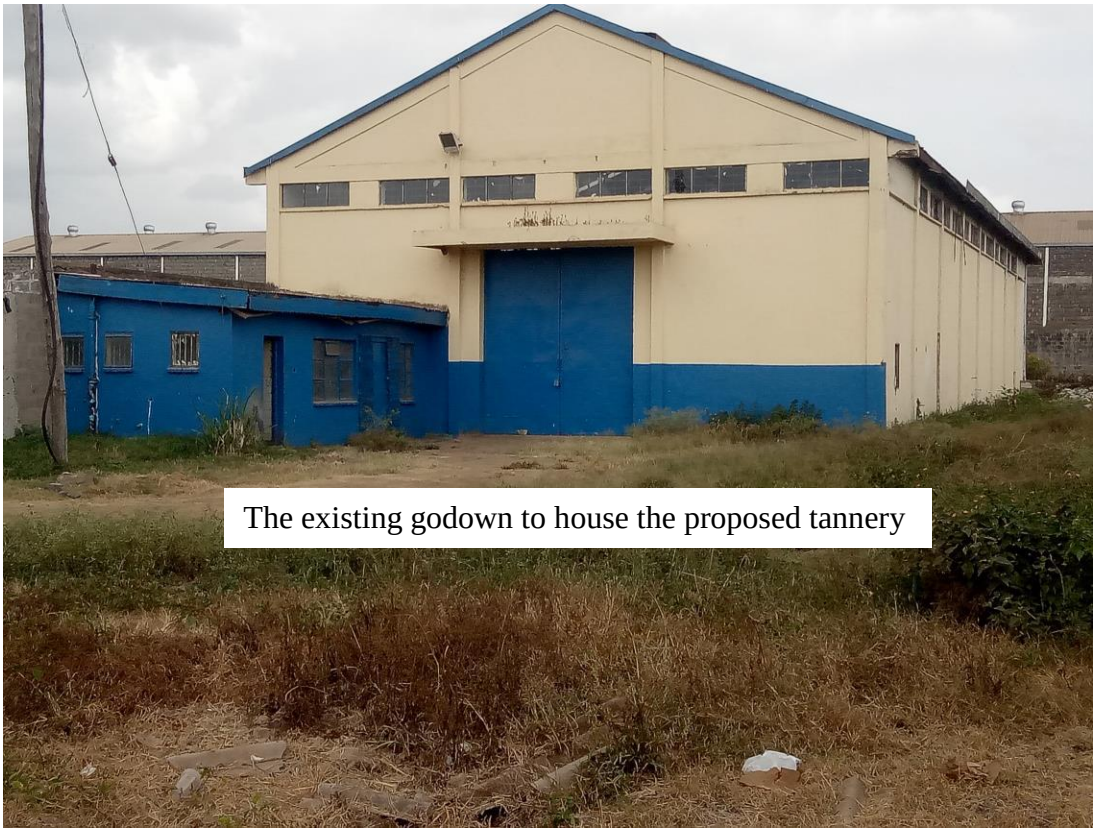
ENVIRONMENTAL IMPACT ASSESSMENT

STUDY REPORT

FOR

THE PROPOSED LEATHER TANNERY ON AN EXISTING GODOWN LOCATED ON L. R. NO. 4953/633 IN THIKA INDUSTRIAL AREA, OFF GARISSA ROAD, KIAMBU COUNTY.



The existing godown to house the proposed tannery

Proponent:

CONTINENTAL LEATHER ECOSYSTEM LIMITED

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MERU

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For and on behalf of:
Continental Leather Ecosystem Limited

Signed: _____ Date: _____

For: CONTINENTAL LEATHER ECOSYSTEM LIMITED

PIN No. : P051775463U

Disclaimer:

The proponent proposes to establish and operate a leather tannery on an existing godown on L.R. No. 4953/633 situated in Thika Industrial area, Kiambu County. Copies of documents, details and information in the report are what were obtained from the proponent. Portions of this report are based on documents, data and verbal information provided by third party sources and reports prepared by other professionals. The experts may not have independently verified all the information and accept no responsibility for the accuracy of information contained in such reports. Whilst this report and the opinions contained herein are accurate to the best of the experts' knowledge and belief, the experts cannot guarantee the completeness or accuracy of any description based on the supplied information.

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Table 1: Acronyms and Abbreviations Used in This Report

EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
NEMA	National Environmental Management Authority
PPE	Personal Protective Equipment
OHS	Occupational Health and Safety
EHS	Environmental Health and Safety
ERPs	Emergency Response Plans
NO_x	Nitrogen Oxides
SO_x	Sulphur Oxides
CO_x	Carbon Oxides
EMCA	Environmental Management Coordination Act
Φ	Diameter
PV	Permanent Vent
Ha	Hectares
EA	Environmental Audit
CGK	County Government of Kiambu
ETP	Effluent Treatment Plant/system

Annexes

Sketch map showing location of the proposed site

Copy of lease, Title deed and PIN number certificate

Copies of minutes of the consultation and public participation meeting

Copies of lists of meeting attendants

EXECUTIVE SUMMARY

This EIA Study report has been carried out for **Continental Leather Ecosystem Limited** who proposes to establish a leather tannery for processing of skins and hides into leather. The proposed project is very beneficial since there are abundant skins and hides for processing and the demand for leather is currently unsatiated and is still growing at unprecedented levels due to the exponential population growth among other factors.

There is growing recognition of the importance of protection and management of the environment and the natural resources unlike in the past where policy makers directed all the efforts in economic development without due regard to the resource base on which the economic development depend on. As a result, there has been unprecedented environmental degradation due to the lack of environmental conservation resulting to unsustainable development. More recently developers, spurred on by regulators world over, have recognized the need for change in order to safeguard the environment.

The EIA study report was conducted in accordance with the requirements of the Environmental Management and Co-ordination Act (EMCA) and the Environmental (Impact assessment and Audit) Regulations 2003. The major objective of the study is to identify the potential impacts of the proposed project, enhance the positive impacts identify ways of avoiding the negative impacts and where not possible, propose reduction and mitigation measures. This is for the purposes of environmental enhancement and co-existence with other land uses.

