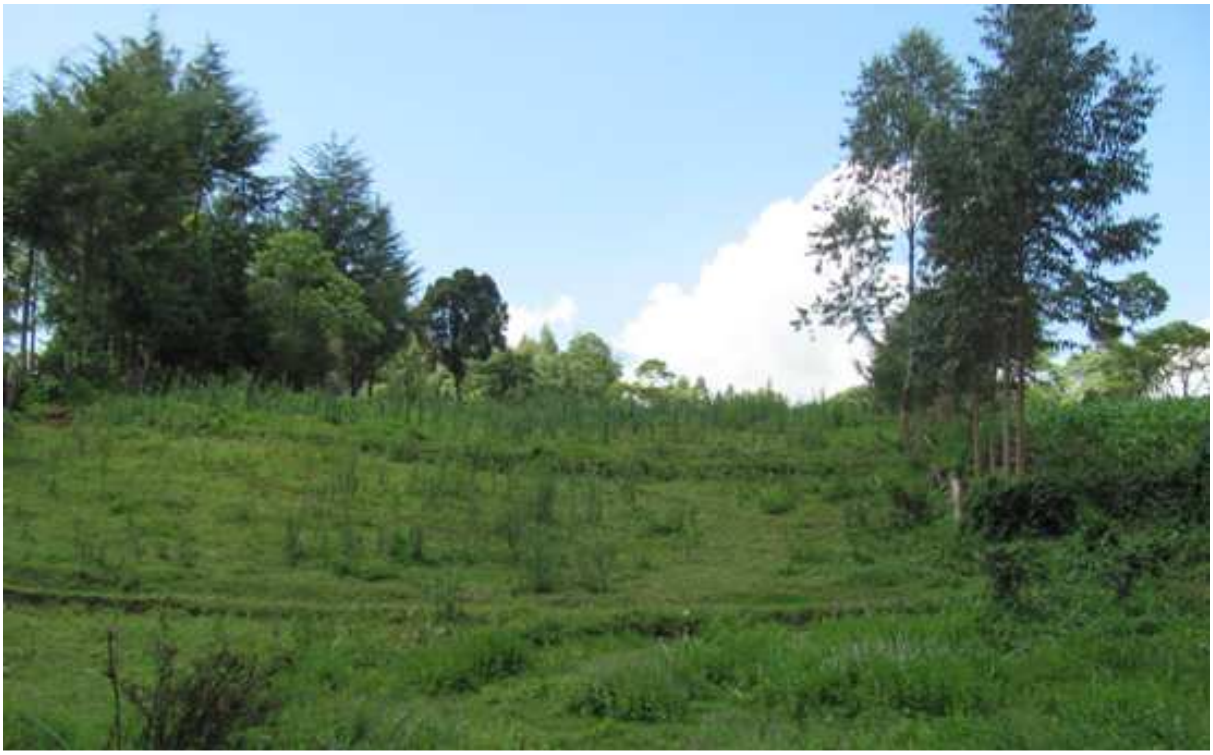
REFERENCE NO.: NEMA/PR/5/2/11,648

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED KAPTEL TEA FACTORY ON LR NO. NANDI/KAPTEL 809, TIRIIN VILLAGE, KAPTEL SUB-LOCATION, KAPTEL LOCATION, NANDI COUNTY



FOR

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CERTIFICATION

This EIA Study Report has been prepared in accordance with the requirement of the Environmental Management and Coordination Act, 1999, and the Environmental Management and Coordination (Environmental Impact Assessment and Audit) Regulations 2003.

We the project proponent and the EIA Firm of Experts certify that the particulars given in this report are correct to the best of our knowledge.

PROJECT PROPONENT:

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1st July 2014

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30th June 2014

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NON TECHNICAL SUMMARY

DL Group of Companies is proposing to construct a modern tea factory on a section of LR No. Nandi / Kaptel Block 809 situated at Tiriin Village, Kaptel Sub-Location, Kaptel Location, Nandi County. The Geographical Reference Coordinates of the project site are Latitude. 0.3°and Longitude 35.05°.

To carry out the Environmental & Social Impact Assessment Study for the proposed project, DL Group of Companies Limited has engaged the services of ENVILEAD Limited (NEMA Reg. No. 6281).

The Title Deed of the land is in the name of DL Koisagat Tea Estate Limited which is one of the many companies fully owned and operated by DL Group of Companies.

Fully owned by DL Group of Companies, the proposed project will entail construction of a single line CTC factory with a provision for future expansion, administration block, parking area, weighbridge, installation of above ground fuel tanks, overhead water tanks and other associated civil works (such as access roads, waste and storm water drains, and water reticulation drainages).

Tea processing entails reception of freshly plucked green tea leaves which are subjected to various processes which include withering; CTC (Cutting, Tearing & Curling); Sorting and grading; and storage and marketing.

The proposed development will have several positive impacts, these include: provision of a modern tea factory; provision of employment opportunities during the construction and operational phases of the project; boosting the local economy; provision of market for construction materials and source of revenue to both the Central Government and County Government. However, the project will result in some negative impacts (for which we have proposed mitigation measures) as summarised in table 1 below:

Table 1: A Summary of Anticipated Impacts and Their Mitigation Measures

Identified Impacts	Proposed mitigation measures
PRE-CONSTRUCTION PHASE	
Loss of Land Use	• Proponent bought from owners at competitive rates.
CONSTRUCTION PHASE	
Soil and geology disturbance	• The minimum area required for construction shall be cleared of vegetation • Top soil shall not be disturbed more than it is absolutely necessary but not below the first impermeable layer • A minimum amount of storm water will be allowed to flow on the site and control measures like paving and banding to avoid storm water damage. • Denuded areas shall be landscaped and vegetation re-planted as soon as feasible after construction.
Loss of vegetation cover	• Re-vegetation to control potential soil loss

Identified Impacts	Proposed mitigation measures
	• Prevention of soil contamination through oil spills/leaks from construction machinery • Landscape area with similar vegetations • Preservation of excavated top-soil for future site restoration procedures particularly in highly disturbed areas; • Limiting vehicular transport to defined roads as to prevent unnecessary injury to vegetation and habitat destruction; • Implementing good housekeeping practices on site and implementing a Solid Waste Management plan in order to eliminate any source of hazard to the native fauna; • Ensure proper demarcation and delineation of the project area to be affected by construction works; • Utilize appropriately clearing techniques (e.g. hand clearing as opposed to mechanized clearing) by using human labour as opposed to heavy machinery. • Minimize clearing and distribution to riparian vegetation.
<u>Biodiversity loss</u>	• Generally, the following should be considered during construction: • Design with a view to incorporating nature conservation into the development including appropriate friendly boundary fencing. • Retain existing habitats where possible and aim to keep natural site features in context rather than in isolated fragments. Pay attention to field boundaries and hedgerows and preserve wildlife corridors and habitat links. Consider integrating ecological features, for example climbing plants and bird nest boxes, within any buildings or structures. • Routine checking of trenches (if any) and escape routes to minimize, if not prevent, entrapment of fauna; • Reporting of any violation relating to hunting and trading activities; • Minimising the removal off-site of any soils containing invasive species. • Compliance with the ecological requirements of the project and any other legal requirements with regard to waste management, environmental pollution, discharge to waters among others. • Replacement of lost habitat throughout the site or in other areas, where possible. • Ensure that landscape design reflects local ecology and uses locally sourced plants wherever possible. Native trees and shrubs should be used for landscaping where practical.
<u>Soil Erosion</u>	• Any construction materials should be screened or covered to prevent off-site movement and the surplus materials should be removed from the site to an approved disposal site.

Identified Impacts	Proposed mitigation measures
	• Striping of vegetation should be limited to areas where civil works will be undertaken • Beaming of the open trenches should be undertaken to prevent them from being washed away by runoff • Sensitization of workers on environmental protection. • Soils excavated from the tower pad area shall be used for backfilling. • Soils shall not be left exposed to wind /water for long.
Noise pollution and vibration	• The contractor to inform neighbours two weeks prior to the commencement of construction activities for early preparedness • Construction activities shall only be undertaken during daytime. • To obtain approvals where night works are to be done from relevant authority • The contractor should use modern equipments which produces the least noise. The use of noise shielding screens should be used and the operation of such machinery restricted to when it is actually required. • Construction activities must abide by the national Noise regulations gazetted by NEMA • The contractor will endeavour to comply with the noise control regulations of 2006 • Only serviceable machinery and equipments shall be used • Employees using equipments shall be provided with ear muffs • Noise reduction /hearing protection devices when working with noisy equipment. • Use serviceable equipment with low noise emission. • Instruct truck and machinery operators to avoid raving of engines.
Solid waste	• Clearing of bushes/vegetation, excavation and cutting should be restricted within the project area. • All solid wastes should be collected at central location for temporary storage until removal to an appropriate disposal site. • Waste generated at the site should be sorted by the contractor and disposed of in a suitable manner into different waste streams. • As provided for by the Building Code, a temporary latrine will be provided on site to be used by construction workers.
Health and safety	• Comply with relevant legislations during construction. • Develop and implement measures to minimize risks and injuries to the public during construction phase.

Identified Impacts	Proposed mitigation measures
	• The contractor must provide and maintain personal protective equipment and facilities to employees engaged in construction activities. • The contractor shall provide a standard First Aid kit at the site office, just in case minor injuries. • All workers will be sensitized before construction begins, on how to control accidents related to construction. • Accordingly, adherence to safety procedures will be enforced. • All workers to wear protective gear (PPEs) during construction. • Undertake Job Risk Assessment Review at each task; • Carry out Tool Box Meetings daily; and • Construction work will be limited to daytime only.
Local Socio-economic impacts	• Implement where feasible measures to employ local community. • Initiate CSR activities for the local community. • Local community given first priority in employment.
Loss of aesthetic / visual intrusion	• Prevent unnecessary removal of vegetation outside the width of the working area by clearly demarcating the working area. • Remove spoil material from the area once the trenches has been filled • Re-vegetate disturbed ground in the working area by seeding and spreading of vegetation that has been removed.
Air pollution	• Appropriate mitigation measures to be implemented - such as wetting down, as well as the erection of shade netting screens, to prevent off-site movement of dusts may be required • All areas disturbed during the construction of the factory must be re-vegetated. • Sensitization of workers on environmental protection and safety. • Control speed of construction vehicles • Prohibit idling of vehicles • Water shall be spraying during the construction phase on excavated areas to reduce dust emission. • Regular maintenance of plant and equipment. • Provision of dust masks for use while working – in dusty conditions. • Use of serviceable vehicles and machinery to avoid excessive smoke emission.
OPERATIONAL PHASE	
Solid waste generation	• Use of an integrated solid waste management system i.e.

Identified Impacts	Proposed mitigation measures
	through several options including of Source reduction Recycling, Composting and reuse and Incineration. • Ensure that wastes generated at the facility are efficiently managed through recycling, reuse and proper disposal procedures. • A private solid waste handler and NEMA approved to be contracted to handle solid waste. • Apply for the statutory licences for the management of wastes as required by EMCA No. 8 1999 and the regulations on waste management. • Wastes to be collected regularly to control air pollution and vermin infestation. • Receptacles will be provided for waste storage prior to collection. • Resource recovery will be encouraged once the project takes off so as to shrink waste stream and recover non-recyclables. • Refuse collection vehicles will be covered to prevent scatter of wastes by wind. • Wastes will be collected by a licensed operator to avoid illegal final dumping at unauthorized sites. • All persons involved in refuse collection shall be in full protective attire.
<u>Public and Occupational Safety and health</u>	• Fence construction site. • Speed limits for project vehicles. • Posting of warning signs at strategic points. • All workers will be sensitized and trained on occupational safety and health issues and on how to control accidents related to construction. • A comprehensive contingency plan will be prepared before begins, on accident response. • Accordingly, adherence to safety procedures will be enforced. • Employees engaged in hazardous work to undergo medical examinations as provided in the Medical examination rules • The Occupier to provide employees with Personal protective equipments. • The occupier should constitute a health and Safety committee as required under Health and Safety Committee rules 2004. • Undertake Job Risk Assessment and Review of each task. • Put in place an Emergency Response Plan.
<u>Pollution of water resources</u>	• Reduce wastewater production. • Recycle the wastewater (where practical) • Reuse the wastewater (generally after treatment) for a beneficial purpose (either onsite or on a neighbouring property)

Identified Impacts	Proposed mitigation measures
	such as dust suppression. • Treat and discharge safely. • Treat and discharge wastewater to soakage or lined evaporation pit (where practical) Treat and discharge to drains or watercourses, meeting values. • Obtain a water abstraction permit from WRMA and implement mandatory seasonal water use limitations in liaison with WRMA; • Rain water harvesting. • Install of interceptors to pre-treat effluents. • Secure effluent water license from NEMA. • Collection and treatment of contaminated runoff before discharge; • Constant review of the design to ensure that capacity is maintained and where necessary corrective measures are undertaken to address the dynamics; Implementation of an effluent program with the objective of monitoring of ground water and surface run off quality though a scheduled and regular sampling and analysis program using NEMA accredited laboratories.
Energy management and conservation	• Enough trees planted for provision of fuel wood. • Local farmers encouraged to plant trees for sale to the factory. • Switching off non operational machines/equipment and lights and using optimum lighting intensity for security and safety purposes. • Routine maintenance of equipment and machines to ensure optimum operations and fuel efficiency. Adopting the use of energy saving lights and machines. • Creation of awareness among users. • Operational efficiency. • Development of key performance indicators.
HIV / AIDS, Sexual transmitted infections and sexual ills	• Employment of locals. • Sensitization staff working on the project on dangers of carefree lifestyle / awareness creation. • HIV/AIDS awareness training for all employees and subcontractors. • Medical examination and care. • Provision of barrier methods such as condoms.
Release of effluent into the environment	• Proponent to ensure the availability of treatment facility onsite that treats wastewater to meet the set NEMA guidelines.
Air pollution	• All workers on the site will be required to wear protective

Identified Impacts	Proposed mitigation measures
	clothing while on duty. • Suitable wet suppression techniques need to be utilized in all exposed areas. • Undertake air assessment to determine the air quality on regular basis.
DECOMMISSIONING PHASE	
Solid waste generation	• A private solid waste handler and NEMA approved to be contracted to handle solid waste. • Resource recovery will be encouraged. • All persons involved in refuse collection shall be in full protective attire.
Public and Occupational Safety and health	• Fence decommissioning site. • Speed limits for project vehicles. • Posting of warning signs at strategic points. • All workers will be sensitized and trained on occupational safety and health issues and on how to control accidents related to construction. • A comprehensive contingency plan will be prepared before work begins. • Put in place an Emergency Response Plan.
Air pollution	• All workers on the site will be required to wear protective clothing while on duty. • Suitable wet suppression techniques need to be utilized in all exposed areas.

Noting that cost effective mitigation measures for the anticipated negative impacts are available, we recommend that the proposed project may be allowed to commence.

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ACKNOWLEDGEMENT

Envilead Limited takes this opportunity to thank DL Group of Companies (the project proponent) for providing the chance to carry out this Environmental Impact Assessment exercise.

Special thanks go to all stakeholders for their input during the assessment.

