer line and all the wastewater must be discharged into sewers. The code also prohibits construction of structures or buildings on sewer lines.

Penal Code Act (Cap.63)

Section 191 of the penal code states that if any person or institution that voluntarily corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same Act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons /institution is dwelling or business premises in the neighbourhood or those passing along public way, commits an offence.

Waste Management Regulations, 2006

Part II of the regulations regulation 4 (1) states that no person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated receptacle. Regulation 4 (2) further states that a waste generator shall collect, segregate and dispose such waste in the manner provided for under these regulations. Regulation 5 (1) provides for cleaner production methods. It states that a waste generator shall minimize the waste generated by adopting the following cleaner production methods:
(a) Improvement of production process through:
(i) Conserving raw materials and energy;
(ii) Eliminating the use of toxic raw materials; and
(iii)Reducing toxic emissions and wastes;
(b) Monitoring the product cycle from beginning to end by:
(i) Identifying and eliminating potential negative impacts of the product;

(ii) Enabling the recovery and re-use of the product where possible; and
(c) Incorporating environmental concerns in the design and disposal of a product.
Regulation 8 of the regulations provides for the responsibility of waste transporters. It states that any person granted a license to transport waste shall ensure that:
(1) The collection and transportation of such waste is conducted in such a manner that will not cause scattering of the waste;
(2) The vehicles and equipment for the transportation of waste are in such a state that shall cause scattering of, flowing out of waste or emission of noxious smells from such waste;
(3) The vehicles for transportation and other means of conveyance of waste follow the scheduled routes approved by the Authority from the point of collection to the disposal site or plant; and
(4) He or his agent (s) possess at all times during transportation of the waste, a duly filled tracking document as set out in Form III in the first schedule to these regulations and shall produce the same such tracking document on demand to any law enforcement officer.

The Agriculture Act (Cap 318)

This is an Act of parliament for the promotion and maintenance of a stable agriculture, to provide for the conservation of soil and its fertility and to stimulate the development of agricultural land in accordance with accepted practices of good land management and good husbandry. Under section 184 of the Act the Minister may make general rules for the preservation utilization and development of agricultural land. The concession land in general is agricultural and is therefore subject to this Act.

The Forest Act (Act Number 7 of 2005)

This is law was enacted by Parliament in 2005 to provide for the establishment, development and sustainable management including conservation and rational utilization of forest resources for the socio-economic development of the country. Parts of the project area consist of indigenous forests. Section 8 of the Act requires all indigenous forests and woodlands to be managed on a sustainable basis for the purposes inter alia of conservation of water, soil and biodiversity, river line and shoreline protection, sustainable production of wood and non-wood productions. Community participation as provided for under Section 46 of the Act should be encouraged. The most appropriate would be initiation of participatory forest management in these forest reserves so that the local community and organization such as Ministry of Energy can have a significant input with Kenya Forest Services (KFS) office playing a coordination and guidance role.

Other Pertinent Pieces of Law

While the Environmental Management and Co-ordination Act supersedes all other environmental legislation, numerous other laws and regulations influence the various aspects and activities of the proposed project. These include the following among others:

- Lakes and Rivers Act;
- Use of Poisonous Substances Act (rev. 1983); and
- Workmen's Compensation Act (rev. 1988).

Licenses and Permits

Ideally, the proponent should demonstrate compliance to the legislation through acquiring of the appropriate licenses and permits. Further all contractors and consultants who will be engaged during the planning and design, construction, operation and maintenance and decommissioning should demonstrate compliance to the necessary pieces of legislation.
Those who will be involved should therefore provide the proponent with all legal documents that show that they are legally in the business or services that they intend to deliver to the proponent. These include NEMA registration certificates and licenses, trade licenses, contractor permits, local authority permits, change of user permits etc.

The World Commission on Environment and Development
The Commission commonly referred to as "the Brundtland Commission" focused on the environmental aspects of development, in particular the emphasis on sustainable development that produces no lasting damage to the biosphere, and to particular ecosystems. In addition, environmental sustainability is economic and social sustainability. Economic sustainable development is development for which progress towards environmental and social sustainability occurs within available financial resources. Social sustainable development maintains the cohesion of a society and its ability to help its members work together to achieve common goals, while at the same time meeting individual needs for health and well-being, adequate nutrition, shelter, cultural expression and political involvement.