The terms of reference are to evaluate the potential environmental impacts on ground and surface water, air quality, wildlife and habitat, social and economic aspects, existing land use, transportation impacts, and the effects of noise and vibrations from the proposed tannery operations. The study examines the proposed tannery project for the purpose of evaluating the environmental impacts and the effects of potential pollution from the proposed tannery operations mainly wastewater, solid waste and air emissions.

The study was accomplished through desktop study, interviews with the proponent and other stakeholders, and site visits. The Existing go-down on which the proposed tannery is to be established is leased to the proponent by Kenya National Trading Corporation.
The EIA Study report was conducted in accordance with the requirements of the Environmental Management and Co-ordination Act (EMCA) and the Environmental (Impact assessment and Audit) Regulations 2003. The major objective of the study is to identify the potential impacts of the proposed project, enhance the positive impacts identify ways of avoiding the negative impacts and where not possible, propose reduction and mitigation measures. This is for the purposes of environmental enhancement and co-existence with other land uses. It is estimated that the on approval; the project will take approximately 6 calendar months to implement and it is estimated that it will cost Kshs **Twenty million (Kshs 20,000,000).**

In general, the proposed project area is characterised by mixed development of commercial developments and industrial developments including bakeries, bakeries, tobacco processors, LPG plants, chemical processors, food processors, maize millers, various assorted goods/products manufacturers and warehousing etc. In the immediate neighbourhood also are land parcels similar to the proposed project site while others are even larger in area some of which were vacant. Other land

parcels have been subdivided and land sold as individual plots for owners to develop individually. The proactive designs of the buildings had provided for adequate ventilation and natural lighting, parking, storm water drainage, water storage and waste water reticulation as well as open areas for auxillary facilities and services. Where necessary, improvements may be done.

Various alternatives were considered including the proposed site and project, alternative site and design, technology and materials and the proposed site, design, materials were chosen due to various factors among them the availability of land, availability of the hides and skins for processing, demand for such leather, proximity to the source of raw material and market for finished product, potential returns, infrastructure availability and the fact that the proposed site is suitable for the propose use and provides better use of the land. Various alternatives has been considered but the proposed alternative has been found one of the best available alternatives as it maximises the benefits to all beneficiaries and the potential negative impacts are not so significant and can further be mitigated by adherence to the proposed EMP.

The study identified various potential positive impacts from the project the major ones being production of leather, generation of revenue to the County and National government through the various levies and taxes charged, creation of employment and means of livelihood, increasing the utility of the land, contribution to industrialization, and the chance to introduce trees in the area by the proponent thus modifying the area microclimate. Other advantages include the chance for improved infrastructure such as water supply, power, road improvement, drainage etc. with time, the industry may also become a foreign exchange earner by exporting the leather. The multiplier effect in the area, the region/county and the national economy may be very large both in the short and long run.

The benefits notwithstanding, the proposed project has the potential to impact negatively on the environment. The potential negative impacts include high water demand, increased energy demand, wastewater management, solid waste management, noise; occupational health and safety issues; effects on air quality (air pollution by odour); effects on water, contamination risks. Chromium, which is conspicuously present in tannery wastewater and hydrogen sulphide gas produced poses a serious health hazard. In addition, Hydrogen sulphide and ammonia gases; and decomposing fleshings and trimmings emit unpleasant odours also if not well managed.

The ideal strategy to counter identified adverse effects is avoidance and whenever not be possible, alternative strategies of reduction, remediation, and compensation may be explored. Measures can therefore be divided into two categories namely primary measures that intrinsically comprise part of the development design; and secondary measures designed to specifically address the remaining (residual) adverse effects. It is possible to minimize and control the negative impacts if they have been taken care of at the design stage. Proposed measures that should be incorporated should include:

- Adapting effective waste management system to ensure proper disposal of the generated waste materials. Wastes should be reduced at source. Waste management (collection, handling, storage and disposal) should be sound and as per the waste regulations. Reuse and recycling should encouraged which shall not only save direct costs but also reduce potential environmental pollution and subsequent litigation. It is encouraged that most

trimmings be done before tanning since the skins and hides are easily biodegradable and can find other uses as compared to leather.

- For occupational health and safety, occupational health and safety training is recommended and operators should be provided with appropriate PPEs. Fire fighting equipment should also be installed and there should be first aid box as required by the OSHA. Material data sheets should be provided.
- The proponent should install a wastewater treatment system for pre-treatment of the wastewater from the tannery before disposal to the sewer. Recycling of the wastewater from the tannery shall not only reduce the cost of pre-treatment but directly reduce the cost of fresh water into the tannery. Recycling shall also reduce the chromium content in the wastewater and thus reduced chances of pollution. The effluent should be regularly tested in an approved laboratory for compliance and remedial measures. Proper design of the system shall reduce/control the production of hydrogen sulphide gas which poses a health hazard to human and aquatic life
- Appropriate and standard practices, materials and engagement of qualified and experienced persons to operate and work in various sections of the tannery shall greatly reduce chances of environmental pollution.
- Introduction of trees along the boundaries shall help in modifying the microclimate and beauty. The proponent in liason with other agencies and actors shall initiate various community development and enhancement projects as a Corporate Social Responsibility in line with community priorities and needs. Cooperation among stakeholders is key
- The proactive design and layout should provide various mitigation measures to ensuring compliance with applicable environmental laws and guidelines including but not limited to lighting, ventilation, space requirements, surface drainage, sewerage system and the structural safety among others.
- Effective emergency response plans should be adapted both during the entire project cycle. There should be a specific area for hazardous material storage. The **OSHA** must be enforced. An accident/incident record should be kept on site and under care of responsible person and a first aid kit(s) with all basic requirements and the in-charge be trained. To prevent social crimes, the workers should be vetted during recruitment and should be closely monitored and movement out of site should be restricted.

Throughout the project cycle, sound waste management systems and procedures must be adopted.

Adoption of best practices shall eventually increase productivity, improve cost-efficiency; without adversely affecting the community and the environment thereby promote sustainable development. By opting for state-of-the-art machinery, the use of Best Available Techniques, adopting techniques for the prevention of untreated emissions to environment and untreated discharges into water etc. (which are achievable), the proponent is creating a stable, well planned for business that fills a fundamental gap in the country's vision of a healthy environment and industrial development. Wastes should be reduced to the minimum as this will save on costs and at the same time preventing environmental pollution. The operators should exercise diligence in all activities to ensure environmental sustainability.