EIA STUDY EXPERTS

NO.	NAME	POSITION
1.	Paul O. Onana	EIA Lead Expert & Safety & Health Expert
2.	Nahashon K. Too	EIA Lead Expert & Food Production Expert
3.	Andrew Munyua Mwenga	Energy / Lead EIA Expert
4.	Fred Aronya	EIA Lead expert
5.	Eng. Job Kaibei	Tea Manufacturing Process Engineer
6.	Otiato Justus Wafula	Sociologist
7.	Martin Mamboleo	Associate Environmental Expert
8.	Mary Kitolel	Associate Environmental Expert

ACRONYMS AND ABBREVIATIONS

ºC:	Degrees Centigrade
CTC:	Cutting, Tearing & Curling
EIA:	Environmental Impact Assessment
EMCA:	Environmental Management and Coordination Act
EMP:	Environmental Management Plan
HAG:	Hot Air Generator
NEMA:	National Environment Management Authority
OHS:	Occupational Health and Safety
SHE:	Safety, Health & Environment
TOR:	Terms of Reference
TSS:	Total Suspended Solids
PPEs:	Personal Protective Equipments
PM:	Particulate Matter
WRMA:	Water Resources Management Authority

CHAPTER ONE: INTRODUCTION

1.0 INTRODUCTION

These Terms of Reference (TOR) are written to set the conditions for carrying out an Environmental Impact Assessment (EIA) Study for the proposed modern tea factory on a section of LR No. Nandi / Kaptel Block 809 situated at Tiriin Village, Kaptel Sub-Location, Kaptel Location, Nandi County. The Geographical Reference Coordinates of the project site are Latitude. 0.3°and Longitude 35.05°.

The Title Deed of the land is in the name of DL Koisagat Tea Estate Limited which is one of the many companies fully owned and operated by DL Group of Companies.

owned by DL The proposed project will entail construction of a single line CTC factory with a provision for future expansion, administration block, parking area, weighbridge, installation of above ground fuel tanks, overhead water tanks and other associated civil works (such as access roads, waste and storm water drains, and water reticulation drainages).

The tea processing involves reception of freshly plucked green tea leaves which are subjected to various processes which include withering; CTC (Cutting, Tearing & Curling); Sorting and grading; and storage and marketing.

To carry out the Environmental & Social Impact Assessment Study for the proposed project, DL Group of Companies Limited has engaged the services of ENVILEAD Limited (NEMA Reg. No. 6281).

1.1 EIA WORK

The proponent submitted a EIA Project Report to NEMA for review, in a letter dated 7th November, 2013, NEMA directed the proponent to initiate an EIA Study by first developing and submitting Terms of Reference for approval.

In line with provisions of EMCA, the Project Proponent is required to submit an EIA Study report to the NEMA for review and approval before commencing the implementation of the project. The EIA study findings (EIA Study Report) enables NEMA and the lead relevant government authorities to monitor impact within the life span of the project on the immediate environment, so as to enable major stakeholders of the project including the government to manage the environment for the well being of the community and future generations.

The TOR has been prepared based on the scoping result, field visits and information collected from both primary and secondary sources including the information provided by the Project Proponent.

1.2 OBJECTIVES OF THE PROPOSED EIA STUDY

The key objectives of this study include the following:

i) To identify and evaluate the significant environmental and social impacts of the proposed project.

ii) To asses and give recommendations on the various mitigation measures to be taken to reduce possible negative impacts on the seasonal stream flowing across the proposed piece of land for development.
iii) To determine the compatibility of the proposed project with the local land uses and evaluate local environmental conditions.
iv) To assess and analyze the environmental costs and benefits associated with the proposed project.
v) To evaluate and select the best project alternative from the various options available.
vi) To incorporate environmental management plans and monitoring mechanisms during design, implementation and operation phases of the project

1.3 TERMS OF REFERENCE (TOR)

The following Terms of Reference apply to the project:

i) Screening and scoping.
ii) Carry out literature review.
iii) Hold meetings with the project proponent, and stakeholders to establish the procedures, define requirements, responsibilities and a time frame.
iv) Carry out preliminary fieldwork.
v) Submission of an EIA Project Report to NEMA.
vi) Prepare the TOR for submission to NEMA for consideration and approval.
vii) Undertake detailed fieldwork.
viii) Carry out baseline laboratory analyses.
ix) Carry out a systematic environmental assessment at the proposed project site and the surrounding area in line with established standards and laws.
x) Provide a description of the proposed project activities.
xi) Develop an Environmental Management Plan and cost estimates for the proposed project.
xii) Produce an Environmental Impact Assessment report.
xiii) Submission of an EIA Study Report to NEMA.

1.4 METHODOLOGY

The methodology used in the study consisted of the following.

- Reviewing and analysis of the project documents
- A site visits and visual survey to determine the baseline information of the project area.
- Comparative study of the project with existing land uses in the neighborhood.
- Discussion with the proponent and his consultants
- Assessment of the site to detail the various existing and likely impacts.
- Assessment of health and safety issues
- Seeking public views through interviews, questionnaire administration, and interviews.
- Carry out baseline laboratory analyses.
- Proposal of mitigation measures to minimize any negative impacts.
- Preparation and submission of study report to NEMA

1.5 OUTPUT

The output of the study was the production of an EIA Study report for submission to NEMA for purposes of seeking an EIA license.

1.6 POTENTIAL POSITIVE IMPACTS

The positive impacts associated with the proposed project include the following among others:

i) The project will provide a new modern tea factory.
ii) Provision of employment opportunities during both construction and operation phases of the project.
iii) Provision of a ready market for local construction material and trees for fuel wood.
iv) Economic returns in terms of revenue generation to the local community and Government.
v) Economic investment hence increases in wealth - the proponent will receive returns on his investments.

CHAPTER TWO: PUBLIC CONSULTATION

2.1 Introduction

Public consultation is a key component of an ESIA process, its goal is to inform the local population, statutory bodies and local organizations and interested parties about the proposed project / activity.

Public consultation is necessary for gathering environmental data, understanding likely impacts, determining community and individual preferences, selecting project alternatives and designing viable and sustainable mitigation and compensation plans.

Section 17-1 of The Environmental-Impact Assessment and Audit Regulations, 2003 requires that an EIA should *"seek the views of any person who may be affected by the project" and* Section 107 of the Water Act, 2002, demands that ''*a water permit applicant must undertake public consultation.''*

Public consultation was undertaken to disseminate information to interested and affected parties (stakeholders), to solicit their views, fears and consult on sensitive issues.

2.2 Objectives of Public Consultation

The objectives of public consultation were to:

i. Disseminate general project and programme information to affected persons and interested parties;
ii. Provide an opportunity to record comments / opinions of affected persons / interested parties, and where possible to address these issues within the ESIA;
iii. Provide for information exchange and answer questions regarding the proposed project;
iv. Discuss and address areas of concern / confusion; and
v. Comply with the Government of Kenya's requirements for Environmental Impact Assessment and application of a Water Permit;
vi. To give stakeholders an opportunity to present their views, concerns and issues regarding the proposed development; and
vii. To receive suggestions from stakeholders on how potential negative impacts can be mitigated.

2.3 The Consultation Methodology

Several methods of communication and consultation were employed, these included:

i. Observation/site visit
ii. Face to face meeting with stakeholders;
iii. Holding public meetings; and
iv. Informal discussions

The public participation and consultative forums was conducted by the experts within the project site and its environs solicit views and opinions from various stakeholders. In this connection a three tier method was employed for the purposes of arriving at informed decision. The collected views and opinions were

independently analyzed and interpreted. This interpreted information was then used to advice the proponent accordingly on the various issues which would ensure the projects viability.

2.3.1 Site Visits (Observation)

Site visits were done on 25th May 2013, 10th June2013 and 15th June 2013. The observation of the proposed project site:

- Project site is a grassland as shown on the cover page
- No work had started yet.
- Proximity to Kaptel Trading Centre & AIC Kaptel Academy
- Destruction of Indigenous tree cover along the stream by the residence
- Planting of maize and exotic eucalyptus trees along the streams prevalent in area as part of catchment area reclamation.

During site visits, the following was done;

- Interview with the project proponent with a view to establishing the proponent's awareness of environmental management (the proponent's plans to establishing an environmental programme), site history.
- Assessing the site status quo, availability of resources including the raw materials (fuel wood, and water, nearby farmers planting tea).
- Accessibility to road network and power supply
- Interview the local residence on their awareness of the proposed projects and translocation of those who sold their land to pave way for the up-coming project.

2.3.2 Public Involvement

The public was involved in making suggestions and giving their views on how the proposed project DL Kaptel Tea Factory is likely to perform in terms of service delivery to the public and as to whether this factory will impact positively or negatively to their immediate environment and to those next to it. The public was to respond to operations that are likely to positively or negatively impact on the total environment, such as field management, crop husbandry, factory processing, grading and parking, transport, distribution consumption to waste disposal. To find out the views of the public, management of the proponent were not involved on the methodology of data collection, but the experts relied purely on the written evidence adduced through the questionnaires and conducted visits on the proposed factory. Details of the visit are enclosed above. A three tier approach was used to solicit for the public views. These approaches were:

- Use of structured questionnaires
- Interviews with various stakeholders
- Consultative meetings and forums

The experts organized various meetings and forums with the community members, this include visiting door to door of the surrounding neighbours, schools and public barazas. During these meetings and forums, consultation was done with the farmers on various issues to ensure the proposed project meets its obligation to farmers.

The photos below show pictures taken during the various consultative forums.

Photo 1: Interview with teachers of AIC Kaptel Primary School - Head Teacher's office

Photo 2: Public meeting at Kaptel Centre

Photo 3: Public meeting during Chief's Baraza at Kaptel Centre

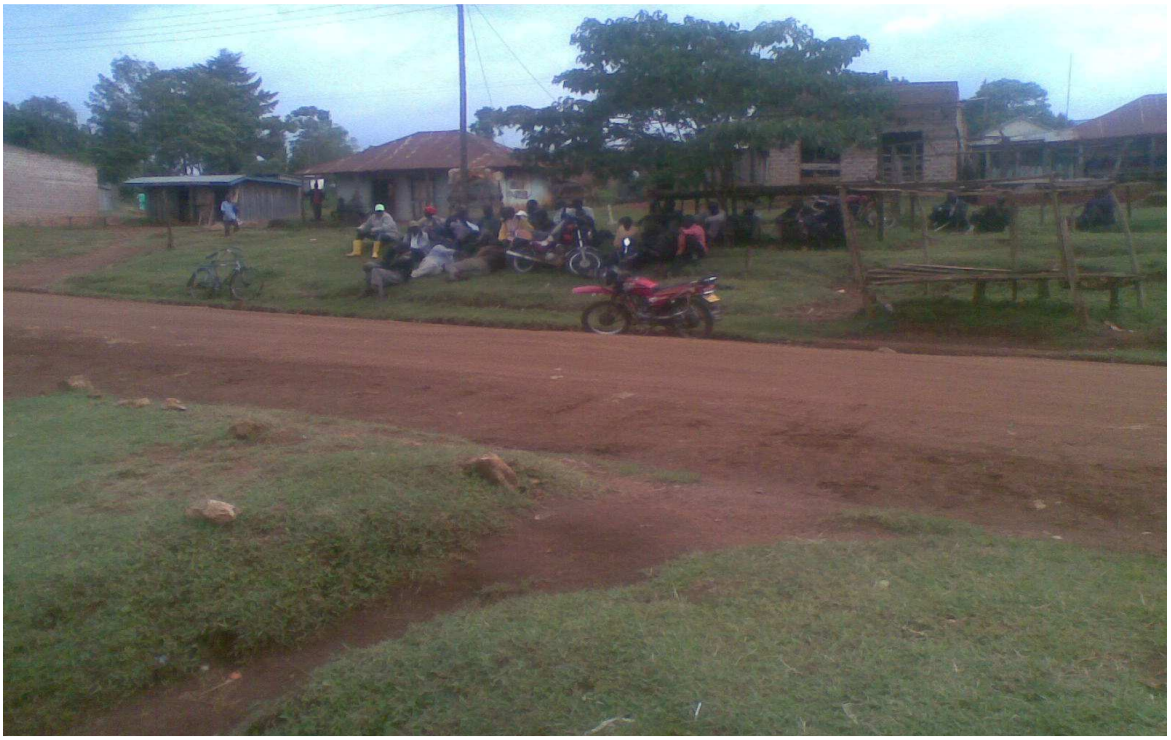

Photo 4: Public meeting at Kaptel Location

2.4 Issues raised during the public consultations

The issues raised include:

i. Food security

It was noted that tea production requires a vast land area and therefore food crop production will be replaced by tea production. Therefore, there was need for an integrated approach to commercial and subsistence farming considering the food situation in the project area.

ii. Farm inputs

The community was of the opinion that farm inputs such as fertilizers should be provided to the farmers by the project proponent. They felt this would increase tea productivity and yield and make tea farming a profitable venture.

iii. Corporate social responsibility

The community felt that the proponent should provide other services and amenities as a way of appreciating the community contribution to the project. Such facilities that were proposed include roads, schools, water and health care facilities (especially for those affected by HIV/AIDS) and economic welfare for the elderly persons.

iv. Job opportunities

The respondents indicated that the tea factory is expected to employ the local people especially the youth either directly or indirectly. It is expected that both casual and permanent jobs will be available.

v. Pollution

It was noted that the factory is likely to emit air pollutants that may cause acid rain and corrode the iron sheets. The proponent was required to ensure that such emissions are controlled well to avert any form of environmental pollution.

vi. Industrial Development

The respondents noted that the proposed Project will enhance industrial development in the area and that it will lead to economic development and growth in the project area.

vii. Respondents overall assessment towards the proposed Project

When the respondents were asked to state whether they find the proposed Kaptel tea factory as positive and beneficial in the overall, all of them said the proposed Project will be positive and beneficial in the overall.

Table 2: A selection of some respondents and their concerns

NO	NAME	OCCUPATION	CONCERN
1	Isaac Kemboi	Chief	Satisfied with project but major concern on security issues
2	Richard Too	Ass chief	No major objection
3	Pamela Langat	Zonal officer	Satisfied with the project
4	Rev.Barnabas Kisorio	Spiritual leader	No objection, but concern on moral values
5	Keiyo Silas	Teacher	Concern on noise pollution
6	Aron Kili	Teacher	Major concern is noise pollution
7	Susan Chebet	Business woman	No objection
8	Joseph Kiplimo	Farmer	Happy with the project
9	Oliver Kibet	Farmer	Satisfied
10	Wilson Keter	farmer	No objection
11	Mr Kosgei	Education officer	Major issues is on moral values
12	Isabella Rugut	farmer	No objection
13	Julius Bett	Chairman	Happy with the project
14	Jeptoo Pamela	Farmer	No major objection
15	Florah Jepkorir	Business woman	No objection
16	Thomas Mitei	Village elder	Satisfied with the project
17	Joel Tanui	Farmer	No objection on the project
18	Ebby Jerubet	Farmer	Satisfied with the project
19	John Kiplimo	Farmer	Satisfied
20	Kemboi Daniel	Farmer	No major objection
21	Priscah Jepketer	Business woman	Happy with the project
22	Eliud Tuwei	farmer	No objection
23	Emilly Bett	farmer	No objection
24	Daniel Mosop	Village elder	Satisfied
25	Kirwa Rotich	Farmer	No objection
26	Truphena Jebet	Business woman	No objection
27	Reuben K. Sang	Village elder	Satisfied with the project

28	Daniel Chepsiror	Farmer	No objection
29	Wesley Sang	Farmer	No objection

2.5 Analysis of Public Consultation

The respondents had no major concerns raising the need not to implement the proposed project within their area. The respondents felt that the proposed project will be of great benefit not only to the tea farmers but also to the jobless youths and other professionals in the area.