The Rio Declaration on Environment and Development
Agenda 21 - a programme of action for sustainable development worldwide, the Rio Declaration on Environment and Development was adopted by more than 178 governments at the United Nations Conference on Environment and Development, known as the Earth Summit, held in Rio de Janeiro, Brazil, 3-14 June 1992.

Principle No. 10 of the declaration underscored that environmental issues are best handled with participation of all concerned citizens at all the relevant levels. At the national level, each individual shall have appropriate access to information that concerns the environment that is held by public authorities. States shall encourage and facilitate public participation by making information widely available.

Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided. The foregoing discussion is relevant to the proposed development because EMCA demands that the public must be involved before any development project that is likely to have adverse impacts on the environment is initiated by a Proponent. The Act has further established a Public Complaints Committee (PCC) where the issues raised by the public in regard to any proposed development can be addressed.

United Nations Framework Convention on Climate Change (UNFCCC)

The landmark UNFCCC was opened for signature at the 1992 United Nations Conference on Environment and Development (UNCED) Conference in Rio de Janeiro (known by its popular title, the Earth Summit). On June 12, 1992, 154 nations signed the UNFCCC that upon ratification committed signatories' governments to a voluntary "non-binding aim" to reduce

atmospheric concentrations of greenhouse gases with the goal of "preventing dangerous anthropogenic interference with Earth's climate system." These actions were aimed primarily at industrialized countries, with the intention of stabilizing their emissions of greenhouse gases at 1990 levels by the year 2000; and other responsibilities would be incumbent upon all UNFCCC parties. The parties agreed in general that they would recognize "common but differentiated responsibilities," with greater responsibility for reducing greenhouse gas emissions in the near term on the part of developed/industrialized countries, which were listed and identified in Annex I of the UNFCCC and thereafter referred to as "Annex I" countries.

Kyoto Protocol

According to a press release from the United Nations Environment Programme:
"The Kyoto Protocol is an agreement under which industrialized countries will reduce their collective emissions of greenhouse gases by 5.2% compared to the year 1990 (but note that, compared to the emissions levels that would be expected by 2010 without the Protocol, this target represents a 29% cut). The goal is to lower overall emissions of six greenhouse gases - carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, HFCs, and PFCs – calculated as an average over the five-year period of 2008-12."(http://en.wikipedia.org/wiki/kyoto_protocol)
It is an agreement negotiated as an amendment to the United Nations Framework Convention on Climate Change (UNFCCC), which was adopted at the Earth Summit in Rio de Janeiro in 1992. All parties to the UNFCCC can sign or ratify the Kyoto Protocol, while non-parties to the UNFCCC cannot. The Kyoto Protocol was adopted at the third session of the Conference of Parties (COP) to the UNFCCC in 1997 in Kyoto, Japan.

Sessional Paper No. 6 of 1999 on Environment and Development

Every person in Kenya is entitled to a clean and healthy environment and has a duty to safeguard and enhance the environment (EMCA, 1999). As envisioned in Sessional Paper No. 6 of 1999 on Environment and Development, Kenya should strive to move along the path of sustainable development to meet the needs of the current generation without compromising the ability of the resource base to meet those of future generations. The overall goal is hence to integrate environmental concerns into the national planning and management process and provide guidelines for environmentally sustainable development (EMCA, 1999). The policy paper emphasized environmental impact assessments must be undertaken by the developers as an integral part of project preparation. It also proposed for periodic environmental auditing to investigate whether the developer is fully mitigating the impacts identified in the assessment report.

Kenya Vision 2030
Kenya Vision 2030 is the country's new development blue print covering the period 2008 to 2030. It aims at making Kenya a newly industrialized 'middle income country providing high quality life for all its citizens by the year 2030'. The vision has been developed through an all-inclusive stakeholder consultative process, involving Kenyans from all parts of the country. The vision is based on three 'pillars' namely; the economic pillar, the social pillar and the political pillar. Vision 2030 comes after the successful implementation of the Economic Recovery Strategy for Wealth and Employment Creation (ERS) which has seen the country's economy back on the path to rapid growth since 2002, when GDP was at 6% in 2006.