The proposed project should at the installation stage integrate mitigation measures with a view to ensuring compliance with the applicable laws and procedures. The structures should be built to the required planning/architectural/structural standards of the building code and the CGK. During entire project cycle, sustainable environmental management should be ensured; avoiding inappropriate use of natural resources, conserving nature and guaranteeing health and safety of all people, working on the project, general public and inhabitants of the project.

Though comprehensive based on the predicted and foreseeable potential impacts, these recommended measures are meant to guide and should be monitored and evaluated periodically once the project is implemented so as to guard against changes in the light of the real actual experiences as the proposed project progresses. The project proponent shall continue to work closely with the environmental consultants, NEMA, area residents and the county government to enhance the environment and to ensure that issues that the environmental concerns are well addressed and integrated into the project at every stage of successive implementation. This way, the co-existence of the proposed project with the environment throughout the project cycle will have been achieved. Adoption of best practices and best technology in the tannery operation is a preliquisite for sustainability. From the EIA study, it is clear that the proposed project is viable though it poses a significant threat to the environment which can fortunately be mitigated to the minimum to reduce the significance and ensure sustainability.

The study and a cost and benefit analysis reveals that the benefits far outweigh the associated costs and the benefits can further be maximized with strict adherence to the proposed mitigation measures (the EMPs) and closely working with NEMA, CGK, environmental experts and other relevant professionals and relevant institutions throughout the project cycle. The importance of liasing is to ensure that variation in predicted impacts is handled appropriately during the project cycle otherwise the major concerns at any point in time should be focused towards avoidance or minimizing the occurrence of negative impacts. Best practices and techniques throughout the operation phase of the proposed project shall greatly simplify decommissioning and related costs.

While the proposed EMP may be considered adequate based on the potential anticipated impacts, the most important aspect is for all stakeholders to appreciate that that there can be no ideal/perfect policies or solutions. Therefore, our attention should focus on seeking formulation of policies and plans, which take into account all known and/or predictable aspects, yet remain flexible enough so that they can be adjusted in the light of actual experience and therefore the need for effective monitoring and evaluation systems.

INTRODUCTION

General overview, Justification and rationale for EIA

The proponent has proposed to establish and operate a leather tannery on an existing godown on L.R. No. 4953/633 off Garissa Road that is in Thika Industrial area, Kiambu County. The proposed project is collaborated by the ever growing demand for leather coupled with growing economy among others, thus the need for increase in leather processing. Besides, the proposed project brings forth various advantages as discussed elsewhere in this report and promotes industrialization.

The rationale for the EIA study report is to integrate environmental aspects in the planning and implementation processes of the proposed project to mitigate adverse impacts and enhance the positives. Besides, Environmental Impact Assessment (EIA) for such projects is now a legal requirement. The ultimate objective of an EIA is to provide decision makers, relevant institutions/organizations, proponent and other stakeholders with the foreseeable environmental impacts of a proposed activity and therefore enable planning ahead taking into account all predictable outcomes and adequately providing them for sustainability.

The purpose of the study is to identify foreseeable potential impacts (physical, ecological and cultural/socio-economic) so as to enhance the benefits and at the same time avoid negative impacts (costs) or provide appropriate cost effective measures to remedy the negative impacts that cannot be completely avoided. Integrating *Sustainable Environmental Management principles* in the planning, implementation and throughout the project cycle is vital in reducing/mitigating conflicts and enhancing environmental conservation.

Objectives

The main objective of this EIA Study was to establish the baseline conditions of the proposed site, evaluate the existing and the anticipated impacts and propose measures to enhance the positive impacts and measures to attenuate the effects of the significant negative impacts

Terms of Reference (TOR)

This Environmental Impact Assessment involved the generation of baseline information, establishing the current status of the proposed site and its environs, identification of predictable effects of the development on the environment (including infrastructure, occupational health and safety issues) and direction & magnitude of the changes, analysis of the compatibility of the proposed project with the surrounding land uses (as per the prevailing policy and legal framework) and the proposition of potential mitigation measures to be undertaken throughout the project cycle; and development of an environmental management plan with proposed mechanisms for monitoring and evaluating the compliance and environmental performance.

Scope of EIA Study

The study has been conducted as per the above TOR and as set out in EMCA, 1999 and the Environmental (Impact Assessment and Audit) Regulations, 2003. i.e. to evaluate the potential and the foreseeable impacts of the proposed project, generation of baseline information evaluation and recommendation of the best alternatives from the options available (if any), the nature, order of magnitude, extent, duration and reversibility of the potential changes. The geographical scope is limited to the direct and indirect physical extent as may be foreseably affected by the proposed project.

Methodology

The methodology involved visits to the proposed site for data collection, relevant desktop study, analysis and interpretation of data collected, analysis of proposed designs, activities and schedules, public participation and consultation with professionals and other stakeholders.

Objectives and scope of the proposed project

Whereas the main objective of the proposed project is development of a leather tannery for some economic gains to the proponent and to those who will directly and indirectly benefit, the main objective of this EIA study report was to establish the baseline conditions of the proposed site, evaluate the existing and the anticipated impacts and propose measures to enhance the positive impacts and measures to attenuate the effects of the significant negative impacts. The scope of the project is limited to the geographical location of the leased godown on L.R. No. 4953/633. All activities including raw material storage, waste storage shall be within the boundaries of the proposed site before unrecyclable wastes are disposed to approved dump sites. There may be minor disturbances or spillover effects to the neighbourhood due to such issues such as odours, solid wastes, wastewater, noise, dust, traffic etc but they shall be reduced to the minimum possible as recommended in the mitigation measures.

ENVIRONMENTAL SETTING OF THE PROJECT AREA AND ITS ENVIRONS

PHYSICAL LOCATION

The proposed project site is located in Thika Industrial area in Thika Sub-county within the larger Kiambu County. It is situated off Garissa Road and along Broadways road just next to Monjo Gas Refilling plant (LPG).

PHYSICAL ENVIRONMENT

Climate

Kiambu County is an area with temperatures varying with altitude between 30° C maximum and 14° minimum. The climate of the area is generally cool throughout the year. The coolest period is between July and August while the hottest months are from November to April. Rainfall in the district is bi-modal, generally occurring in the months of March to May and October to December. The area receives unreliable rains with a mean annual rainfall of 1100mm. the evaporation/evapo-transpiration is estimated to be between 1,450 and 2,200mm per annum.