The respondents however showed concerns on the need to conserve and manage the environment in a sustainable manner. Similarly they felt that occupational health and safety were key issues which needed to be addressed when the proposed facility is commissioned. However, the community was able to come up with mitigation measures to ensure the project run smoothly and effectively. The measure suggested includes:

a) Provision of noise absorbers or use of silent machines
b) Proper disposal of effluent and other waste materials
c) Afforestation
d) Police station to curb insecurity
e) Well build drainage systems
f) Provision of hydro electricity to promote security
g) Use of modern machines to reduce air pollution
h) Natural vegetation should be conserved by clearing the vegetation manually without burning

CHAPTER THREE: BASELINE INFORMATION

3.0 STUDY AREA

3.1 Location and Land Ownership

The project will be located on LR No. Nandi / Kaptel Block 809 situated at Tiriin Village, Kaptel Sub-Location, Kaptel Location, Nandi County. The Geographical Coordinates of the site are Latitude. 0.3° and Longitude. 35.05°.

The Title Deed of the land is in the name of DL Koisagat Tea Estate Limited which is one of the many companies fully owned and operated by DL Group of Companies.

3.2 Administrative, Political Units, and Population

The proposed project site is in Nandi County, Nandi North Sub County which lies on the western part of the Rift Valley Province and occupies 1,482 square kilometres. The Sub County has five administrative divisions; these are Kapsabet, Kilibwoni, Kosirai, Kabiyet and Kipkaren.

3.3 Topography and Soils

Nandi County has four main features, these are the rolling hills to the west, the Kapsabet Plateau, the highlands and Kingwal swamp in the Baraton/Chepterit area. Land rises from 1,300m to 2,500m above the sea level in the highlands. The district is hilly and underlain by outcrop of basement rock system, distinct in the north. The topography is apt for growth of natural forest which covers an estimated 19% of total land area and acts as watershed for numerous rivers.

Sandy and clay loams are the main soil types found in the district but areas such as Kabiyet and Kilibwoni divisions have humic nitisols. These soils are generally suitable for production of various crops. Other regions like Ngecheck are rocky.

3.4 Rainfall and Climate

Nandi North has a cool and moderately wet climate and receives mean rainfall of between 1,200-2,000mm per year. The rainfall is bimodal with dry spells experienced between December and March. The distribution of rainfall is affected by topography and the south-westerly winds from Lake Victoria. The eastern and north-eastern parts of the district receive the lowest rainfall. About 75% of the district is arable and capable of producing diverse crops such as tree crops, tea, horticulture, pyrethrum, coffee and cereals due to adequate and reliable rainfall. The district has 7 major agro-ecological zones. The southern parts receiving higher amounts of rainfall of about 1,500mm form the tea belt while the relatively warmer areas of Kipkaren and Kabiyet are ideal for maize and wheat cultivation. The climate is ideal for dairy activities.
The site is fenced and undeveloped. Some of the vegetation previously growing on the site has been cleared.

3.5 Water and Infrastructure

Nandi North receives adequate rainfall and therefore has a robust drainage system. The system comprises of a number of permanent rivers such as Kipkaren, Clare, Nyonkie, Kingwal and Yala and the Kingwal Swamp. Permanent streams can also be found all over the district but are concentrated in Kilibwoni division. These resources can provide adequate quantities for domestic, livestock and industrial use. However, there is limited access to safe and clean sources of water for domestic use. Over three-quarters of the households have restricted access to improved water points, especially piped sources.

3.6 Natural Ecological Resources

Nandi North experiences encroachment in forest area due to settlements of landless residents and expansion of agricultural activities. There is also uncontrolled logging of trees for timber production and charcoal burning. There is also human encroachment in the Kingwal Swamp, negatively affecting the biodiversity of the ecosystem. A more judicious use of these resources is necessary to maintain balance in the ecosystem. The rapidly expanding urban centres are also in need of sanitation facilities to reduce pollution of water resources.

The site for the proposed development is situated around an already developed area; natural fauna and flora are limited. The original indigenous natural forest with its fauna has been displaced, creating land for agriculture as well as settlement.

3.7 Infrastructural facilities

The area is well served with communication and transport network.

3.7.1 Transport Infrastructure

The area has poor road network.

3.7.2 Power supply

The area is not well served with electricity.

3.7.3 Health Care Facilities

The project area is not easily accessible to public and private health facilities.

3.7.4 Water Supply

Area is not served by piped water. Alternative sources of water in the area are: borehole water, River water and harvested rain water from the roofs.

3.7.5 Waste Water Management

A waste water treatment plant will be used to treat process water.

The area is not served by public sewer system; hence, a conservancy / septic tank will be used for management of sewage.

3.8 Ambient Air Quality

The project site is located far away from an industrial area, apart from dust during dry seasons, there is absence of pollutants in the air and the ambient air is relatively clean. The proposed project will in no way significantly alter the area's ambient air quality.

CHAPTER FOUR: LEGAL AND INSTITUTIONAL FRAMEWORK

4.0 Legislations Relevant to the Project

The proposed project falls under the provisions of several national and international laws, regulations and standards as discussed below:

4.1 The Constitution of Kenya, 2010

Article 42 of the Constitution states that every person has the right to a clean and healthy environment, which includes the right:

(a) to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and
(b) to have obligations relating to the environment fulfilled under Article 70.

Article 69(2) states that every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

Article 70 (1) states that If a person alleges that a right to a clean and healthy environment recognized and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter.

4.2 The Environmental Management and Coordination Act, 1999

Until 1999, Kenya did not have a consolidated legislation for the protection and management of the environment. The legal provision on environmental protection have been scattered in 77 statutes which touch on various aspects of the environment. This set up did not offer adequate protection of the environment mainly due to weak legal and institutional framework.

Significant progress has, however, been accomplished towards arresting this issue. In 1999, a bill to provide for the establishment of appropriate legal and institutional framework for the management and protection of the environment was enacted into law as the Environmental Management and Co-ordination Act, 1999 and received Presidential assent on 6th January 2000.

The Environmental Management and Co-ordination Act (EMCA), 1999, made provision for the establishment of the National Environment Management Authority (NEMA) which has the statutory mandate to supervise and co-ordinate all environmental activities in Kenya. NEMA is ultimately responsible for coordinating the EIA process and issuing, varying or cancelling Environmental Impact Assessment licenses.

Part II of the Environment Management & Coordination Act, 1999 states that every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment. In order to ensure this is achieved, Part VI (Section 58) of the Act directs that any proposed programme, activity or operation – out of character with its surrounding, should undergo environmental impact

assessment and a report prepared for submission to the National Environmental Management Authority (NEMA), who in turn may issue a license as appropriate.

Environmental Impact Assessment (EIA), as a tool for better planning, is undertaken to trigger informed prediction of likely environmental impacts of proposed projects, check compliance with environmental policies and legislative environmental requirements in order to allow for consideration of mitigation measures, check risks and expose them for correction. It provides information for regular monitoring in an elaborate environmental management plan, ensuring that environmental management is optimized at all stages of development through best practice. Policies and laws that relate to EIA aim at promoting sound environmental management. Section 78 of EMCA requires observance of air quality standards i.e. ambient and occupational air quality and emission standards for various sources. It further requires that necessary measures be taken to reduce existing and new sources of pollution through redesign of plants, installation of new technologies or both.

Several Regulations has been formulated to operationalize EMCA, those regulations which have a direct bearing to the proposed project include:

4.2.1 Environmental Impact Assessment and Audit Regulations 2003 (Legal Notice No. 101)

The regulations govern Environmental Impact Assessment (EIA) studies in Kenya.

Regulation 7 (3) states that a project report shall be prepared by an environmental impact assessment expert registered as such under these Regulations.

Regulation 8 demands that a proponent shall submit at least ten copies of the project report to the Authority or the Authority's appointed agent in the prescribed form accompanied by the prescribed fees.

Regulation 11 (1) states that an environmental impact assessment study shall be conducted in accordance with terms of reference developed during the scoping exercise by the proponent and approved by the Authority.

Regulation 13 (2) states that every environmental impact assessment study shall be carried out by a lead expert qualified in accordance with the criteria of listing of experts specified in the Fourth Schedule to these Regulations.

Regulation 24 on EIA licensing states that environmental Impact License shall be issued after the authority approves the study report under regulations 23, and shall be issued in form and accompanied by the prescribed fee.

Section 87 provides for the proponent to adhere to the disposal of wastes requirement in such a manner as not to cause pollution to the environment or ill health.

4.2.2 The Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2009

It amends the Fifth Schedule Environmental (Impact Assessment and Audit) Regulations, 2003, by deleting item 4 and substituting therefore the following: –

"Environmental Impact Assessment license - 0.05% of the total cost of the project, to the minimum of Ksh. 10,000 and maximum of Ksh. 1,000,000 payable as follows:

a) 50% of the 0.05% being Processing Fee Payable upon submission of a project report;
b) 50% of the 0.05% being license fee payable upon collection of the Environmental Impact Assessment License".

N/B: this has been repealed as seen below:

4.2.3 Gazette Notice No. 13211 of 17th September 2013 – Review of Environmental Impact Assessment Fees

The EIA Fees payable to NEMA is reviewed as follows: 0.1% of the total cost of the project to a minimum of Ksh. 10,000 with no upper capping.

4.2.4 Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations, 2006

NEMA is mandated under this regulation to approve any substance to be used as a fuel catalyst if the substance improves fuel economy, enhances combustion and reduces harmful emissions that adversely affect human, animal and plant health and degrade the environment. Furthermore, NEMA has to issue a catalyst license of an approved fuel catalyst and may impose such conditions as it may deem appropriate.

4.2.5 Environmental Management and Coordination (Water Quality) Regulations, 2006

These regulations apply to drinking water, water used for industrial purposes, agriculture purposes, fisheries and wildlife and water used for any other purpose. The objective of the water quality regulations is to prevent water pollution by prescribing threshold levels of various elements that are permissible in effluent water. Provides the permissible limits for wastewater discharge to environment i.e. water body, sewer and land. It is thus the benchmark for adoption of wastewater treatment technologies and best practice to avoid water pollution.

It also creates riparian zones along rivers and streams alongside providing for the daily monitoring of effluent discharge both in terms of quality and quantity to the environment. The regulations provides for the sound and integrated management of waste across the sectors in Kenya.

The First Schedule of the regulations gives quality standards for sources of domestic water; these are shown in the table below:

The Third Schedule of the regulations gives standards for effluent discharge into the environment; these are shown in the table below:

4.2.6 Environmental Management and Coordination (Waste Management) Regulations, 2006 and Water Quality (Amendment) Regulations, 2012

This subsidiary legislation creates rules to govern the handling, transportation, treatment and disposal of various wastes. It defines wastes broadly into industrial, biomedical, hazardous and toxic and stipulates the various ways of handling these waste streams.

Regulation 4 (1) demands 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 waste receptacle.

Regulation 4 (2) states that a waste generator shall collect, segregate and dispose such waste in the manner provided for under these Regulations.

Regulation 5(1) 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
  (iii) Reclamation and recycling; and

(c) Incorporating environmental concerns in the design and disposal of a product.

Under regulations 10 (1) a licence for waste disposal facilities is needed.

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

Regulation 14(2) states that Anti-pollution equipment installed pursuant to paragraph (1), shall be determined by the best practicable means, environmentally sound practice or other guidelines as NEMA may determine.

Regulation 15 states that no industry shall discharge or dispose of any waste in any state into the environment, unless the waste has been treated in a treatment facility in a manner prescribed by the NEMA in consultation with the relevant lead agency.

The Environmental Management and Co-ordination (Water Quality) (Amendment) Regulations, 2012 amends the Environmental Management and Co-ordination (Water Quality) Regulations, 2006 by deleting the Eleventh Schedule and substituting it with the following new Schedule:

Table 3: Eleventh Schedule

	KSh.
The fees chargeable under these Regulations shall be as specified hereafter:	
1. Application for discharge of effluent into the environment	

(a) Sewerage service providers	5,000
(b) Discharging facility in Schedule 4 other than (a) above	5,000
(c) Any other institution	5,000
2. Annual License fee for discharge of effluent into the environment	
(a) Sewerage service providers sector—	
Category (I) ≥ – 80,000 M DWF Design Capacity	500,000
Category (II) ≥60,000<80,000m3 DWF Design Capacity	400,000
Category (III ≥40,000<60,000m3 DWF Design Capacity	300,000
Category (IV) ≥20,000<40,000m3 DWF Design Capacity	200,000
Category (V) 20,000m3 DWF Design capacity	100,000
Discharging facility in Schedule 4 other than (a) above – and for— *(i) Petroleum sector*	100,000
Category (I) Depots, pump stations and refineries	100,000
Category (II) Service station (Filing station + Vehicle service + carwash)	75,000
Category (III) Service station (Filling station +Vehicle service)	50,000
Category (IV) Filling station ≥50M3 (Tank Storage)	30,000
Category (V) Filling Station < 50M 3(Tank storage)	**25,000**
(ii) *Hotels, Camps and lodges sector* Category (I) ≤ 25 persons bed capacity	25,000
Category (II) >25 ≤ 50 persons bed capacity	30,000
Category (III)>50≤ 75 persons bed capacity	50,000
Category (IV) >75≤ 100 Persons bed capacity	75,000
Category (V) >100 Persons bed capacity	100,000
(iii) Agro-based Processing Industries	
Category (i) ≥ 2,000 M3 DWF Design capacity	100,000
Category (i) ≥ 1500 <2,000 M3 DWF Design capacity	75,000
Category (i) ≥ 1000 <1500 M3 DWF Design capacity	50,000
Category (i) ≥ 1,000 M3 DWF Design capacity	30,000
(iv) Abattoirs /slaughterhouses	
Category (i) ≥40 animals per day	100,000
Category (ii) ≥ 20 < 40 animals per day	75,000
Category (iii) ≥ 6 < 20 animals per day	50,000
Category (iv) < animals per day	20,000
(v) Chemical-based Processing Industries	
Category (i) ≥2,000 m3 DWF Design Capacity	100,000
Category (ii) ≥1500<2,000 m3 DWF Design Capacity	75,000
Category (iii) ≥1000<1500 m3 DWF Design Capacity	50,000
Category (iv) <1,000 m3 DWF Design Capacity	30,000
(vi) Intensive Chemical Agriculture	
Category (i) ≥40 HA Acreage	100,000
Category (ii) ≥30 <40 HA Acreage	75,000
Category (iii) ≥20<30 HA Acreage	50,000
Category (iv) ≥10 <20 HA Acreage	30,000
Category (v) < 10 HA Acreage	20,000

(a) Institutions, commercial or residential premises with population > 100persons	20,000
(b) Commercial or residential premises with populations ≤ 50 ≤ 100 persons	10,000
(c) Others	
3. Inspection of records/effluent register	200
4. Variation of effluent discharge license	10% of the Annual License fee

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

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

Regulation 4 (1) states that except as otherwise provided in these Regulations, no person shall-
(a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or
(b) Cause to be made excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source; Regulation 4(2) states that any person who contravenes the provisions of this Regulation commits an offence.