The economic pillar aims at providing prosperity of all Kenyans through an economic development programme aimed at achieving an average Gross Domestic Product (GDP) growth rate of 10% per annum over the next 25 years. The social pillar seeks to build 'a just and cohesive society with social equity in a clean and secure environment'. The political pillar aims at realizing a democratic political system founded on issue-based politics that respect the rule of law, and which protect the rights and freedoms of every individual in the Kenya society.

Under Vision 2030, Kenya aims to increase annual GDP growth rates to an average of 10% over the vision horizon. This is an ambitious goal and the government is aware of that. But it has the confidence that Kenyans will rise to the challenge as they have done often before. Kenya, in fact, will be only the 5th country in the world to achieve such a high level of sustained economic growth. Considering that the current economic growth of 6.1% has come primarily through rapid utilization of existing capacity rather than efficiency gains or much new investments, achieving the 10% growth will require a dedicated campaign to alleviate existing constraints to future growth. It will be particularly important for resources to be used more efficiently. To achieve that ambition, Kenya must continue with the tradition of macro-economic stability that has been established since 2002. It must also address other key constraints, notably, a low saving to GDP ratio. Delivering the country's ambitious growth aspirations will require a rise in national savings from the current 17% in 2006 to about 30% in 2012. It will also be necessary to deal with a significant informal economy employing 75% of the country's workers. Other critical problems include poor infrastructure and high energy costs.

Policy, Legal and Administrative Framework Compliance Matrix

POLICY	**COMPLIANCE**
1. Environmental policy	The proponent has contracted environmental experts to come up with an E.I.A.
2. National environmental action plan	The proponent has contracted environmental experts to offer guidance on the same
3. National policy on water resource management	They proponent has put in place waste water disposal systems. They also have mechanisms for discharge effluent standards.
4. EMCA	The proponent has contracted environmental experts to come up with an E.I.A.
5. Water Act	The facility gets water from the water services board and this is rightly licensed
6. Forest Act	The proponent will provide for the establishment, development and sustainable

	management including conservation and rational utilization of forest resources for the socio-economic development of the country.
7. Public health Act	The workers will be trained on safety issues and first aid equipment be installed.
8. Local government Act	The proposed Small-Hydropower station plan to be approved by the local council.
9. Physical planning act	The facility to be duly licensed and the facility plans are rightly acquired
10. Land planning Act	The facility to have all legal documents as required by the Ministry of lands
11. Agriculture Act	The proposed Small-Hydropower station plan to be approved by Physical Panning Department

CHAPTER FOUR

Public Participation & Consultation

Public Participation and Consultation

The public participation and consultation for this project was done on Thursday 17th July 2014 at Itumbe Tea Factory and presided over by KTDA officials with the attendance of these key stakeholders as follows;

- Director KTDA
- Director Sanganyi Tea Factory.
- Director- KTDAOgembo Tea Factory and Chairman Nyakwama Power Company.
- Directors Nyamache Tea Factory.
- Regional Manager KTDA Kisii County and Nyamira County.
- KTDA Regional Engineer, Gucha, Kisii County.
- Production Manager Itumbe Tea Factory.
- KTDA Power Headquarters Nairobi Representatives._
- NEMA Consultant

The names and signatures of these key stakeholders are attached in the Appendix. The meeting was also attended by over 40 members and representatives of the surrounding and affected communities and families. The listing of these people and their signatures is attached in the Appendix as well. From this group of people, a total of 8 No. questionnaires were filled in regarding environmental aspects of this project. These are also in the Appendix. A report of this meeting is also in the Appendix. The following were the key issues that were discussed and concluded in this meeting;

- During construction, the local community will be considered for employment by the contractor
- The survey work has been done and sizes have been determined that will be affected by the project, especially the area along where the canal will pass and the area of the proposed penstock and powerhouse
- Compensation will be for the land acquired at a rate of Kshs. 800,000 per acre. The size acquired for each family will be established by a registered surveyor and the size in acres will be multiplied by Kshs. 800,000 to determine the commensurate amount to be compensated to each affected family
- There will be accessibility bridges constructed by the proponent for those affected where their land will have been split or separated by the canal.
- The proponent will also cater for the surveyor who will measure the exact sizes affected in agreement with the affected families.
- The proponent will finance the hiring of lawyers for any legal agreements between the proponent and affected families.
- The proponent will cater for the acquisition of the land titles. The affected families

- The power generated will be sold to KPLC from which anyone interested in connecting dealing directly with KPLC as stipulated by Kenyan laws
- The affected families will form a committee with officials elected to act as the intermediary between the proponent and the affected community.