Geology, Soils and topography

The soils in the area classified as luvisol and are developed on undifferentiated tertiary volcanic and basic igneous rocks. They are well drained, shallow, dark reddish brown from ashes, pumice from volcanoes, and sediments mainly from crystalline basement rocks. The site is fairly level though the general area has a mix of flat and both gentle and steep slopes. The general area is characterized by a topography both with both steep and gentle slopes, valleys and flat topography.

BIOLOGICAL ENVIRONMENT

Flora

The general area is planted with vegetation (trees) mostly along the roads, plot boundaries and in designated gardens within the respective plot boundaries. The proposed site had no significant vegetation except for grass and weeds in some sections else other sections were bare. Within and in the immediate neighbourhood, there is no vegetation of special conservation or cultural importance.

Fauna

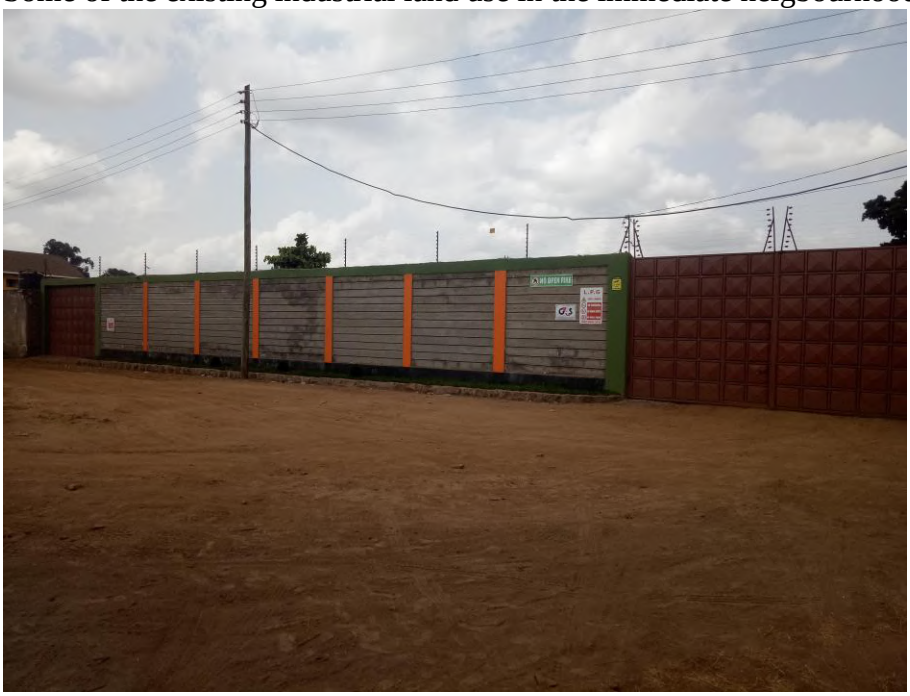
The site is situated within an area zoned for industrial use and formerly agricultural where human activities have altered the natural habitat for wildlife over the years. Consequently, there are no major animals in the environs except may be birds, insects, and small rodents. Therefore, there is no fauna threatened by the proposed project.