Regulation 15 states that any person intending to carry out construction, demolition, mining or quarrying work shall carry out an EIA study, during the Environmental Impact Assessment study the following will be investigated:

a. Identify natural resources, land uses or activities which may be affected by noise or excessive vibrations from the construction, demolition, mining or quarrying;
b. Determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction, demolition, mining or quarrying noise or vibration impacts; and
c. Incorporate the needed abatement measures in the plans and specifications.

Regulation 16 (1) states that where a sound source is planned, installed or intended to be installed or modified by any person in such a manner that such source shall create or is likely to emit noise or excessive vibrations, or otherwise fail to comply with the provisions of these Regulations, such person shall apply for a licence to the Authority.

4.2.8 Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009

Section 14 of the regulations states: Duty of land owners users and occupiers.
(1) Every owner, occupier or user of land which is adjacent or contiguous to a wetland shall, with advice from the Authority, have a duty to prevent the degradation or destruction of the wetland, and shall maintain the ecological and other functions of the wetland.

4.2.9 The Draft Environmental Management and Coordination (Air Quality) Regulations

These regulations are at an advanced stage of coming into force, they have been forwarded to the Attorney General. The objective of the regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources such as mobile sources (e.g. motor vehicles) and stationary sources (e.g. industries) as outlined in the Environmental Management and Coordination Act, 1999. It also covers any other air pollution source as may be determined by the Minister in consultation with the NEMA. Emission limits for various areas and facilities have been set. The regulations provide the procedure for designating controlled areas, and the objectives of air quality management plans for these areas.

4.3 The Water Act (No. 8 of 2002)

An Act of Parliament to provide for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water; to provide for the regulation and management of water supply and sewerage services; to repeal the Water Act (Cap. 372) and certain provisions of the Local Government Act; and for related purposes

Section 3 of the Act states that every water resource is hereby vested in the State, subject to any rights of user granted by or under this Act or any other written law.

Section 6 gives provisions for acquisition of Water Rights, it states that 'After the commencement of this Act, no conveyance, lease or other instrument shall effectual to convey, assure, demise, transfer or vest any person any property or right or any interest privilege in respect of any water resource, and no such property, right, interest or privilege shall be acquired otherwise than under this Act.'

Section 7(1) establishes the Water Resources Management Authority (WRMA). Powers and functions of WRMA.

Section 25(1) (1) stipulates that a permit shall be required for any of the following purposes:

a. any use of water from a water resource, except as provided by section 26;
b. the drainage of any swamp or other land;
c. the discharge of a pollutant into any water resource;
d. 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.

Section 27 outlaws unauthorized Construction and Use of Works, it states that:

'(1) A person who -

a. not being the holder of a permit, constructs or employs any works for a purpose for which a permit is required; or
b. being the holder of a permit, constructs or employs any such works in contravention of the conditions of the permit, shall be guilty of an offence.

(2) The holder of a permit authorising the construction of works who, without the permission of the Authority, takes water from any water resource by means of any work authorised by the licence before the whole of the works authorised by the permit have been certified, in accordance with the conditions of the permit, to be completed shall be guilty of an offence.'

Section 28(1) stipulates that the holder of a permit which authorises the construction of works that would (or a portion of which would), when constructed, be situated upon lands not held by the permit holder shall acquire an easement on, over or through the land on which the works would be situated and, unless the works have previously been lawfully constructed, shall not construct or use the works unless and until he has acquired such an easement.

Section 31(1) states that, 'the conditions of a permit may require that, on issue of the permit and at prescribed intervals thereafter, the permit holder shall pay charges to Authority for use of water in accordance with the permit.'

4.4 The Public Health Act

The act makes it the duty of every local authority (in the capacity of "health" authority) to take all lawful, necessary and reasonably practicable measures to safeguard and promote public health (s.13). Part IX of the act deals with sanitation and housing, and is of most significance for the control of polluting discharges. S.116 imposes a duty on every local authority to maintain its district in a clean and sanitary condition, to prevent nuisances and prosecute those responsible for nuisances. Nuisances include drains and sewers for the discharge of pollutants into watercourses and lakes. *The Public Health (Drainage and Latrine) Rules* made under s.126 of the Act, makes more specific provision for drainage. The Rules –

- Require the drainage of new buildings;
- Prohibit the drainage of surface water into foul water sewers;
- Prohibit the discharge into sewers of matter which may interface with the free flow of the sewage or injure the sewer;
- Empower the local authority to prohibit the discharge of injurious matter into sewers;
- Impose a requirement for permits to be obtained from the local authority before the making of sewer connections or the construction of sewage treatment works.

4.5 The Local Government Act cap 265

The act also contains provisions empowering local authorities to control discharges and development activities. Under s.163 a local authority may control or prohibit activities, both industrial and domestic, which constitutes 'a source of danger, discomfort or annoyance to the neighborhood', as an offensive trade or as has been gazzetted by the Minister. One further way of control is for the local authority to refuse to license the activity on the ground that the treatment method proposed is not adequate [s.165]. The Act also provides for approval of any development by the local authority before commencement.

4.6 The Occupational Safety and Health Act, 2007

This act was signed into law in October 2007 to repeal and replace the Factories and Other Places of Work Act Cap 514. It came into force on December 20, 2007. The Act makes provision for safety and health of

workers in all workplaces in Kenya. All rules made under the previous Act remain in force under the new Act.

The Act requires developers to notify the Director of Occupational Health and Safety of their intended development before commencement. The act also sets minimum standards that are to be maintained in such workplaces to safeguard health, safety and welfare of workers. These are all aimed at elimination of hazards from workplaces. The act further requires all workplaces to display the abstract of the act for all workers to read and remind themselves on how to protect themselves from hazards.

The Act also makes it mandatory for occupiers or employers to provide personal protective equipment and all practicable means to prevent injury to health of workers who are exposed to any potentially harmful substances or conditions.

Section 9(1) demands that every occupier shall establish a safety and health committee at the workplace in accordance with regulations prescribed by the Minister if:

(a) There are twenty or more persons employed at the workplace; or
(b) The Director directs the establishment of such a committee at any other workplace.

The Act further requires all workplaces to have stocked first aid boxes under the charge of trained first aid attendants. The Factories (Building Operations and Works of Engineering Construction) Rules of 1984 are more specific on standards and requirements for the construction works.

The said Act requires that before any premises are occupied or used a certificate of registration should be obtained from the chief inspector. The occupier must keep a general register with provision for health, safety and welfare of workers on site. For safety fencing of the premise and dangerous parts must be done. There should be provision for clean and sanitary working conditions. More so there must be also provision of wholesome drinking water.

The act requires proponents to keep a general register at the workplace to record accidents or occupational diseases.

Despite being repealed, the regulations under the Factories and Other Places of Work Act (Cap 514) are still operational under the Occupational Safety and Health Act, 2007 and shall apply, where appropriate, the following regulations are relevant to the proposed project:

4.6.1 The 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 apply to every plant, premises, place, process and operations to which the provisions of the Factories applies.

4.6.2 The Fire Risk Reduction Rules, 2006

The rules apply to every workplace, process and operations to which the provisions of the Factories and Other Places of Work Act.

4.6.3 The Factories (Building Operations and Works of Engineering Construction) Rules, 1984

Legal Notice No. 40 cited as "The Factories (Building Operations and Works of Engineering Construction) Rules, 1984'' provides further regulations under the Act. Rule 5 provides for compliance by every contractor to ensuring the health, safety and welfare of all persons engaged in building operations of works of engineering construction undertaken by him. Rule 20 provides for protection and/or amelioration of dust or fumes effects that are likely to be injurious to the health of persons employed. Rule 46, 47, 59, 32 and 134 further provides for protection of workers during construction phase.

4.7 The Malaria Prevention Act (Cap. 246)

Section 5 on Drainage System states that no occupations at the construction phase that shall obstruct flow of water into or out of any drainage. The contractor shall be required to maintain drainage system within the area of the project for removal of water from any land around the project to prevent larvae breeding.

4.8 The Penal Code (Cap. 63)

An Act of Parliament to establish a code of criminal law.

Section 191 states that any person who voluntarily corrupts or fouls the water of any public spring or reservoir, so as to render it less fit for the purpose for which it is ordinarily used, is guilty of a misdemeanor.

Section 192 states that any person who voluntarily vitiates the atmosphere in any place, so as to make it noxious to the health of persons in general dwelling or carrying on business in the neighbourhood or passing along a public way, is guilty of a misdemeanour.

Section 193 states that any person who, for the purposes of trade or otherwise, makes loud noises or offensive or unwholesome smells in such places and circumstances as to annoy any considerable number of persons in the exercise of their common rights commits an offence and is liable to be punished as for a common nuisance.

4.9 The Physical Planning Act, 1996

Section 24 of the Physical Planning Act gives provision for the development of local physical development plans for guiding and co-coordinating development of infrastructure facilities and services within the area of authority of County, municipal and town council, and for specific control of the use and development of land.

Section 29 of the Physical Planning Act gives councils power to prohibit and control the use of land, building, and subdivision of land, in the interest of proper and orderly development of its area. The same section also allows them to approve all development applications and grant development permissions as well as to ensure the proper execution and implications of approved Physical Development Plans.

Section 30 states that any person who carries out development within an area of a local authority without development permission shall be guilty of an offence and the development shall be invalid. The act also

gives the local authority power to compel the developer to restore the land on which such development has taken place to its original condition within a period of ninety days. If no action is taken, then the council will restore the land and recover the cost incurred thereto from the developer. At the same time, sub-section 5, re-enforce it further that, no licensing authority shall grant under any written law, a license for commercial use for which no development permission had been granted by the respective local authority.

Section 36 states that if in connection with development application a local authority is of the opinion that, the proposed activity will have injurious impact on the environment, the applicant shall be required to submit together with the application, an Environmental Impact Assessment report. The environmental impact assessment report must be approved by the National Environmental Management Authority (NEMA) and followed by annual environmental audits as spelled out by EMCA 1999.

Section 38 states that if the local authority finds out that the development activity is not complying to all laid down regulations, the local authority may serve an enforcement notice specifying the conditions of the development permissions alleged to have been contravened and compel the developer to restore the land to its original conditions.

4.10 The Land planning act (Cap 303)

Section 9 of the subsidiary legislation (the development and use of land Regulations 1961) under which it require that before the local Authority to 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, which intends to reduce conflict of interest with other socio economic activities.

4.11 The Land Act (No. 6 of 2012)

An Act of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources, and for connected purposes.

Come into force on 2nd May, 2012

Repeals the following Acts of Parliament:

i. The Wayleaves Act, Cap. 292; and
ii. The Land Acquisition Act, Cap. 295

4.12 The Land Registration Act (No. 3 of 2012)

An Act of Parliament to revise, consolidate and rationalize the registration of titles to land, to give effect to the principles and objects of devolved government in land registration, and for connected purposes

Come into force on 2nd May, 2012

The Act repeals the following Acts of Parliament:

i. The Indian Transfer of Property Act 1882
ii. The Government Lands Act, (Cap 280)
iii. The Registration of Titles Act, (Cap 281)
iv. The Land Titles Act, (Chapter 282)
v. The Registered Land Act, (Cap. 300)

4.13 The Occupiers Liability Act (Cap. 34)

Section 3 requires that an occupier of premises owe the "common duty of care" to all visitors and workers. Rules of common law regulates the duty which an occupier of premises owes to his visitors in respect of danger and risk due to the state of the premises or to things omitted or attributes an affliction on his/her health to a toxic materials in the premises.

4.14 Institutional framework

There are several organizations involved in solid waste and environment management in the country. These organizations include the Ministry of Local Government, Ministry of Water and Irrigation, Ministry of Environment and Natural Resources, National Environment and Management Authority, Water Resources Management Authority and the Local Authorities etc. The overall entity involved in the environmental management in Kenya is the National Environment Management Authority which has been founded and mandated under the Environmental Management and Coordination Act.

a) National Environment Management Authority (NEMA)

The objective and purpose for which NEMA was established is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment.

NEMA's core functions include the following:

- Coordinating the various environmental management activities being undertaken by the lead agencies;
- Promote the integration of environmental considerations into development policies, plans, programmes and projects, with a view to ensuring the proper management and rational utilization of environmental resources, on sustainable yield basis, for the improvement of the quality of human life in Kenya;
- Take stock of the natural resources in Kenya and their utilization and conservation.

- Establish and review land use guidelines;
- Examine land use patterns to determine their impact on the quality and quantity of natural resources;
- Carry out surveys, which will assist in the proper management and conservation of the environment;
- Advise the Government on legislative and other measures for the management of the environment or the implementation of relevant international conventions, treaties and agreements;
- Advise the Government on regional and international conventions, treaties and agreements to which Kenya should be a party and follow up the implementation of such agreements;
- Undertake and coordinate research, investigation and surveys, collect, collate and disseminate information on the findings of such research, investigations or surveys;
- Mobilize and monitor the use of financial and human resources for environmental management;
- Identify projects and programmes for which environmental audit or environmental monitoring must be conducted under this Act;
- Initiate and evolve procedures and safeguards for the prevention of accidents, which may cause environmental degradation and evolve remedial measures where accidents occur e.g. floods, landslides and oil spills;
- Monitor and assess activities, including activities being carried out by relevant lead agencies, in order to ensure that the environment is not degraded by such activities. Management objectives must be adhered to and adequate early warning on impending environmental emergencies is given;
- Undertake, in cooperation with relevant lead agencies, programmes intended to enhance environmental education and public awareness, about the need for sound environmental management, as well as for enlisting public support and encouraging the effort made by other entities in that regard;
- Publish and disseminate manual codes or guidelines relating to environmental management and prevention or abatement of environmental degradation;
- Render advice and technical support, where possible, to entities engaged in natural resources

management and environmental protection, so as to enable them to carry out their responsibilities satisfactorily; and

- Prepare and issue an annual report on the State of Environment in Kenya and in this regard, may direct any lead agency to prepare and submit to it a report on the state of the sector of the environment under the administration of that lead agency.