From the questionnaires filled, the affected families have no major issues regarding this project and they welcome it to their location – see several questionnaires attached to this report. They would however want that soil erosion, if likely to happen owing to the implementation of the project, to be mitigated. All questionnaires filled in show that the affected families welcome the project.

Figure 4: Shaking of hands in agreement of the proposed project after the affected parties and KTDA officials came into agreement on compensation rate.

Figure 5: Winding up of the meeting.

CHAPTER FIVE

Environmental Impacts, Environmental Management Plan, Suggested Mitigation Measures, Project Decommissioning and Environmental Monitoring

Brief Information about the Project

The following table shows the characteristics of the small-hydro power project as noted in the feasibility study to this project conducted by Q-Energy as commissioned by the Ministry of Energy, Republic of Kenya.

Impacts Associated with the Project

Both negative and positive impacts are associated with the proposed Small-Hydro power project. A summary of impacts of the proposed small-hydropower station as presented in the feasibility study report are as per the following table.

Positive Impacts	Negative Impacts
• Improved energy supply • Increased formal and informal sectors opportunities.	• Siltation • Air, water, noise and cultural pollution. • Encroachment of farmland during canal construction • Health and diseases. •

Table on Possible Environmental Impacts and Suggested Mitigation Measures

Construction of the proposed Small-Hydropower station may have the following possible environmental and social impacts. They have been described along with their respective recommended mitigation measures.

Possible Impacts	Suggested Mitigation Measures
1. Biological Diversity (Flora and Fauna): Negative ecological impacts on the construction site (soil erosion, destruction of flora and faunal interference). Small Organisms may be killed and destruction of grass. Trees and shrubs likely to be destroyed are as follows: Markhamialutea, Pinusspp., Grevillearobusta(Mukima), Eucalyptus spp. (Mutimbao), Acaciamearnsi	• All trees uprooted to pave way for canal construction should be replanted. • Planting of grass and trees species that would be destroyed, flowers and grass within the Proposed Small-Hydropower station site. • Planting of trees, grass and flowers has been done and will continue to be done to improve on the landscape quality of the Small-Hydropower station site and also act as windbreakers. • Special attention paid to propagation of the endangered tree species especially *Prunusafricana.* • Tree species to be planted to rehabilitate the site

Shrubs: LantariacaI menti, Ferns among others. Grass: napier grass Fruit trees: Avocado, Guava	and improve the aesthetic value of the Small-Hydropower station site. • Promote the development of community nurseries and educate on need of planting trees to mitigate impact of global warming in the region. • Emphasis to be on indigenous such as *Cordia Africana, CordiaAbbysicca, Dovyalisabyssinica, Vitexkeniensis* (Meru Oak), *Prunusafricana, Podo carpus, Oleaspp, Croton macrostachyus, Junisperusprocera, Miliciaexcelsa, Ocoteausambarensis*(Camphor), *Casuarinaequiselifolia, Calliandracalothyrus, Ficus spp., Uvariodendronanasitum, Celtismildenbracdtii*and*Newtoniabuchananii*(Mu kui), . • Other recommended fruit tree species along the canal include: *Carica papaya* (pawpaw), citrus fruits, *Citrus sinensis*(Orange) Mango (Mangiferaindica), *Psidium guava* (Guava) among others.
2. Land degradation due to increased soil erosion - Clearing of grass, shrubs and other bushes for construction of Small-Hydropower station, footpaths and parking spaces increases the vulnerability of the land/site to soil erosion.	• Terraces to be constructed at appropriate places at the site and suitable plants and grass species planted. • Extra roads to be constructed as narrow as possible and along the contour in consultation with Kenya Forest Service (KFS) and Ministry of Roads as necessary. • Rip-off compacted for planting of trees. • Footpaths to be protected with appropriate grass species, stones or appropriate environmentally friendly measures that would prevent soil erosion. • Avoid use of heavy machinery. • Use water bowsers to minimize dust pollution • Control earth works.
3. Increased water demand/extraction, Supply & Water Quality	• Observe the Water Act 2007 and the 30% water rights for the downstream users. • Water intake to comply with the recommended cubic meters if possible not affecting users downstream. • Keep natural water channels free from obstruction • Support tree planting programmes to enhance water catchment in the area
4. Siltation	• Ensure de-silting is done regularly • Divert storm water from canal to reduce siltation • Construction of recommended silt traps