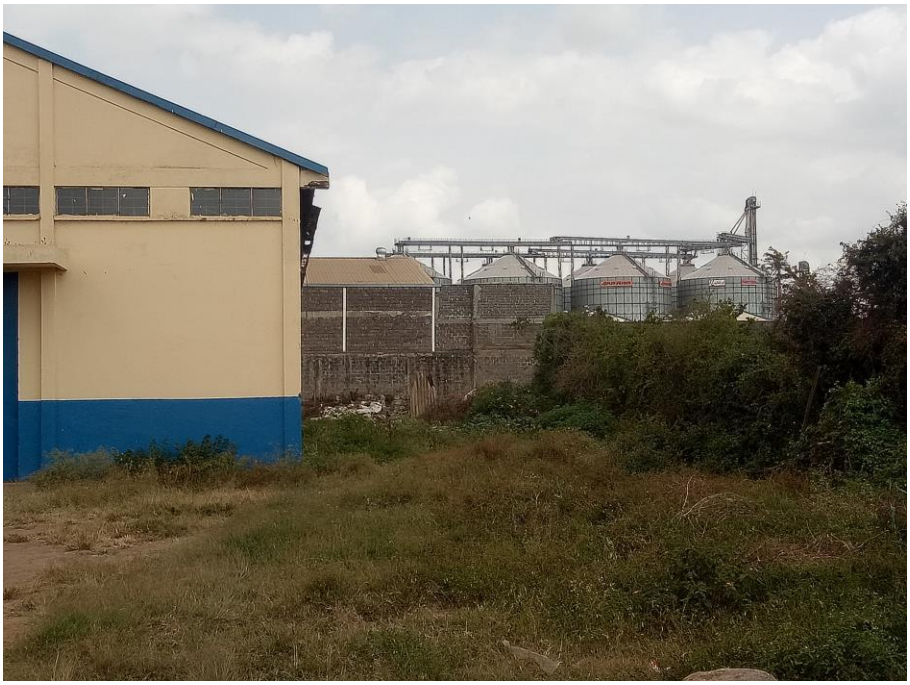
SOCIO-ECONOMIC ENVIRONMENT

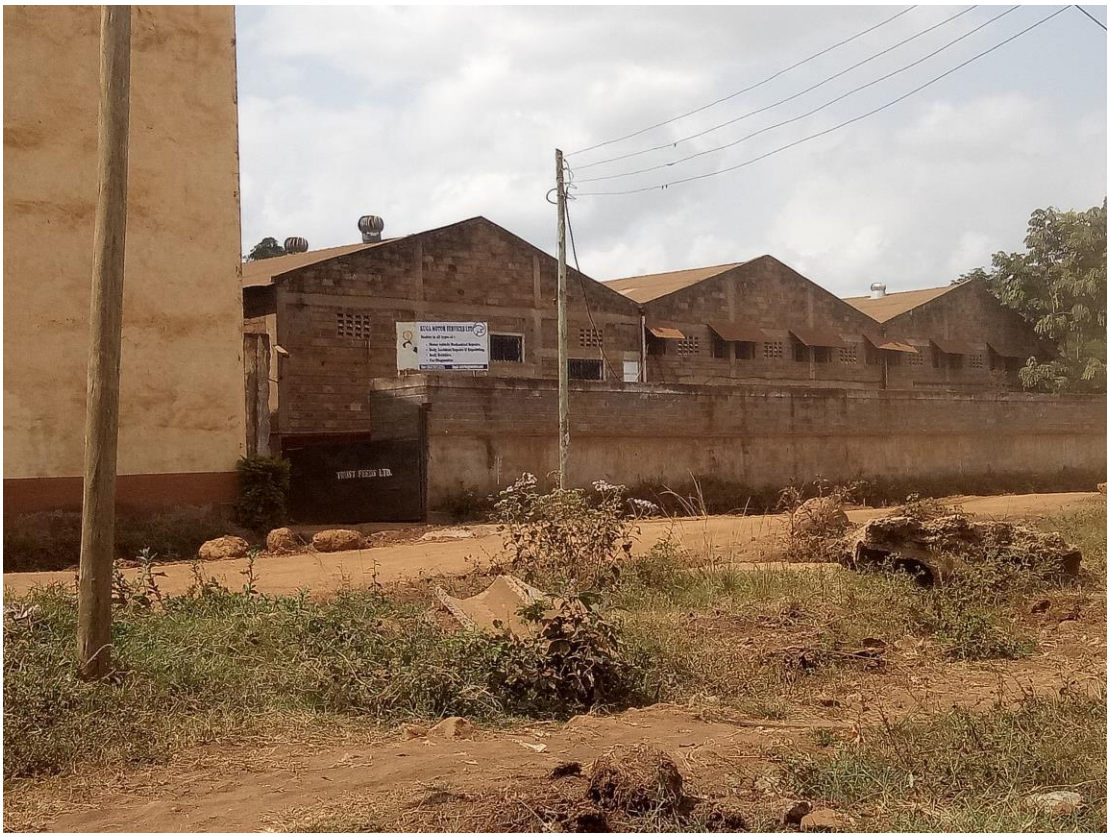
Lying within an industrial area, the proposed project site is in line with the area's planning policy. Almost every other plot in the neighbourhood is under industrial related activities. The proposed site is well accessible and in close proximity to Thika town among others. Being an industrial area, all

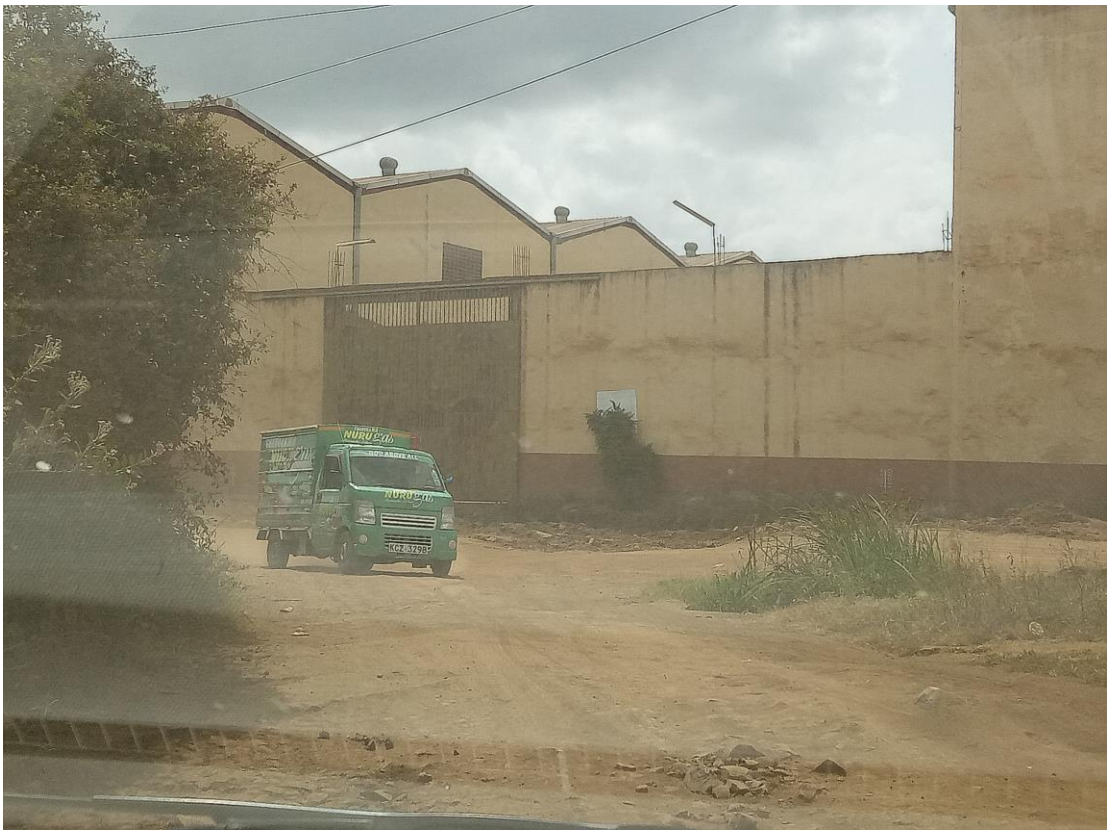
social amenities and services (hospitals, schools, religious places, shopping areas etc.) are within easy reach. Water, sewer and electricity are available in the area. All emergency facilities (fire brigade, ambulances etc) are within easy reach from the various providers. The area is currently an industrial area. There are no sites of cultural, historic or traditional significance in the immediate neighbourhood. The area is within the County Government of Kiambu's jurisdiction and therefore served by the CGK's infrastructure and is also bound by the CGK's by-laws.