NEMA's mandate is designated to the following committees:

b) County (Provincial and District) Environment Committees

The Provincial and District Environment (now referred to us county) Committees are responsible for the proper management of the environment within the Province and District in respect of which they are appointed. They are also to perform such additional functions as are prescribed by the Act or as may, from time to time be assigned by the Minister by notice in the gazette. The decisions of these committees are legal and it is an offence not to implement them.

c) Public Complaints Committee

The Committee performs the following functions:

Investigate any allegations or complaints against any person or against the authority in relation to the condition of the environment in Kenya and on its own motion, any suspected case of environmental degradation and to make a report of its findings together with its recommendations thereon to the Council;

Prepare and submit to the Council periodic reports of its activities which shall form part of the annual report on the state of the environment under Section 9 (3); and

To perform such other functions and excise such powers as may be assigned to it by the Council.

d) National Environment Action Plan Committee

This Committee is responsible for the development of a 5-year Environment Action Plan among other things. The National Environment Action Plan shall:

- Contain an analysis of the Natural Resources of Kenya with an indication as to any pattern of change in their distribution and quantity over time;
- Contain an analytical profile of the various uses and value of the natural resources incorporating considerations of intergenerational and intra-generational equity;
- Recommend appropriate legal and fiscal incentives that may be used to encourage the business community to incorporate environmental requirements into their planning and

operational processes;

- Recommend methods for building national awareness through environmental education on the importance of sustainable use of the environment and natural resources for national development;
- Set out operational guidelines for the planning and management of the environment and natural resources;
- Identify actual or likely problems as may affect the natural resources and the broader environment context in which they exist;
- Identify and appraise trends in the development of urban and rural settlements, their impact on the environment, and strategies for the amelioration of their negative impacts;
- Propose guidelines for the integration of standards of environmental protection into development planning and management;
- Identify and recommend policy and legislative approaches for preventing, controlling or mitigating specific as well as general diverse impacts on the environment;
- Prioritise areas of environmental research and outline methods of using such research findings;
- Without prejudice to the foregoing, be reviewed and modified from time to time to incorporate emerging knowledge and realities; and
- Be binding on all persons and all government departments, agencies, States Corporation or other organ of government upon adoption by the national assembly.

e) Standards and Enforcement Review Committee

This is a technical Committee responsible for environmental standards formulation methods of analysis, inspection, monitoring and technical advice on necessary mitigation measures.

f) National Environmental Tribunal

This tribunal is the first point of call (within 14 days) for those dissatisfied with NEMA's decisions.

g) National Environment Council (NEC)

EMCA 1999 No. 8 Part III Section 4 outlines the establishment of the National Environment Council (NEC). NEC is responsible for policy formulation and directions for purposes of EMCA; set national goals and

objectives and determines policies and priorities for the protection of the environment and promote co-operation among public departments, local authorities, private sector, non-governmental organisations and such other organisations engaged in environmental protection programmes.

h) High Court

Those dissatisfied with NEMA decision may search legal redress in High Court.

CHAPTER FIVE: PROJECT DESCRIPTION

5.1 INTRODUCTION

The proposed project is a modern tea factory. The project execution is divided into four major components, these are: pre construction; construction; commissioning (operation); and decommissioning of the facility.

5.2 PROJECT IMPLEMENTATION SEQUENCING

I. Pre-construction stage

This involved the following:

a) Land acquisition;
b) Plan preparation and seeking of the appropriate approvals from the relevant authorities (done);
c) Appraisal of baseline condition to determine supply and demand for required infrastructural services (done);
d) EIA Project Report preparation (done); and
e) Preparation of the TOR for the EIA Study.

ii. Change of User and Project Plans Approval

Change of user and the project plans approval has already been secured from the County Government of Nandi.

iii. Construction stage

This will involve the following:

a) Establishment of related works and all support infrastructures that are significant for the construction work.

This would involve the transportation of machinery and deployment of the workers to the construction site. The machinery would be used for ground breaking and for transportation of materials from the sources to the site. The major machineries that will be used include mixers, welding machines and transmission machines. The contractor will also mobilise human workforce to the site. Both casual and permanent will be hired.

c) Acquisition and transportation of building materials.

The contractor shall source for materials for construction from the various available suppliers. Supply of materials will be a continuous activity throughout the project life since different materials will be needed at different phases of the construction. The materials that shall be used in the construction include among others building stones, sand, ballast, cement, timber, reinforced concrete frame, steel, bars, G.I pipes, PVC

pipes, pavement blocks, concrete slabs, murram, hardcore, insulated electrical cables and timber among others.

d) Construction of the Facility

The engineering designs and site layout plans have been approved and will be implemented. The setting will comply with the specifications set out by the client to the contractor under the supervision of qualified engineers. In accordance with the designs and the layout plans, the construction of the proposed project and associated infrastructure will begin immediately NEMA approves the project report. The contractor will then be supplied with all the approved documents including the EIA report.

iii. Operation stage

This will involve paint mixing, packaging, storage and dispatch to the market.

5.3 PROJECT AND PROCESS DESIGN

5.3.1 PROJECT DESIGN

The proposed project will entail construction of a single line CTC factory with a provision for future expansion, administration block, parking area, weighbridge, installation of above ground fuel tanks, overhead water tanks and other associated civil works (such as access roads, waste and storm water drains, and water reticulation drainages).

5.3.2 TEA MANUFACTURING PROCESS

The tea processing involves reception of freshly plucked green tea leaves which are subjected to various processes which include withering; CTC (Cutting, Tearing & Curling); Sorting and grading; and storage and marketing.

5.3.3 FUEL FOR THE OPERATION

5.3.3.1 SOURCE OF FUELWOOD

Fuel wood will be the major source of fuel to be used at DL Kaptel to generate Steam for the process. DL Group already runs DL Koisagat Tea Factory which has got an established Gum plantation and Firewood sources. There is surplus that is available, and the proponent intents to divert this for use at upcoming DL Kaptel Factory. Some is also purchased from out growers around Nandi County. There are farmers aware of this opportunity, and have planted hordes of trees. The consultants were able to see this establishment in Nandi County.

From discussions with DL Group team, it was pointed out to the Prodigy Quests Consultants that DL Group of Companies has acquired 1000 acres (400 ha) land at Tereno Location, Tinderet District. Eucalyptus trees have been planted to supply of fuel wood. The ideal type of Boilers are the firewood fired boilers, hence the need to guarantee a sustainable source for the long term.

It is forecasted that at throughput of 2400 Kg MT/hr, annual demand is 53,040 cu m.

5.3.3.2 STEAM GENERATION

Steam plant will require 10,000 Kg Steam per hour for the four lines. This is arrived at by using 4 Kg steam per Kg Made tea. Hence for 2400 Kg / hr throughput on four lines at DL Kaptel requires two Boilers, each of 6 tons capacity.

Any spare steam may be directed to withering when demanding during challenging seasons when steam is used at withering.

5.3.3.3 TYPE OF BOILERS

DL Kaptel will acquire a John Thompson type of Boiler, a Six Tonner which is the latest in Steam generation technology. It is known to attain efficiency above 75% which means it consumes less firewood. The other type is the Thermax, 4.5 Tonner that attains efficiency criteria of (70 – 75) %. The proponent is also considering a type of Boiler known as Forbes Marshal and Rocho. The driver on choice for the others consist efficiency on fuel use.

5.3.3.4 WOOD CHIPPING & BILLETS

The efficiency of wood chipping is higher than for stocking of billets; wood chipping however demands a supply of dry firewood and equipment to convey the chipped firewood into the boiler; also a furnace constructed ideally to suit the firewood chips.

5.3.3.5 FOSSIL FUELS

The company fleet will run on Diesel and Petrol. It is not unreasonable to predict that bulk supply contracts may be sourced from local dealers, yet it will be of importance to note that reduction of carbon footprint should be a consideration.
A method of transport that minimises or eliminates the gases, which have a green house effect, is of importance. There are instances where wire rope powered by Electricity should be advanced.

5.4 DECOMMISSIONING PHASE

Decommissioning is an important phase in the project cycle and comes last to wind up the operational activities of a particular project. It refers to the final disposal of the project and associated materials at the expiry of the project lifespan. If such a stage is reached, the proponent needs to remove all materials resulting from the demolition/ decommissioning from the site.

The generally accepted purpose of decommissioning is to allow for release of valuable assets such as buildings and sites for alternative use, recycling and reuse of materials and the restoration of environmental amenity. In all cases, the basic objective is to achieve an end-point that is sensible in technical, social and financial terms, that properly protects workers, the public and the environment and, in summary, complies with the basic principles of sustainable development.

5.5 PROJECT BUDGET AND NEMA FEE

The project cost is estimated at **Kenya Shillings Two Hundred Forty Nine Million One Hundred Seventy Thousand only (Ksh. 249,170,000.00**) – for the purpose of easy calculation of the EIA Fee payable to NEMA, we have rounded up the figure to Ksh. 250,000. Accordingly, the fee payable to NEMA is Ksh. 250,000 (Two Hundred and Fifty Thousand).

CHAPTER SIX: ANALYSIS OF PROJECT ALTERNATIVES

6.0 INTRODUCTION

The analysis of alternatives for the proposed project will focus on the following issues:

i. The 'yes' and 'no' project alternative;
ii. Alternative energy sources;
iii. Alternative project sites; and
iv. Alternative waste management

6.1 THE 'NO' PROJECT ALTERNATIVE

The Government of Kenya's policy is to encourage investment in the industrial sector. It is also interested in the provision of affordable food resources to the population at a cheaper rate. The demand for tea processing in Kenya has always been met by the few tea factories mainly located in Kericho. Without this project established in Nandi, the consumers across the country will continue to reel from expensive tea products which are currently out of reach of the majority of the remote population. This will of course result in continued reliance on the few tea factories and hence, the continued exploitation of poor Kenyans in remote areas. The employment opportunities provided by this project will also be lost, along with the economic benefits.

6.2 THE 'YES' PROJECT ALTERNATIVE

This option implies that the project will be implemented and once implemented there will be a number of losses and gains that will be realised. We strongly recommend this options as the benefits far outweigh the negative impacts.

6.3 ALTERNATIVES SOURCES OF ENERGY

Fuel wood will be the major source of fuel for the facility, the proponent has already planted enough trees to provide fuel for the facility, and local farmers have been encouraged to plant trees as the facility will provide a ready market for trees.

6.4 ALTERNATIVE PROJECT SITES

The proponent does not have an alternative site in Kaptel area. Moreover change of user for the site has already been secured.

6.5 ALTERNATIVE WASTE MANAGEMENT

The available cost effective waste management options are:

i. Construction of a waste water treatment plant for management of effluent water;
ii. Solid waste segregation, reuse, reduction, and composting;
iii. Contract a NEMA certified solid waste management firm; and
iv. Use of a septic tank system for sewerage management.

6.6 ALTERNATIVE TECHNOLOGY

The proponent intends to install modern facilities for the tea factory, using high technology. The packaging area will be provided with conveyors that will allow the easy movement of packages while there will be a large open space to allow for any tea droppings to be quickly contained.

The designs will consider technologies that conserve water and energy, ensure environmental and social sustainability and consider the utilization of local materials and resource skills.

6.7 ALTERNATIVE PROJECT DESIGN

Design plans for the development were undertaken with a view to providing the most efficient facilities, and efficiency of maintenance with quick response to any fire risks. The design of the facility will include a 200,000 litres water tank connected to the perimeter wall with automatic water sprays that will be used in case of a fire outbreak.

Also the location of the tea processing area is far enough from the perimeter fence to ensure any cigarette or fires thrown over the 7 meter wall will not come near the equipment. The proponent will surround the plot with a high perimeter wall equipped with automatic sprinklers with a pump connected to adequate water supply with fire detectors that will automatically begin spraying the area with water in case of fire. Gas leak detectors will be available to warn of any leakages. This is the best design available.

CHAPTER SEVEN: IDENTIFICATION AND ANALYSIS OF PROJECT IMPACTS

7.1 Introduction

The purpose of this section is to identify and consider the most pertinent environmental impacts and to provide possible mitigation measures that are expected from the development, operation and maintenance activities. This chapter identifies and discusses both positive and negative impacts associated with the construction and operation of the proposed tea factory. On-site and off-site impacts can occur due to project location, and during construction, operation and decommissioning phases of the proposed Project. Identification and assessment of impacts depend on the nature and magnitude of the activity being undertaken and also on the type of pollution control measures that are envisaged as part of the Project proposal.

Two different phases are associated with the proposed development. Firstly, the construction and machine installation phase, and secondly the operational phase are being covered by this assessment. Should the facility close or expand in the future, a decommissioning audit or an EIA respectively will need to be conducted to deal with the associated changes to the tea factory. Mitigation measures for the identified impacts are also provided in this Section.

Key benefits will accrue over the operation period while the primary negative impacts will accrue during the construction period and secondary negative impacts during the operation period.

Anticipated impacts are discussed in Phases namely: Design, Construction, Operational and Decommissioning Phases.

7.2 Positive Impacts during Planning and Design phase

7.2.1. Socio-economic benefits and issues

Through this investment, the overall revenue of the Country will increase through payment of income tax, Pay As You earn, (PAYE), VAT, and Import Tax.

7.2.2. Potential Direct Benefits

- Direct capital investment
- Stimulation of skills transfer: Due to the nature of their operations, the proponent will have to implement a training programme for all staff. Training programmes will be advanced and staff will permanently benefit from these training programmes. Many of the training programmes will target specifically semi-skilled local workers
- Stimulus for technology transfer to Kenya: The new plant includes state-of the-art technology (e.g. vapour recovery systems). The operation, maintenance and support of these new technologies will without doubt expose local artisans and industries to these. The net effect will be a workforce and supporting services, which is internationally more competitive than what it is at the moment.
- Stimulation of economic development (e.g. supply of materials and goods for construction purposes; new businesses, employment, housing, better markets and access to public services

etc.).

- Sustained supply of tea will ensure that prices are stabilized in the local market and in any case consumers may benefit in the long term from reduced tea prices
- Job creation: approximately 500 new jobs will be created. It is estimated that 30 new jobs will ensure livelihood for at least 150 people (young and old) in the area. Given the unemployment levels in the area this in itself is regarded as a significant benefit to the socio-economic situation in Nandi County.
- Increased tea out-growers. With the establishment of the factory in Kaptel area, more farmers will be encouraged to grow tea due the ready market to supply solving the current problem of un-collected green leaf. These will directly increase the local income base.

7.2.3. Potential Direct Benefits Potential Indirect Benefits

- More competitive conditions that could lower costs of consumer goods;
- The need for more residential dwellings to house workforce
- Expansion of trade and industrial activity in the nearby town;
- Inducement of additional investments;
- Creation of new long-term employment opportunities outside the tea factory facility; and
- General enhancement of the health conditions and quality of life in the project area
- Corporate Social responsibility benefits from the factory

7.2.4. Employment opportunities

The proposed Project will directly and indirectly create employment for a number of workers, especially casual workers within Kaptel location. Though the employment terms will be temporary or permanent, those who will be employed will earn income hence use the money to satisfy some of their needs.

7.2.5. Provision of market for building materials

The Project will require supply of large quantities of building materials most of which will be sourced locally in Nandi county and in the surrounding areas. Producers and suppliers of materials such as building stones, timber, electrical cables, paint, sand, and cement will thus get market for their goods. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

7.2.6. Provision of market for food vendors and owners of nearby business premises

The construction workers will attract food vendors in the area to supply food to the construction workers. The food vendors will therefore increase their sales and income as a result of selling food to the construction workers. In addition, the owners of the nearby business premises are also likely to benefit as a result of the construction workers purchasing some of the items from their shops.

7.2.7. Optimal use of land

The proposed tea factory project will enhance economy of land through intensification of land use in

addition to provision of tea. This will be significant since the country is currently experiencing high pressure on tea and related by -products.

7.2.8. Increase in revenue to the national and County Government

The operation of the proposed Project will result in positive gains for numerous authorities- The local county government, Kenya Revenue Authority (KRA), Kenya Power and Lighting Company (KPLC), Kenya Tea Development Authority (KTDA) through payment of relevant taxes, rates and fees to respective institutions.