5. Physical environmental destruction (land scarification)	• Avoid use of heavy machinery • Use water bowsers to minimize dust pollution • Control earth works • Roads rip-off and re-vegetation after construction.
6. Wastes disposal Types of typical solid and liquid wastes expected at the Small-Hydropower station site would include but not limited to the following: These are as follows: Papers, Polyethylene bags, Plastic containers, broken glasses, foodstuff remains, green leaves from clearing of site, human wastes, dirty water, machinery, etc.	The proposed Small-Hydropower station will address the problem as follows: • Waste disposal containers will be placed at strategic places where wastes are sorted out into biodegradable, and non-biodegradable. • Solid wastes such as plastics, papers, and bottles will be collected for recycling. While papers and other wastes that cannot be recycled are burnt in the compost pit or incinerator. • Wastes such as green leaves will be used to produce compost manure for flower gardens to improve soil fertility and also planting trees and flowers later at the Small-Hydropower station site. • Waste water to be disposed into water sanitation system and exhausted for disposal as need arises • Construction of eco toilets away from the river bank for use by the construction workers and visitors.
7. Environmental Pollution through oil, petrol and diesel spillage	• Minimize accidental spillage of oils, petrol and diesels • Ensure direct coupling of turbine and generator to avoid grease mixing with water • Where they occur, immediate collection and treatment of site is recommended. • Dispose wastewater using environmentally sound methods. • Dispose machinery pollutants using environmentally sound methods. • Ensure machinery and equipment are well serviced to reduce leaks. • Construct storage fuel tanks away from regular activities in compliance with Energy bill, 2006.
8. Occupational health hazards or issues during construction and after	• Provision of adequate personal protective gear/equipment to workers such as gloves and gum boots to workers during construction work and operations. • Use of water to reduce effect of dust on workers and the environment. • Erect warning signs

	• Fence where necessary • Building a permanent bridge to the powerhouse • Close contact with the nearest health facility to send ambulance immediately in case of emergency • Ensure night shifts in case the construction will be done over night • HIV and AIDS, VCT and Health Support Clinic within the Small-Hydropower station area.
9. Personal Safety such as workforce accidents by unsafe working practices	• Guard all moving parts of machines; provide personal protective clothing and ensure they are used; • Display for all to read health, safety and environmental management policies • Compliance to the provisions of the EHS management plan to safeguard workers • Prepare and print safety manual for distribution to workers. • Contract an EHS Consultant to police workers with the view to ensure provisions of the EHS regulations are adhered to • Provide protective gear for example overalls, hard hats (helmets), and safety boots among others.
10. Accidents from heavy, long trucks	• Assign a vehicle specifically for emergencies. • Put signs at the front and the rear of the trucks e.g. WIDE LOAD – KEEP DISTANCE • Notices at the sites warning people prone to accidents.
11. Water quality: Pollutants may be swept away into the downstream hence endangering human lives and that of aquatic life.	• Provision of potable water within the proposed facility should be as per NEMA, Ministry of Water & Irrigation and the WHO Standards • Ensuring effective discharge of waste water into the septic tank.
12. Surface run off into the river	• Terraces and cut-off drain to be done. • Planting of suitable flowers and grass to control surface run-off around the project site.
13. Aesthetics of the project site	• Guard against degradation and pollution of the environment • Landscaping • Tree planting
14. Air, dust and noise pollution	• Dust masks to be provided to workers to limit inhalation of the dust. • Contractor will give prior notice of activities and time durations to neighboring households.