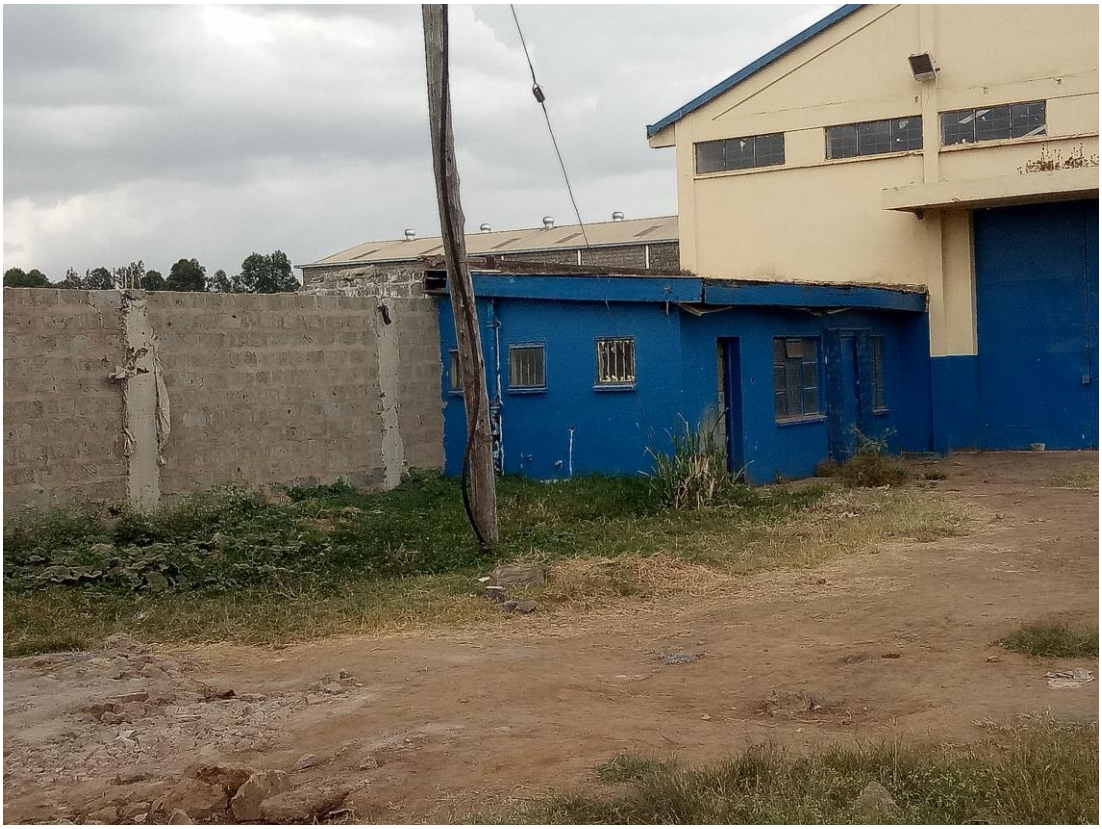
Some of the existing industrial land use in the immediate neigbourhood

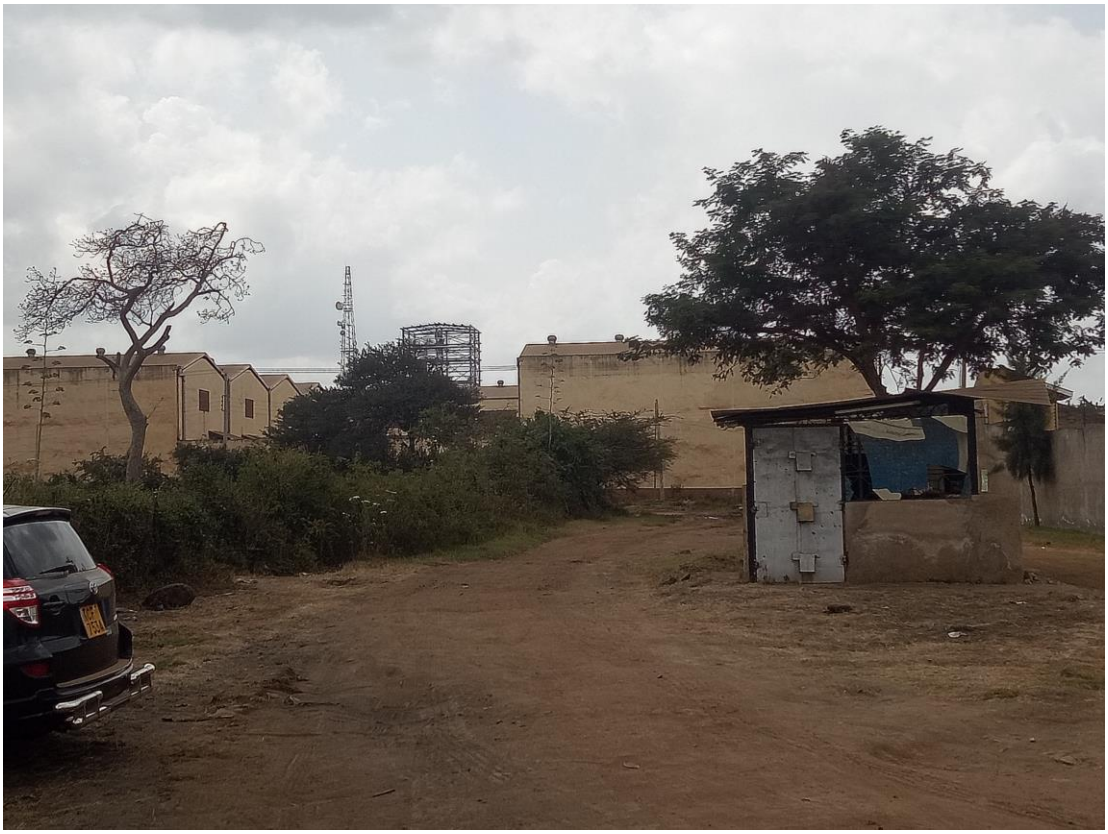












Source: Field survey

INFRASTRUCTURE AND SERVICES

Roads and accessibility

The immediate access road is not tar surfaced but is all weather and well networked with other several major roads notably the tar surfaced immediate connecting access road and Garissa Road and therefore the site is well accessible.

Sewer system

The area is served by the main sewer. The sewer system reticulation shall be effectively designed and will be connected to the system after pre-treatment to set standards.

Water resource

The proposed project site is connected to the area water supply network. It is proposed that the proposed development will have cold-water storage tanks to the specifications of the mechanical engineer. It is recommended that the proponent explore harnessing rainwater for general use to minimize pressure on the existing water supply.

Surface Drainage

There is an existing common drainage system which drains the area. During construction, internal drains to collect the surface run-off and safely dispose to the existing drainage system shall be installed. Drainage costs shall be significantly reduced by harvesting water from roof catchment.