7.2.9. Improved amenities

The operation of the proposed Kaptel Tea factory is expected to improve amenities such as roads, water, health care and social facilities in the surrounding area in that the proposed Project will construct class rooms, a health center, water points and support the needy in the society.

7.2.10. Increased market for tea

The farmers and the general consumer community are likely to benefit from the operation of the tea factory since wholesalers who will purchase tea products from the factory premises will improve their sales.

7.3 Negative impacts

Negative impacts are envisaged during construction. These are low to medium and will not have lasting impacts on the physical chemical and biological environment within the project location. The following negative impacts are associated with the construction of the proposed Project.

7.3.1. Waste water generation

There will be a lot of waste water being generated during the production phase. Tea requires a lot of water during production and, therefore more waste will be produced hence lowering the water quality. The waste water from tea factories contains cleaning chemicals and tea residues rinsed off from the tea production machinery. Waste water in tea factories is typically not treated and after screening, the wastewater is channelled back into local water systems. This has negative impacts in terms of climate change and the local environment. It is thus important to consider implementing a waste water management system.

Emissions from waste water occur when organic matter contained in the water decomposes. Since water prevents oxygen from reaching the organic material, the material decomposes in anaerobic conditions. This results in the release of Methane (CH4) and Nitrous oxide (N0) which are both greenhouse gases. If the water is treated it is possible to avoid these emissions.

Waste water systems must be assessed for their ability to generate methane emissions, and where possible, measures taken that can credibly reduce this risk. The firm must analyse and implement wastewater treatment options that reduce methane emissions from wastewater treatment and recover the generated methane, to the extent possible.

7.3.2. Impacts on biodiversity

It is envisaged that the works will impact the ecosystems, plants and fauna on which various species rely on for their survival. Almost all development sites will have some wildlife or habitat interest regardless of whether they are located in rural or urban areas. Many sites which are not designated as conservation may be important for wildlife in their own right. In all cases, wildlife and/or habitat value should be determined at an early stage in a project and all efforts should be made to avoid, or avoid as far as possible, any potential adverse impacts that a proposed project may have. The development could have the following potential adverse effects on wildlife in the area:

7.3.3. Habitat loss

The construction of the factory will lead to loss of habitat for some fauna and flora species and biodiversity reduction as a consequence of migrating species due to vegetation clearing of the quarrying site. The loss of habitat through the conversion of land from its natural state to a developed landscape represents impact of increased human activity. Those species able to survive in urban settings may thrive, but the rest are forced to find new territory to survive. Where habitats and wildlife species have been identified as being of importance, special measures may be required either to avoid or minimise the loss or to mitigate for it during the construction process.

It is however important to note the location of the site is agricultural land currently fully cultivated and used as animal grazing. During the site visit, no large wild animals were observed in the site or immediate neighbourhood other than birds, cows, goats, sheep and dogs.
The proponent also seeks to restore the natural indigenous plant cover along the catchment area so as to replace the habitats destroyed.

7.3.4. Habitat Fragmentation

Habitat fragmentation is an umbrella term describing the complete process by which habitat loss results in the division of large, continuous habitats into a greater number of smaller patches of lower total area, isolated from each other by a matrix of dissimilar habitats, and is not just the pattern of spatial arrangement of remaining habitat.
It therefore leads to large tracts of the natural landscape being gradually developed and subdivided until only patches of original habitat remain. The patches are often too small and too far apart to support the survival and reproductive needs of many wildlife species during various stages of their life-cycle or in different times of the year.

7.3.5. Ecosystem disturbance

The impact of human activity on biodiversity extends beyond the actual area of development into what is referred to as a “disturbance zone” i.e. the entire area where habitat value has been meaningfully reduced. In ecology, a **disturbance** is a temporary change in average environmental conditions that causes a pronounced change in an ecosystem. Disturbances often act quickly and with great effect, sometimes resulting in the removal of large amounts of biomass. Construction of DL Kaptel Tea factory will therefore have a great impact on the ecology of the area. The various components in the ecosystem might therefore be adversely affected.

7.3.6. Local increase of construction traffic

The construction of the proposed Project will make local increase of construction traffic inevitable. This is as a result of the movement of the construction vehicles and machines in and out of the construction site. However, there is unlikely to be significant increased traffic jam along Stendi Kisa-Yala Road as a result of the construction vehicles turning to the proposed Project site.

7.3.7. Noise pollution and vibration

Noise pollution and vibration is likely to occur due to site excavation, grading and offloading of construction materials at the proposed site. Noise pollution and vibration is also likely to occur as a result of excavation activities, use of porker vibrator, use of mixers and communication from construction workers on site. However, since excavation will be manual and explosives are not likely to be used, adverse impacts to the construction workers and neighbouring villages will not be experienced.

7.3.8. Occupational health and safety

Construction sites always present an element of danger. Construction workers are likely to encounter accidental injuries as a result of the intensive engineering and construction activities including erection and fastening of materials, metal grinding and cutting, concrete work, steel erection and welding among others. Such injuries can result from accidental falls from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others.

Workers are also likely to be exposed to diseases from building materials during the construction phase of the Project. It is therefore recommended that before the construction phase of the proposed Project commences, building materials will be inspected according to the occupational health and safety standards.

Occupational health and safety of the workforce will have to be monitored by the respective contractor's supervisors and foremen. As long as proper procedures are followed and personal protective equipment (PPE) provided and their use enforced, risks of accidents and incidents can be substantially reduced.

7.3.8. Impact on air quality

Potential impacts on the air quality during construction phase will be due to exhaust and dust emissions generated in and around the construction site by the construction equipment. Motor vehicles used to mobilize materials for construction and operating of construction vehicles and equipments would cause a potentially significant air quality impact by emitting pollutants through exhaust emissions.
The sources of air emission can be grouped into three categories namely:

- Point Source;
- Area Source; and
- Line Source.

A point source is a single source of emission with an identified location; an area source is when the

sources of emission are many widely distributed point sources having relatively comparable significance; and a line source is when the sources of emission from a number of fixed or moving facilities have relatively comparable significance, such as roads.

Dust emission is likely to occur during site clearance, excavation and spreading of top soil during construction of the proposed tea factory especially if the activities are taking place during dry seasons. However, there will be very small possibility of particulate matter (PM) suspended and settle-able particles affecting the site workers and even neighbours health, since construction method of minimum excavation and nil cart away of soil will be applied and only residual material and debris carted away.

During the period of maximum construction activity, the fuel consumption at the Project site is expected to rise significantly and the background concentrations of Suspended Particulate Matter (SPM), Respiratory Particulate Matter (RPM), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and both Carbon Monoxide (CO) and Lead (Pb) are also expected to rise.

These emissions can have significant cardio-pulmonary and respiratory effects on the local population; the health effects may range from subtle biochemical and physiological changes to difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac condition. The impact of such emissions can be greater in areas where the materials are sourced and at construction site. Activities associated with site clearance, excavations, spreading of the top soil during construction, frequent vehicle turning and slow vehicle movement loading and off- loading areas can be implicated in this process. Table 2 below is a summary of the impact of these emissions on human health.

Even then, dust and exhaust gas emissions from construction machineries will be small and temporary. Therefore, no adverse impacts, except for those close to the construction site, are likely to be affected. On completion of construction, the adverse impacts of SPM, RPM and engine emissions on ambient air close to the construction site will be eliminated.

7.3.9. Disposal of solid wastes

Construction activities create solid wastes that need to be disposed. Such wastes include:

- Excavated materials from the earth works;
- Timber from used formwork;
- Paints, lubricants and petroleum wastes;
- Containers, cement paper bags and other packaging materials;
- Metal, glass, plastic containers and other unwanted materials; and
- Food remains.

Soils will be excavated at the proposed Project site; the excavation works to level the site and to come up with the basement will result in the generation of the excavated material.
These wastes may have a direct impact on the neighbouring premises. Disposal of the same solid wastes off-site could also be a social inconvenience if done in wrong places. The off- site effects could be un-aesthetics view, pest breeding, unhygienic conditions, chocking of nearby drains and stream and pollution of physical environment. Proper waste management will however be taken into consideration and proper dumping done according to the requirements and directions of the County

council and NEMA.

7.3.10. Increased water demand

Construction and operation phases will create additional demand for water in addition to the existing demand at the project area.

7.3.11. Energy consumption

The proposed Project will majorly use fuel wood and the source of energy for production. Fossil fuels will be used to run transport vehicles and construction machinery. The machinery will include: construction vehicles and compactors. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability.

Electricity will also be used during the construction of the proposed Project. The consumption of electricity is likely to be on the higher side. It should be noted also that manual labour as a source of energy will mainly be used during construction of the proposed Project. Efficient management of energy consumption is therefore required for optimal performance of the Project and to control Project costs.

7.3.12. Increased storm water runoff from new impervious areas

Construction of the proposed Project and access driveway could result in additional runoff through creation of impervious areas. These areas generally have higher runoff coefficients than natural area, and increased flood peaks are a common occurrence in developed areas. The storm water runoff is likely to increase the flooding along access roads.

7.3.13. Extraction and use of building materials and procurement

Building materials such as hard core, ballast, cement, rough stone and sand required for the construction of the tea factory will be obtained from quarries, hardware shops and sand harvesters. These materials are mainly extracted from natural resource bases such as river banks, and forests among others. Since substantial quantities of these materials will be required. The availability and sustainability of such resources at the extraction sites will be negatively affected as they are not renewable in the short term. In addition, the sites from which the materials will be extracted may be significantly affected in several ways including landscape changes, displacement of animals and vegetation, poor visual quality and opening of depressions on the surface leading to several human and animal health impacts.

Certain construction materials are also hazardous and expose the construction workers to diseases. These include materials or substances made of asbestos, silica, heavy metals (such as lead and cadmium). It is therefore recommended that before the construction phase of the proposed Project commences, building materials will be inspected according to the occupational health and safety standards.

7.3.14. Oil spills

The machines to be used on site will have moving parts which will require continuous oiling to minimize the usual corrosion or wear and tear. Possibilities of such oils spilling and contaminating the soil on site are real. Likewise, moving vehicles on site may require oil change leading to oil spills. Irrespective of these possibilities, no significant adverse effects are expected as a result of oil spills given the scope, nature and duration of time to be taken on the construction of the proposed Project.

7.3.15. Noise and vibration

The demolition works will lead to significant deterioration of the acoustic environment within the Project site and the surrounding areas. This will be as a result of the noise and vibration that will be experienced as a result of demolishing the proposed Project.

7.3.16. Solid waste generation

Demolition of the proposed Project and related infrastructure will result in large quantities of solid waste. The waste will contain the materials used in construction including concrete, metal, drywall, wood, glass, paints, adhesives, sealants and fasteners. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as chloride, sodium, sulphate and ammonia which may be released as a result of leaching of demolition waste, are known to lead to degradation of groundwater quality.

7.3.17. Occupational health and safety impacts

Risks of accidents and ill health as a result of construction and demolition activities are likely to take place. Workers, neighbouring premises are also likely to be affected by the dust generated and other fumes generated by the demolition machines.

CHAPTER EIGHT: MITIGATION MEASURES AND MONITORING PROGRAMMES

8.1 Overview

This Chapter highlights the mitigation measures for the anticipated negative impacts of the proposed Kaptel Tea Factory. The design has addressed biodiversity management in the area through the following actions, namely:

- The selected area of development is devoid of vegetation and far from the road and the wildlife. In selecting this area, it was noted that wildlife does not normally frequent here and there were no obvious signs of visitations.
- Fencing of the property. The selected fencing design is wildlife friendly and does not inhibit free movement of animals.
- Colour schemes. The final selection of the colour schemes shall be such that it blends in with the surrounding and has low reflection indices.

8.2 Mitigation of construction related impacts

The following measures can be considered as mitigation measures of the negative impacts associated with the proposed Project during construction phase.

a) Reduction of local construction traffic

The proponent through the contractor will put measures in place to mitigate the local traffic jam that will occur in the project are as a result of the construction vehicles turning to offload the raw materials to the site and after offloading the raw materials. To minimize the local construction traffic, construction vehicles will enter and leave the site at appropriate times. The contractor will also use signs and barriers to direct vehicles and pedestrian traffic as needed around the construction site. Some activities may also be scheduled in off- peak traffic times to minimize impacts.

b) Minimization of noise and vibration

Significance of noise and vibration impacts depends on whether the project would increase noise and vibration levels above the existing ambient levels by introducing new sources of noise and vibration. Noise and vibration impacts would be considered significant if the project would result in the following:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels.
- A substantial permanent increase in ambient noise levels (more than five dBA) in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Proponent of the proposed Project shall put in place several measures that will mitigate noise pollution and vibration arising during the construction phase. The following noise- suppression techniques

will be employed to minimize the impact of temporary construction noise at the Project site.

- Install portable barriers to shield compressors and other small stationary equipment where necessary.
- Prescribe noise reduction measures if appropriate e.g. Restricted working hours, transport hours and noise buffering.
- Consult with the surrounding community on the permissible noise levels and best working hours.
- Use quiet equipment (i.e. equipment designed with noise control elements).
- Co-ordinate with relevant agencies regarding all construction activities in the Project area.
- Limit pickup trucks and other small equipment to a minimum idling time and observe a
- Switching off idle equipments and vehicles.
- Construct mainly during the day. The time that most of the neighbours are out working.

c) Minimization of occupational health and safety impacts

To reduce the occupational health and safety impacts during the construction phase of the proposed Project, the Proponent through the Contractor is committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Safety and Health Act, 2007. In this regard, the Proponent is committed to provision of appropriate personal protective equipment, as well as ensuring a safe and healthy environment for construction workers as outlined in the Environmental Management Plan (EMP). Construction Workers accidents especially in deep trenching operations and elevated areas shall be mitigated by enforcing adherence to safety procedures and preparing contingency plan for accident response in addition, safety education and training shall be emphasized.

d) Minimization of air quality impacts

Air quality impacts generated from exhaust emissions and dust emissions will be minimized as follows. The following measures shall be implemented during construction to minimize the exhaust emission:

- The engine size of the construction equipment shall be the minimum practical size;
- The number of construction equipment operating simultaneously shall be minimised through efficient management practices;
- Vehicle idling time shall be minimized; and
- Equipment shall be properly tuned and maintained as per the manufacturer's specifications.

This will also be achieved through proper planning of transportation of materials to be used during construction of the proposed Project to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road.
Dust emissions from construction sites can also pose health risk to workers, and sensitive receptors surrounding the site, if not managed properly. It is the responsibility of the contractor to provide appropriate safety training, information equipment, signage, security and emergency response plans on site.
To mitigate the impact of (dust), the following measures are recommended for implementation:

- Applying water to at least 80% of all inactive accessible disturbed surface areas on a daily basis when there is evidence of wind driven dust;
- Watering all roads used for any vehicular traffic at least twice per day of active operations or road used for any vehicular traffic once daily and restrict vehicle speed to 15 mph;
- Down wash of trucks (especially tyres) prior to departure from site;
- Cover stockpiles of sand, soil and similar materials or surround them with wind breaks;
- Cover trucks hauling dirt and debris to reduce spillage on to paved roads surface or have adequate free board to prevent spillage;
- Post signs that limit vehicle speeds onto unpaved roads and over disturbed soils; and
- Rapid onsite construction so as to reduce duration of traffic interference and therefore reduce emissions from traffic delays.

e) Minimization of solid waste during construction phase

The Proponent through the Contractor shall put in place measures to ensure that construction materials requirements are carefully budgeted and to ensure that the amount of construction materials left on site after construction is kept minimal. It is further recommended that the Proponent should consider the use of recycled or refurbished construction materials. Purchasing and using once-used or recovered construction materials will lead to financial savings and reduction of the amount of construction debris disposed of as waste.