	• Watering dusty ground before excavation begins • Measures will be put in place to ensure use of serviced and greased equipment and earmuffs by operators. • Switch off engines when not being used • Generators to be well insulated or placed in enclosures to minimize noise levels. • Sprinkling of water on graded routes to reduce dust. • Provide earmuffs to workers. • Use of appropriate devices to filter toxic emissions from the smoke before release to the atmosphere. • Screening/fencing the site to avoid spread of dust and ensuring all noisy work is done during daytime to avoid disturbance to neighbors.
15. Encroachment of private land and impact on transport access	• Ensure involvement of all the affected households during canal construction and fully compensating them. A meeting was organized on Public Participation and Consultation and it was agreed all will be compensated at a rate of Kshs. 500,000 per acre and compensated for all developments thereof and crops as per set rates • Ensure construction does not affect movement of people by constructing appropriate bridges where canal crosses road or public path. • Give priority to the affected households when allocating power supply • Facilitate proper maintenance of major roads to the Small-Hydropower station.
16. Other cultures (personnel who will be posted to work in the area)	• Sensitization and education of communities on other cultures, their potential impacts and coping mechanisms
17. Security issues	• Promoting community policing. • Small-Hydropower station to provide adequate security for plant and machinery.
18. Employment opportunities	• Give preference to local community on employment matters unless skills required are not available • Where possible offer women equal employment opportunities to men.

Project Decommissioning and Closure Phase

In addition to the Environmental Management/Monitoring Plan for the construction, commissioning and operations of the small-hydro electric power plant, it is necessary to outline basic measures that will be required to be undertaken once all operation activities have ceased. The necessary objectives, activities, actions, mitigation measures and allocation of responsibilities pertaining to prevention, minimization and monitoring of all potential impacts associated with the decommissioning and closure of the plant are as outlined in the table below.

Environmental Management Plan for the Decommissioning and Closure Phase

Action required	**Responsible party**	**Time frame**
Objective: To make the place occupied by the SHP plant equivalent or better than its original condition		
• All structures, pipes, reinforced concrete, steel walls, fencing material, turbines, partitions, electrical cables etc. that will not be used for other purposes must be removed and recycled/reused as far as possible	Contractor, Manager, Proponent	Once-off
• Where recycling/reuse is not possible, the materials should be taken to a licensed waste disposal site	Contractor, Manager, Proponent	Once-off
• Where necessary, canal areas might require stabilization of the lower layers to seal layer works from surface runoff	Contractor, Manager, Proponent	Once-off
• Areas under construction/rehabilitation must be demarcated with danger tapes to prevent vehicular access.	Contractor, Manager	Monthly
• Ensure NO oil spillage occurs during equipment removal and ensure use of serviceable machinery	Contractor,	Once-off
• Any fuels or liquids removed from containers, the tank materials, surrounding soil that may be	Contractor,	Once-off

contaminated must be removed carefully and disposed into licensed sites.		

This is an important phase in a project cycle which comes when the lifespan of a project has come to an end. If by any unforeseen circumstances the operation of the proposed Small-Hydropower station ceases, the removal of facilities and structures will entail demolition of buildings, slabs, foundations and other structures within the built area of the Small-Hydropower station, and proper disposal and/or re-use of demolition materials followed by backfilling, grading, and re-vegetation of the site. All underground storage tanks and any facility containing hazardous liquid shall be located and removed. Disposal of such materials shall be governed by the national standards. The following should be undertaken to restore the aesthetic value of the environment.

- The proponent to employ integrated solid and liquid waste management system
- The proponent together with the local council will select disposal locations based on properties of particular wastes generated.
- Removal, recycling, re-use or selling of scrap materials
- All disposals should be done according to legal requirements.
- Re-vegetation of the site to restore the aesthetic value of the environment.
- Proper erosion control measures during re-vegetation
- Proper monitoring and inspection of the site for indications of erosion
- Fencing and signs restricting access to Minimize disturbance.
- Ensure safety of workers
- Offer advice and counseling to employees on other livelihood opportunities
- Assist with re-employment and job-seeking of the involved workforce
- Compensation and suitably recommend the project workers in seeking employment opportunities elsewhere.

Emergency response plan:

The following table represents the proposed emergency response plan. This should be posted in clear print for all workers to read and understand during construction, commissioning and operational phases.