Solid waste Management

The area is within the jurisdiction of the County Government of Kiambu, which has the responsibility of disposal of waste. However, the proponent/contractor has an option of contracting a private garbage collecting company. The proposed project shall included dustbin cubicles and waste storage area (protected from rain and animals). This calls for sound waste management system especially during operation. All solid wastes should be dumped in approved dumpsites and in accordance with the Waste Regulations.

Energy

The site is connected to the national grid but there is need for the proponent to liase with KPLC to cater for the increased demand. Fossil fuels will power some machinery/equipment.

Communication

The area is well covered by all communication facilities such as landline and mobile services. All these will facilitate communication throughout the project cycle.

Security

There will be a single gate to the development, which will be fully manned 24 hours. The entire area of the project will also be banded with a masonry perimeter wall. Outdoor lighting will as well be installed sufficiently within the project area. The property management is anticipated to engage security firms to beef-up security.

RELEVANT LEGISLATIVE AND REGULATORY FRAMEWORK

The Environment Management and Coordination Act, 1999

The Act was enacted to provide for the establishment of an appropriate legal and institutional framework for the management of the environment and matters connected therewith and incidental thereto.

The Act entitles every person in Kenya to a clean and healthy environment and aims to safeguard and enhance the environment. Though there are other sectoral laws on environmental conservation, this is the supreme legislation. It provides guidelines on issues of environment, stipulates offences and penalties and establishes NEMA. The Act (EMCA) under the Second Schedule list down the various proposed projects that should undergo an EIA study and the proposed project qualifies for an EIA. The Act and the Environmental (Impact Assessment and Audit) Regulations, 2003 require an environmental impact assessment project/study reports prepared and submitted to the National Environment Management Authority (NEMA) for review and eventually licensing before the development commences. This was necessary as many forms of developmental activities cause damage to the environment and hence the greatest challenge today is to maintain sustainable development without interfering with the environment. The Act also lists the type of projects, which must be subjected to the EIA process and establishes NEMA. *In compliance, the proponent appointed experts to conduct the EIA study report to seek approval of the proposed project.*

The Environment (Impact Assessment and Audit) Regulations, 2003

The Regulations are entrenched under section 147 of the EMCA, 1999 of the laws of Kenya. The regulations provide the framework for carrying out EIAs and EAs in Kenya. The Regulation provide for fees, guidelines, rules, standards and administration procedures in the EIA/EA process. The Regulations' later amendment made significant changes regarding fees payable, various timings and modified the Second Schedule of EMCA, 1999. The amendments revised the fees payable and categorised the projects (under) Second Schedule) into low risk, medium risk and high risk. Currently, there are no fees payable to NEMA. *This EIA study report is conducted in conformity with these regulations and EMCA, 1999.*

The Environmental Management and Co-ordination (Water Quality) Regulations, 2006

The main objective of the Regulations is pollution control on water including surface and ground water. The regulations provide guidelines for water supply, abstraction, monitoring, authorization/permits and also wastewater treatment and discharge to the environment.

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. 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.

These regulations set the standards of domestic water and waste water. The regulations are meant for pollution control and prevention and provides for protection of water sources. *The proposed project*

will connect to the area water supply network. Waste water shall be to a proposed wastewater treatment system; and the proponent shall take appropriate measures as provided in the regulations. The sewerage system in particular must be sound to prevent leaks and blockages. There is no surface water body in the immediate environs, and the proponent shall take appropriate measures as provided in the regulations. A standard and adequate wastewater treatment system shall cater for the wastewater and shall be strictly monitored for effectiveness and efficiency.

Environmental Management and Co-ordination (Waste Management) Regulations 2006

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 wastes streams, the regulations emphasis the adoption of cleaner production technologies to achieve wastes minimization.

These regulations define the responsibilities of waste generators and define the duties and requirements for transportation and disposal of waste. The Regulations are meant for pollution control from waste, provide for sound waste management including disposal and the necessary authorization/permit. It provides for mitigation of pollution and provides for hazardous and toxic wastes. The regulations require a waste generator to dispose waste only to a designated waste receptacle.

The proponent shall adhere to the regulations and proposes to contract a NEMA registered waste transporter.

Environmental Management and Coordination (Noise and Excessive Vibrations Pollution) (Control) Regulations, 2009.

The noise and excessive vibrations regulations require that noise and excessive vibrations should be minimized to the largest extent possible ant that this should not exceed particular decibels.

To minimize the impacts of noise and vibrations from the proposed activities, the activities will be limited to working hours between, 8.00 am and 5.00 pm. All possible care will be undertaken to ensure that the machinery are properly greased and oiled to reduce friction and possible noise emission. The proponent shall strictly adhere to the provisions and requirements of these Regulations.

National Environmental Action Plan (NEAP)

According to NEAP, 1994 the Government recognized the negative impacts on ecosystems emanating from development programmes that disregarded environmental sustainability. Established in 1990, the plan's effort was to integrate environmental considerations into the country's economic and social development. Under the NEAP process EIA was introduced.

The world commission on environment and development–The Brundtland Commission of (1987)

The Brundtland Commission addresses the environmental aspects of development. It has emphasized on sustainable development that produces no lasting damage to the biosphere and to particular ecosystems. In addition to environmental sustainability is the economic and social sustainability.

Economic sustainable development is development for which progress towards environmental and social sustainability occurs within available financial resource. *The proponent is committed to adhere to the proposed EMP to ensure environmental enhancement and this would first be monitored through the initial environmental audit.*

National Policy on Water Resources Management and Development

It enhances a systematic development of water facilities in all sectors for the promotion of the country's socio-economic progress, and also recognizes the by-products of these processes as wastewater. It calls for development of appropriate sanitation systems to protect people's health and water resources from pollution. *The proponent shall provide a suitable wastewater treatment system appropriately planned, designed and constructed to the standards. The pre-treated effluent shall be discharged to the existing sewer.*

Occupational Safety and Health Act, 2007

The Act is a repeal of the Factories and Other Places of Work Act. The Act makes provision for the health, safety and welfare of persons employed in factories and other places of work. The provisions require that all practicable measures be taken to protect persons in places of work from dust, fumes or impurities originating from any process within the workplace. The provisions of the Act are also relevant to the management of hazardous and non-hazardous wastes, which may arise at a project site. The Act provides for all necessary safety precautions to ensure the health and safety of workers.

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.