Additional recommendations for minimization of solid waste include: -

- Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time;
- Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements;
- Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste;
- Use of construction materials containing recycled content when possible and in accordance with accepted standards; and
- Adequate collection and storage of waste on site and safe transportation to the disposal sites and disposal methods at designated area shall be provided.
- The proponent through the contractor will also make sure that the construction wastes generated are disposed to the approved dump site by the private waste management company that will be contracted.

f) Minimization of increased water demand

The Proponent of the proposed Project shall ensure that water is used efficiently at the site by sensitizing construction workers to avoid irresponsible water use. The contractor should also harvest rainwater and use in the construction activities. In addition the contractor should:

- Rain water harvesting;

- Install water conserving taps;
- Promote recycling and reuse of water as much as possible;
- Promptly detect and repair of water pipes and tank leaks; and
- Install discharge meter to determine and monitor total water usage.

However, it should be noted also that apart from the negative impacts likely to be caused by mismanagement of water, increased water demand is inevitable during construction of the proposed Project.

g) Reduction of energy consumption

The Proponent through the Contractor shall ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used. In addition, proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. Complementary to these measures, the Contractor shall monitor energy use during construction and set targets for reduction of energy use. The Contractor will also develop energy management plan.

h) Reduction of increased storm water runoff from new impervious area

The proponent of the proposed Project will put in place some measures aimed at minimizing soil erosion and associated sediment release from the Project site during construction. These measures will include leveling the Project site to reduce run-off velocity and increase infiltration of rain water into the soil. A storm water management plan that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention with graduated outlet control structures will be designed.

i) Reduction of impacts at extraction sites and impacts associated with construction materials and procurement

The Proponent of the proposed Project shall ensure that all building materials such as sand ballast hard core are extracted from registered quarry and sand mining firms whose facilities have undergone satisfactory environmental impact assessment/audit and received NEMA approval. Since such firms are expected to apply acceptable environmental performance standards, the negative impacts of their activities at the extraction sites are presumably well mitigated.

To reduce the negative impacts on availability and sustainability of the materials, the Proponent will only order for what will be required through accurate budgeting and estimation of actual construction requirements. This will ensure that materials are not extracted or purchased in excessive quantities. Moreover, the Proponent will ensure that wastage, damage or loss (through run-off, wind, etc) of materials at the construction site is kept minimal, as these would lead to additional demand for and extraction or purchase materials.

In addition to the above measures, the Proponent shall consider reuse of building materials and use of recycled building materials. This will lead to reduction in the amount of raw materials extracted from natural resources as well as reducing impacts at the extraction sites.
The following should also be taken into consideration:

- The tender documents should specify required standards and certification for procurement of all materials and appliances;
- As far as possible, environmentally friendly and sustainable materials should be used.

j) Controlling oil spills during construction Phase

The Contractor shall control dangers of oil and fuel spills during construction by maintaining machinery in specific areas designated for this purpose. Prompt cleaning of oil and fuel spills, and proper disposal of clothing or rags contaminated with oil will also take place.

8.3 Mitigation of negative impacts during operation phase tea

The anticipated negative impacts of the proposed Project arising during the operation phase shall be mitigated as discussed below:

a) Ensuring efficient solid and liquid waste management

During operational phase of the Project, scrap metal and waste oils and grease waste will be generated. NEMA has come up with the Environmental Management and Coordination (Waste Management) Regulations, 2006 on how various wastes should be managed. The effluent treatment facility shall be monitored to ensure consistent efficiency in the emissions from the plant to the receiving environment.

The Proponent of the proposed Project will be responsible for efficient management of wastes generated by the Project during its operation. However, the waste metals, oils and grease will be collected in drums and resold. The Proponent has also designed waste collection facilities. As indicated in the Environmental Management and Coordination (Waste Management) Regulations, 2006, an integrated solid waste management system will be taken into consideration.

b) Minimization of air quality impacts

Air quality impacts generated from emissions will be minimized by the use of the particulate precipitate. The particulate precipitate will neutralize gaseous emissions and trap particulates to control air pollution. Dust emissions from the operations of the plant can also pose health risk to workers, and sensitive receptors surrounding the site, if not managed properly. It is the responsibility of the contractor to provide appropriate safety training, information equipment, signage, security and emergency response plans at the factory.

c) Energy consumption management

Energy conservation measures are often the easiest, quickest and cheapest way to reduce costs and be environmentally pro-creative. Energy conservation program will be implemented through measures taken both on energy demands and supply.

The following measures will be put in place to ensure effective and optimal use of energy:

- Plant enough trees for fuel wood;

- Encourage local farmers to plant trees for sale to the facility;
- Install energy efficient boilers;
- Selecting the most efficient lighting system design and minimum lighting level appropriate for the required application in various stages of industrial processes;
- Adopting the most effective lighting controls to ensure optimum operating efficiency and minimum energy wastage, e.g. central programmable time switches;
- Installing energy saving appliances e.g. energy saving bulbs; and
- Maximizing the contribution of daylight to reduce the use of artificial lighting.

d) Efficient water use

A combination of water saving appliances and water management measures will be planned and implemented within the proposed tea factory complex. Specific measures that will be implemented include the following:

- Re-use the water for cooling purposes;
- Promote awareness on water conservation and reducing water wastage;
- Quick fixing of licking pipes; and
- Sweep with a broom and pan where possible, rather than hose down external areas.

The following water saving investments should be taken into consideration:

- Reduce water delivery in taps, through the installation of low flow devices or aerators on taps;
- A manually pressed button flush valve which stops on release of button; and
- Water efficient plumbing fixtures to save water and energy.

Rain water harvesting should be taken into consideration to capture rain water and store. Rain water harvesting helps in utilizing the primary source water and prevent the runoff from going into storm drains and thereby serving dual purpose of:

- Making water available for future use; and
- Reducing the load on other service lines.

e) Disposal of waste water

The proponent will make sure that the effluent treatment plant to serve the proposed factory complex is well operated and that proper monitoring takes place to make sure that the surrounding environment is not polluted.

f) Storm water management

Rainwater runoff comprises of storm water, which flows into both surface water and ground water. Proper management of this resource ensures that storm water discharge is free from contamination.
A good storm water management policy should include:

- Good housekeeping to avoid contamination of storm water;
- Provision of slit traps in storm water drains; and
- Regular inspection and cleaning of storm drains.

g) Minimization of occupational health and safety impacts

To reduce the occupational health and safety impacts during the operation phase of the proposed Project, the Proponent is committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Safety and Health Act, 2007. In this regard, the Proponent is committed to provision of appropriate personal protective equipment, as well as ensuring a safe and healthy environment for workers as outlined in the Environmental Management Plan (EMP). Workers accidents especially in deep curing operations and elevated areas shall be mitigated by enforcing adherence to safety procedures and preparing contingency plan for accident response in addition, safety education and training shall be emphasized.

8.3 Mitigation of negative impacts during decommissioning phase

The Developer in conjunction with a Health, Safety, and Environment expert shall develop environmental, health, and safety procedures for decommissioning, in keeping with the formulated Decommissioning Environmental Management Plan (DEMP).

Just as in the construction and operational phase, the negative impacts of the proposed tea factory complex during decommissioning phase can be mitigated as follows:

a) Minimization of noise and vibration

Significant impacts on the acoustic environment will be mitigated as above.

b) Efficient solid waste management

Solid waste resulting from demolition works associated with the proposed Project during decommissioning phase will be managed as described above.

c) Occupational health and safety impacts

Risks of accidents and ill health as a result of demolition activities shall be mitigated by ensuring that appropriate health and safety measures are applied in all activities; fence all unsafe and dangerous areas; and continue to monitor environmental health at all main receptor points around the site until the site handover.

High levels of dust concentration resulting from demolition or dismantling works will be minimized as follows:

- Rehabilitating or stabilize all disturbed areas through tree planting and landscaping;
- Avoiding dusty activities for example loading and dumping on windy days; and
- Continuing to monitor dust emissions in the surrounding areas.

d) Noise levels in the area

Construction of the proposed Project will most likely result in noise emissions as a result of the machines that will be used in the construction activities, and construction vehicles delivering materials to site. This is likely to result in an increase in noise levels in the neighbourhood especially during the day as construction activities progress.

Proposed mitigation measures

Noise pollution to both neighbours and employees at the construction site will be mitigated in the following ways;

- The mitigating factor is the fact that the background noise i.e. vehicular traffic on the traffic Road is at a higher level compared to the anticipated noise from the construction of the facility and due to the fact the activities for construction and installation of the tanks will be temporal.
- Construction work and delivery of raw materials will be limited to day time hours only.
- Delivery of raw materials will be done so as to exclude weekends.
- The contractor shall inform neighbours in writing prior to commencement of the development so that they are prepared psychologically at least two weeks in advance.
- Employees using equipment that produce peak sounds shall be provided with earmuffs
- replacing noisy machinery, equipment or processes with less noisy machinery, equipment or processes;
- locating noise sources away from hard walls or corners;
- isolating noise sources such that a minimum number of persons employed or working in the factory are exposed to the noise
- Endeavor to comply with Noise Regulations, 2006.

e) Health safety and security at site

During construction, earthmoving equipment will be used on site. This increases the possibility of injuries and the responsible contractor must ensure that all the site workers are briefed about the potential risks of injuries on site and psychologically prepared on how to handle them.

Proposed mitigation measures

In order to manage the potential for injuries to employees during the construction and installation phase, the contractor will ensure the following measures are implemented:

- Provision of adequate and appropriate Personal Protective Equipment (PPE) including safety shoes, helmets, gloves and overalls
- Employees to be given the correct tools and equipments for the jobs assigned
- Employees to be trained in the use of all equipment that they will be required to operate
- Rest times and breaks will be observed
- First aid services and an emergency vehicle to be readily available at site
- Moving parts of machines and sharp surfaces to be securely protected with guards to avoid unnecessary contacts and injuries during construction phase
- The contractor will comply with the provisions of Occupational Safety and Health Act of 2007

f) Ambient air quality

Construction activities are likely to cause air pollution from dust generated during site clearance, excavation / earthworks and aggregate transportation to/from and around the site. Construction machinery may also discharge combustion fumes containing oxides of carbon and nitrogen.

Air pollution from the above-named sources is likely to affect site workers and the surrounding neighbouring establishments. In extreme situations, this may lead to respiratory problems in the workers and neighbours but it is not envisaged this will be the case given the magnitude of the proposed activities.

The key impacts of a change in ambient air quality are as follows:

- Health impacts associated with increased levels of pollutants;
- Dust generation and nuisance/health impacts on the local community.
- Emissions of Greenhouse Gasses (GHG's)causing global climate impacts
- Diseases associated with high levels of air pollutants
- Dust and particulate spread to off site locations and lands.

Proposed mitigation measures

- Regular dust suppression should be included in the construction phase, as and when dust becomes an issue
- The contractor will secure the site using appropriate dust screens.
- Building materials that are likely to produce dust such as ballast should be sprinkled with water before use
- Access road and dust surfaces at the construction site should be sprinkled with water twice a day
- Employees will be provided with appropriate dust masks and their use enforced by the site supervisor

g) Solid waste generation

Solid wastes generated during construction include spoil material, packaging wastes (mainly paper, polythene, plastics, and tins), cuttings and trimmings off materials and construction wastes among others. Dumping around the site will interfere with the aesthetic status and has a direct effect on the surrounding community. Disposal of the same solid wastes off-site could also be a social inconvenience if done in the wrong places. The off-site impacts could be aesthetic, creation of breeding grounds for vermin, pollution of physical environment and invasion of waste pickers/scavengers.

Proposed Mitigation Measures for the generation of solid wastes

- It is recommended that construction waste be recycled or reused as much as possible to ensure that materials that would otherwise be disposed off as waste are diverted for productive uses. In this regard, the Contractor will ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed off. The Proponent shall

put in place measures to ensure that construction materials requirements are carefully budgeted and to ensure that the amount of construction materials left on site after construction is kept minimal. Additional recommendation for minimization of solid waste during construction of the proposed Project include the use of durable, long-lasting materials that will not need to be replaced often, thereby reducing the amount of construction waste generated over time.

- Provide for separation of wastes so that non-hazardous waste (e.g. office solid wastes) are not mixed with hazardous waste
- Avoiding and/or minimizing waste generation where practical by improvements or changes in the project design or site procedures;
- Reusing/recycling/recovering materials where possible and thereby negating /minimizing disposal requirements (e.g. by waste segregation according to type, separation of recyclable materials such as metal, reuse of wood from site hoarding/concrete formwork, utilization of excavated material for filling or landscaping)
- Ensuring that all treatment and disposal options comply with best practice and all relevant guidelines and legislation.
- Ensure that the contractor engaged in the collection of the solid wastes is duly registered and licensed by NEMA
- Keep wastes tracking register

The following specific measures will therefore be adopted during the detailed design and construction stages of the project to minimize waste generation:

Detailed Design

- Minimizing excavation requirements as far as possible.
- Balancing cut and fill requirements.
- Evaluating the potential for maximizing the re-use of excavated materials for example, within landscape mounds.
- Considering treatments for unsuitable excavated materials e.g. upgrading of sub soils to top soils by mixing with compost.
- Providing an area within the construction site to allow for sorting and segregation of materials.

Construction

- Segregating waste materials according to type to facilitate re-use and recycling.
- Separation of inert construction and demolition materials for either re-use on-site or use as public fill.
- During demolition works, segregating materials at source as far as practical.
- Co-ordinate material deliveries to site in order to minimize storage times on site and the likelihood of causing damage.
- Consider on site mulching of vegetation to reduce bulk and review opportunities for possible use within landscaping areas.
- Training site staff in waste minimization practices.

h) Increased water demand

Water requirements of the construction works and construction workers during the construction phase of the proposed Project will lead to an increased demand on the existing water resources in the area.

Improper management of construction wastewater may lead to pollution of surface and ground water resources in the area.

The identified impacts associated with the development are listed as follows:

- Stress on local groundwater resources;
- Groundwater and surface water pollution;
- Accidental chemical or oil spill from the project's construction activities (e.g. vehicle leakages).

i) Occupational safety, accidents and hazards

The construction works unavoidably expose workers to occupational health and safety risks. The construction workers are also likely to be exposed to risk of accidents and injuries resulting from accidental falls, injuries from hand tools, and construction equipment. These require caution and adherence to established health and safety standards.

Dangerous factors also include electrical currents and explosions of pressurised devices (cylinders, boilers and tanks), gas pipes and installations, as well as mixtures of gases with air. The threat of explosion may be related to the incorrect use of devices and leaks in pipes and connections, as well as incorrect operation of control and metering apparatus and security devices.