Item no	Aspect	Response plan	Responsibility
1	Fire	• Use available fire extinguishers to fight fire at incipient stage. • Call police 999 • Call nearest fire brigade • Call plant operator	• Plant staff on duty

		plant/ proponent • Account for all members of staff.	
2	Serious injury/loss of life	• Apply first aid • Call police 999 • Call ambulance service • Call plant operator/proponent	• Plant staff on duty
3.	Theft	• Call police 999 Call plant operator/proprietor	• Plant staff on duty

Environmental Monitoring and Auditing

The project may have minimal adverse environmental effects, provided that recommendations and mitigation measures identified in this report are incorporated into all the contracts and followed by both the developer and the contractor. During operation of the proposed project there will be need for monitoring of air quality, water quality, and ambient noise quality. The purpose of environmental monitoring is to ensure that the state of environment of the project area is maintained at a level equal to or better than pre-construction conditions.
In compliance with Legal Notice No. 101 of 2003, the Proponent will undertake environmental auditing of the proposed project. The Proponent will develop a comprehensive environmental monitoring programme that will be used to:

- ensure protection of the environment
- ensure that personnel exercise due diligence in carrying out activities
- evaluate the effectiveness of the measures used to prevent or minimize environmental impacts.

CHAPTER SIX

Conclusions and Recommendations

Conclusions

In accordance with the Environmental Management and Coordination Act 1999 and The Environmental (Impact and Audit) Regulations, 2002, the findings of the environmental impact assessment carried out for this indicate that possible environmental impacts generated during operations and decommissioning phases will be addressed effectively by the proponent as mitigation measures indicated in the matrix above. As per the above analysis of the aspects of both positive and negative environmental impacts of the project's development, we, the **experts found no significant negative impacts that could pose adverse effects to the extent of the proposed project not being implemented.** The proponent of the proposed project shall be committed to putting in place several measures to mitigate the negative environmental, safety health and social impacts associated with the life cycle of the project. The local community has an overwhelming support for the project and they are very well informed. There is a high expectation of employment for the youths and improvement in the household incomes, infrastructure and general delivery of social services. The community expects the proposed Small-Hydropower station to reduce losses related to frequent power blackout at the nearby Itumbe Tea Factory. It is also recommended that the positive impacts that emanate from such activities shall be maximized as much as possible. It is expected that these measures will go a long way in ensuring the best possible environmental compliance and performance standards.
It is therefore concluded that the proposed small hydro-power project will not compromise the well being of surrounding families (as they are also all well being adequately compensated), ecological and environmental conditions and will be of benefit to the surrounding community as well as to the proponent. However the minor potential negative impacts of the proposed project could be managed with the suggested environmental and social mitigation management plans.

Recommendations

It is therefore recommended that the proposed project be approved subject to the following recommendations:-

- The proponent and the contractor shall ensure that they implement statutory provisions of the statutes mentioned in Chapter Three
- Proponent to ensure implementation of the proposed mitigation measures and compliance with EMP during construction, commissioning and operational phases of the small hydro-power plant
- Annual Audit from the start of operations of the plant as per the requirements of NEMA and existing regulations.

REFRENCES

Government of Kenya (2008), *Kenya Vision 2030, government printer, Nairobi*

Government of Kenya (1994), *The National Environment Action Plan, government printer, Nairobi and*

http://www.nema.go.ke/index2.php?option=com_docman&task=doc_view&gid=210&Itemid=35

Kenya gazette supplement Acts 2000, Environmental Management and Coordination Act Number 8 of 1999. *Government printer, Nairobi*

Kenya gazette supplement Acts, *Building Code 2000 by government printer, Nairobi*

Kenya gazette supplement Acts, *Land Planning Act (Cap. 303) government printer, Nairobi*

Kenya gazette supplement Acts, *Local Authority Act (Cap. 265) government printer, Nairobi*

Kenya gazette supplement Acts, *Penal Code Act (Cap.63) government printer, Nairobi*

Kenya gazette supplement Acts, *Physical Planning Act, 1999 government printer, Nairobi*

Kenya gazette supplement Acts, *Public Health Act (Cap. 242) government printer, Nairobi*

Kenya gazette supplement Acts, *Water Act, 2002 government printer, Nairobi*

Kenya gazette supplement number 56, *Environmental Impact Assessment and Audit Regulations 2003.Government printer, Nairobi*

Kenya gazette supplement Acts, *Occupational Safety and Health Act, 2007government printer, Nairobi*

The Environmental Management and Coordination (Noise and Excessive Vibration Pollutions) (Control) Regulations, 2009

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

Business Daily Newspaper.

Appendix

- Public Participation & Consultation Documents
    - Attendance – Key Stakeholders
    - Attendance – Surrounding Community / Affected Families
    - Questionnaires
    - Report
- Certified Bills of Quantities
- Design Drawings