The harmful factors that could take place on the construction site include physical factors -noise, mechanical vibrations, low temperature, high humidity of the air and incorrect lighting, as well as chemical factors -wood impregnation agents, solvents, asphalt smoke and dust.
The adverse impacts due to hazards and occupational safety cause injury to workers, loss of man hours and property.

Proposed mitigation measures

The proponent shall ensure that a risk assessment of all processes, activities and tasks is carried out and appropriate mitigation measures based on OSHA hierarchy of controls are established and implemented. Engineering controls e.g. inbuilt machine guarding, administrative controls e.g. training and supervision of inexperienced workers, use of persona protective clothing e.g. protection of eyes with goggles or effective screens must be provided in certain specified processes.

Floors, passages, gangways, stairs, and ladders must be soundly constructed and properly maintained and handrails must be provided for stairs. Other measures to be undertaken should include:

- Proper training of machine operators;
- First aid treatment;
- Medical assistance;
- Emergency treatment;
- Prevention of inhalation of dusts;
- Protective clothing, footwear, gloves and belts; safety goggles and shields;
- Manuals and training regarding the correct handling of materials and packages should be in place and updated as new or updated material safety data sheets becomes available;

- Monitoring should be carried out on a regular basis, including accident reports; and
- Medical surveillance

j) Impacts on traffic at and around Project area

Inevitably, area will encounter increased traffic due to construction vehicles, with a possible creation of nuisance to other motorists from obstructions and slow movement of the construction vehicles. The traffic will include both heavy and light vehicles moving in and out of the proposed site.

The key environmental aspects for the traffic and transportation on site are listed as follows:

- Stress on local traffic infrastructure;
- Traffic congestion and obstruction; and
- Public safety risk.
- Air, dust and noise pollution in neighbourhood,
- Loss of human, wildlife and livestock due to collisions on the road and access lanes.
-

Proposed mitigation measures

The proponent will work in line with the requirements of the Traffic Act and implement good safety practices , rules and regulations and where available the Municipality and Kenya National Highway Authority's traffic management guidelines. If none of these are relevant, the proponent will in best interest and practice develop a tailored Traffic Management Plan that will address safety, timing of site activities with the other users' activities, warning and signage and notification of intent to use the roads in the area outside the normal practice.

CHAPTER NINE: ENVIRONMENTAL MANAGEMENT PLAN (EMP)

9.0 Significance of EMP

EMP involves the protection, conservation and sustainable use of the various elements or components of the environment. The EMP for the proposed project provides all the details of project activities, impacts, mitigation measures, time schedules, costs, responsibilities and commitments proposed to minimize environmental impacts of activities, including, monitoring and evaluation and environmental audits during implementation and decommissioning phases of the project. The Table below summarises the EMP.

Table 4: Environmental Management Plan

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
PRE-CONSTRUCTION PHASE				
Loss of Land Use	• Proponent bought from owners at competitive rates.	Proponent	Adequate compensation; no complaints from land owners	800,000 per acre
CONSTRUCTION PHASE				
Soil and geology disturbance	• The minimum area required for construction shall be cleared of vegetation • Top soil shall not be disturbed more than it is absolutely necessary but not below the first impermeable layer • A minimum amount of storm water will be allowed to flow on the site and control measures like paving and banding to avoid storm water damage. • Denuded areas shall be landscaped and vegetation re-planted as soon as feasible after construction.	Contractor / proponent	Reduced soil and geology disturbances	Nil – part of the contractor's cost
Loss of vegetation cover	• Re-vegetation to control potential soil loss • Prevention of soil contamination through oil spills/leaks from construction machinery • Landscape area with similar vegetations • Preservation of excavated top-soil for future site restoration procedures	Contractor / proponent	Less soil erosion	Nil – part of the contractor's cost

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
	particularly in highly disturbed areas; • Limiting vehicular transport to defined roads as to prevent unnecessary injury to vegetation and habitat destruction; • Implementing good housekeeping practices on site and implementing a Solid Waste Management plan in order to eliminate any source of hazard to the native fauna; • Ensure proper demarcation and delineation of the project area to be affected by construction works; • Utilize appropriately clearing techniques (e.g. hand clearing as opposed to mechanized clearing) by using human labour as opposed to heavy machinery. • Minimize clearing and distribution to riparian vegetation.			
<u>Biodiversity loss</u>	• Generally, the following should be considered during construction: • Design with a view to incorporating nature conservation into the development including appropriate friendly boundary fencing. • Retain existing habitats where possible and aim to keep natural site features in context rather than in isolated fragments. Pay attention to field boundaries and hedgerows and preserve wildlife corridors and habitat links. Consider integrating	Contractor / proponent	Less biodiversity loss	Nil – part of the contractor's cost

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
	ecological features, for example climbing plants and bird nest boxes, within any buildings or structures. • Routine checking of trenches (if any) and escape routes to minimize, if not prevent, entrapment of fauna; • Reporting of any violation relating to hunting and trading activities; • Minimising the removal off-site of any soils containing invasive species. • Compliance with the ecological requirements of the project and any other legal requirements with regard to waste management, environmental pollution, discharge to waters among others. • Replacement of lost habitat throughout the site or in other areas, where possible. • Ensure that landscape design reflects local ecology and uses locally sourced plants wherever possible. Native trees and shrubs should be used for landscaping where practical.			
Soil Erosion	• Any construction materials should be screened or covered to prevent off-site movement and the surplus materials should be removed from the site to an approved disposal site. • Striping of vegetation should be limited to areas where civil works will be undertaken	Contractor / proponent	Reduced soil erosion.	Nil – part of the contractor's cost

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
	• Beaming of the open trenches should be undertaken to prevent them from being washed away by runoff • Sensitization of workers on environmental protection. • Soils excavated from the tower pad area shall be used for backfilling. • Soils shall not be left exposed to wind /water for long.			
Noise pollution and vibration	• The contractor to inform neighbours two weeks prior to the commencement of construction activities for early preparedness • Construction activities shall only be undertaken during daytime. • To obtain approvals where night works are to be done from relevant authority • The contractor should use modern equipments which produces the least noise. The use of noise shielding screens should be used and the operation of such machinery restricted to when it is actually required. • Construction activities must abide by the national Noise regulations gazetted by NEMA • The contractor will endeavour to comply with the noise control regulations of 2006 • Only serviceable machinery and equipments shall be used	Contractor / proponent	Reduced noise and vibration	Nil – part of the contractor's cost

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
	• Employees using equipments shall be provided with ear muffs • Noise reduction /hearing protection devices when working with noisy equipment. • Use serviceable equipment with low noise emission. • Instruct truck and machinery operators to avoid raving of engines.			
Solid waste	• Clearing of bushes/vegetation, excavation and cutting should be restricted within the project area. • All solid wastes should be collected at central location for temporary storage until removal to an appropriate disposal site. • Waste generated at the site should be sorted by the contractor and disposed of in a suitable manner into different waste streams. • As provided for by the Building Code, a temporary latrine will be provided on site to be used by construction workers.	Contractor / proponent	Proper management of solid waste.	Nil – part of the contractor's cost
Health and safety	• Comply with relevant legislations during construction. • Develop and implement measures to minimize risks and injuries to the public during construction phase.	Contractor / proponent	Reduced safety and health incidences and cases.	Nil – part of the contractor's cost

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
	• The contractor must provide and maintain personal protective equipment and facilities to employees engaged in construction activities. • The contractor shall provide a standard First Aid kit at the site office, just in case minor injuries. • All workers will be sensitized before construction begins, on how to control accidents related to construction. • Accordingly, adherence to safety procedures will be enforced. • All workers to wear protective gear (PPEs) during construction. • Undertake Job Risk Assessment Review at each task; • Carry out Tool Box Meetings daily; and • Construction work will be limited to daytime only.			
Local Socio-economic impacts	• Implement where feasible measures to employ local community. • Initiate CSR activities for the local community. • Local community given first priority in employment.	proponent	Benefits of the project to local community	Nil – part of the contractor's cost
Loss of aesthetic / visual intrusion	• Prevent unnecessary removal of vegetation outside the width of the working area by clearly demarcating the working area.	Contractor / proponent	No unnecessary removal of vegetation.	Nil – part of the contractor's cost

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
	• Remove spoil material from the area once the trenches has been filled • Re-vegetate disturbed ground in the working area by seeding and spreading of vegetation that has been removed.			
Air pollution	• Appropriate mitigation measures to be implemented - such as wetting down, as well as the erection of shade netting screens, to prevent off-site movement of dusts may be required • All areas disturbed during the construction of the factory must be re-vegetated. • Sensitization of workers on environmental protection and safety. • Control speed of construction vehicles • Prohibit idling of vehicles • Water shall be spraying during the construction phase on excavated areas to reduce dust emission. • Regular maintenance of plant and equipment. • Provision of dust masks for use while working – in dusty conditions. • Use of serviceable vehicles and machinery to avoid excessive smoke emission.	Contractor / proponent	Less air pollution	Nil – part of the contractor's cost
OPERATIONAL PHASE				

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
Solid waste generation	• Use of an integrated solid waste management system i.e. through several options including of Source reduction Recycling, Composting and reuse and Incineration. • Ensure that wastes generated at the facility are efficiently managed through recycling, reuse and proper disposal procedures. • A private solid waste handler and NEMA approved to be contracted to handle solid waste. • Apply for the statutory licences for the management of wastes as required by EMCA No. 8 1999 and the regulations on waste management. • Wastes to be collected regularly to control air pollution and vermin infestation. • Receptacles will be provided for waste storage prior to collection. • Resource recovery will be encouraged once the project takes off so as to shrink waste stream and recover non-recyclables. • Refuse collection vehicles will be covered to prevent scatter of wastes by wind. • Wastes will be collected by a licensed operator to avoid illegal final dumping at unauthorized sites. • All persons involved in refuse collection	Proponent	Effective management of solid waste.	Approximately 500,000 per year

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
	shall be in full protective attire.			
Public and Occupational Safety and health	• Fence construction site. • Speed limits for project vehicles. • Posting of warning signs at strategic points. • All workers will be sensitized and trained on occupational safety and health issues and on how to control accidents related to construction. • A comprehensive contingency plan will be prepared before begins, on accident response. • Accordingly, adherence to safety procedures will be enforced. • Employees engaged in hazardous work to undergo medical examinations as provided in the Medical examination rules • The Occupier to provide employees with Personal protective equipments. • The occupier should constitute a health and Safety committee as required under Health and Safety Committee rules 2004. • Undertake Job Risk Assessment and Review of each task. • Put in place an Emergency Response Plan.	Proponent	Reduced public and occupational safety & health incidence and cases	Approximately 1 million annually
Pollution of water resources	• Reduce wastewater production. • Recycle the wastewater (where practical) • Reuse the wastewater (generally after	Proponent	Reduced / no water pollution	Approximately 500,000 annually

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
	treatment) for a beneficial purpose (either onsite or on a neighbouring property) such as dust suppression. • Treat and discharge safely. • Treat and discharge wastewater to soakage or lined evaporation pit (where practical) Treat and discharge to drains or watercourses, meeting values. • Obtain a water abstraction permit from WRMA and implement mandatory seasonal water use limitations in liaison with WRMA; • Rain water harvesting. • Install of interceptors to pre-treat effluents. • Secure effluent water license from NEMA. • Collection and treatment of contaminated runoff before discharge; • Constant review of the design to ensure that capacity is maintained and where necessary corrective measures are undertaken to address the dynamics; Implementation of an effluent program with the objective of monitoring of ground water and surface run off quality though a scheduled and regular sampling and analysis program using NEMA accredited laboratories.			
<u>Energy management and conservation</u>	• Enough trees planted for provision of fuel wood.	Proponent	Availability of enough fuel	Approximately 10 million annually

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
	• Local farmers encouraged to plant trees for sale to the factory. • Switching off non operational machines/equipment and lights and using optimum lighting intensity for security and safety purposes. • Routine maintenance of equipment and machines to ensure optimum operations and fuel efficiency. Adopting the use of energy saving lights and machines. • Creation of awareness among users. • Operational efficiency. • Development of key performance indicators.		wood. Less energy consumption	
HIV / AIDS, Sexual transmitted infections and sexual ills	• Employment of locals. • Sensitization staff working on the project on dangers of carefree lifestyle / awareness creation. • HIV/AIDS awareness training for all employees and subcontractors. • Medical examination and care. • Provision of barrier methods such as condoms.	Proponent	No / reduced sexually transmitted diseases	Approximately 200,000 annually
Release of effluent into the environment	• Proponent to ensure the availability of treatment facility onsite that treats wastewater to meet the set NEMA guidelines.	Proponent	No raw effluent discharged into environment	Approximately 300,000 annually

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
Air pollution	• All workers on the site will be required to wear protective clothing while on duty. • Suitable wet suppression techniques need to be utilized in all exposed areas. • Undertake air assessment to determine the air quality on regular basis.	Proponent	Reduced air pollution	Approximately 1.5 million annually
DECOMMISSIONING PHASE				
Solid waste generation	• A private solid waste handler and NEMA approved to be contracted to handle solid waste. • Resource recovery will be encouraged. • All persons involved in refuse collection shall be in full protective attire.	Proponent / contractor	Proper management of solid waste	Approximately 700,000 once
Public and Occupational Safety and health	• Fence decommissioning site. • Speed limits for project vehicles. • Posting of warning signs at strategic points. • All workers will be sensitized and trained on occupational safety and health issues and on how to control accidents related to construction. • A comprehensive contingency plan will be prepared before work begins. • Put in place an Emergency Response Plan.	Proponent / contractor	Reduced public and occupational safety & health incidences and cases	Approximately 100,000 once

Identified Impacts	Proposed mitigation measures	Responsibility	Monitoring	Costs (Ksh.)
Air pollution	• All workers on the site will be required to wear protective clothing while on duty. • Suitable wet suppression techniques need to be utilized in all exposed areas.	Proponent / contractor	Reduced air pollution	Approximately 150,000 once

CHAPTER TEN: CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusion

The proposed tea factory is a timely investment which NEMA should be approved.

10.2 Recommendations

i. Ensure that worker's occupational health and safety standards are maintained through capacity building, proper training, providing protective clothing and equipment.
ii. Annual environmental audits should be carried out on the project in order to ensure compliance of the project with the mitigation measures outlined in the Environmental Management Plan (EMP),
iii. All activities concerning construction and maintenance such as, work execution and site inspection shall be strictly monitored by an engineer or a designated official. Engineers and/or designated official shall be trained and experienced enough to judge the appropriateness of the work executed in order to carry out the monitoring properly.
iv. There is need for community and workers' awareness creation on the environmental management issues, and the need for all project-affected populations to cooperate in the projects construction, operation and maintenance.
v. Upon completion and commissioning, the proponent should engage services of waste handling companies registered by NEMA in compliance with Environment Management and Coordination (Solid Waste) Regulations 2006.

CHAPTER ELEVEN: REFERENCES

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CHAPTER TWELVE: APPENDICES

a. CURRENT EIA / EA PRACTISING LICENSE OF ENVILEAD LIMITED AND EXPERTS

b. DL GROUP OF COMPANIES' LETTER CLARIFYING LAND OWNERSHIP

c. CHANGE OF USER

d. SUMMARY OF COST