The Act further requires all workplaces to have stocked first aid boxes under the charge of trained first aid attendants.

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 premises 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.
The proponent has appointed a reputable contractor who will be responsible in enforcing the requirements during subsequent repairs and maintenance. Appropriate PPEs shall be provided and all the provision of the Act shall be adhered to including training.

The Physical Planning Act, Cap 286

This is the principle Act governing land planning and the project proponent is required to acquire a Certifiate of Compliance or approval letter from the relevant institutions as set out in the Act. The sole objective of the Act is to harmonize deveolopment.

The Act gives provision for the development of local physical development plans for guiding and coordinating development of infrastructure facilities and services within the area of authority of County government, and for specific control of the use and development of land.

The Act gives county governments 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 application and grant development permissions as well as to ensure the proper execution and implications of approved physical Development plans.

The Act requires that any person who carries out development without development permission shall be guilty of an offence and the development shall be invalid. The Act also gives the County Government 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 government will restore the land and recover the cost incurred thereto from the developer. To further enforce, the Act demands 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 County Government.

The Act state that if in connection with development application a County Government 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 spelt out by EMCA, 1999.

The Act further states that if the County Government finds out that the development activity is not complying to all laid down regulations, the County Government may serve as enforcement notice specifying the conditions of the development permissions alleged to have been contravened and compel the developer to restore the land to it's original conditions. The sole objective of the Act is to harmonize deveolopment.

The proposed project site is within an area zoned for industrial use and thus compliant.. *The relevant approvals regarding the act shall be acqired.*

County Government Act, 2012

The Act was a repeal of The Local Government Act in conformity with the new constitutional dispensation. The Act empowers County Governments to make by-laws in respect of suppression of nuisances, imposing fees for any license or permit issued in respect of trade or charges for any services. County Governments are given power to control or prohibit all developments which, by reason of smoke, fumes, chemicals, gases, dust, smell, noise, vibration or other cause, may be or become a source of danger, discomfort or annoyance to the neighbourhood, and to prescribe the conditions subject to which such developments shall be carried on.

In compliance, EIA Study report has proposed potential mitigation measures (in the EMP and monitoring plan; and the environmental management Framework in the report.

Public Health Act, Cap 242

The Public Health Act provides for the securing and maintaining of public health. Part IX Section 115 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. The Act requires County Governments to take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or conditions that are injurious or dangerous to human health.

The Act demands the adoption of practicable measures to prevent injurious and unhealthy conditions in the site. The Act requires the proponent to enhance effective management of Nuisances i.e. noxious matter or wastewater as will be discharged from the proposed project throughout the project cycle. To achieve this, systems on the management of both solid and liquid waste (effluent) will be adopted as proposed in the report. *For instance, the effluent will be discharged into the proposed wastewater treatment system. The solid waste shall be handled by a professional garbage collector on regular basis and disposed appropriately as per the waste regulations. Sanitary facilities shall be in conformity with MOH standards and installation of standard fittings. All policy and regulations requirements shall be adhered to and we shall implement measures to safeguard public health and safety during the demolition, construction, operation and decommissioning phases of the project***.** To achieve compliance, systems on the management of both solid and liquid waste (effluent) will be adopted as proposed in the report with, *the effluent will be pre-treated to meet set standards before being discharged into the sewer. The solid waste shall be handled by a professional garbage collector on regular basis and disposed appropriately as per the waste regulations. Sanitary facilities shall be in conformity with MOH standards and installation of standard fittings.*

The Water Act, 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; to repeal the Water Act (Cap. 372) and certain other provisions.

The Act provides for national monitoring and information systems on water resources allows the Water Resources Authority to demand from any person, specified information, documents samples or materials on water resources. Under these rules, specific records may be required to be kept and the information thereof and furnished to the authority on demand.

The Act requires a permit to be obtained for among others any use of water from water resources, discharge of a pollutant into any water resources. According to the same Act, application for such a permit shall be subject to public consultation as well as an environmental impact assessment as per the Environmental Management and Co-ordination Act, 1999. The conditions of the permit may also be varied if the authority feels that the water so used is causing deterioration of water quality of causing shortage of water for other purposes that the authority may consider has priority.

Under the Act, no person shall discharge any trade effluent from any trade premises into sewers of a licensee without the consent of the licenses upon application indicating the nature and composition

of the effluent, maximum quantity anticipated, flow rate of the effluent and any other information deemed necessary. The consent shall be issued on conditions including the payments rates for the discharge as may be provided under the Act.

The Act provides for national monitoring and information systems on water resources and also allows a person with license (licensee) to supply water to make regulations for purposes of protecting against degradation of water sources. The Act allows the licensee (water and sewerage company) to construct and maintain drains, sewers and other works for intercepting, treating or disposing of any foul water arising or flowing upon land for preventing pollution of water sources within his/her jurisdiction. *The proponent shall connect to the local area water supply network while the wastewater shall be directed to the proposed wastewater treatment system for treatment to the set quality standards before discharge to the environment under strict monitoring.*

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 as affliction on his/her health to toxic materials in the premises.
We will ensure that health and safety management is of high priority during the construction and operational phase of the project. The site will also be fenced off to prevent unauthorized access by members of the public while appropriate and suitable construction materials, finishes and raw materials shall be used to ensure safety and health.

STAKEHOLDER ENGAGEMENT / CONSULTATION & PUBLIC PARTICIPATION

This is a very important and an integral part of the EIA process, which is a legal requirement and a very important tool for collection of the data and especially the baseline/background information. The SIA helps bring out the contentious issues and gives a chance to those who may be affected by a proposed project to give their views.

The key target respondents included among others the neighbours and individuals who would directly or indirectly be affected by the implementation of the proposed project. The geographical scope targeted stakeholders within potential impact and approximately 1km radius. The target groups include persons working and living in the vicinity of the proposed project area, those sharing same infrastructure and services, various relevant public offices, administration, opinion leaders, business community, community based organizations and the local individuals. Printed and signed Notice of public meeting for the proposed project were distributed and conspicuously displayed widely to all Project affected Persons and stakeholders inviting them to the meeting for their comments/opinions/views regarding the proposed project. The public meeting notice had a project brief of the proposed project and specified the venue, date and time of the public meeting.

The public meeting was conducted on 19th day of June 2021 which was attended by various individuals including one Mr. Wilfred Murigi who is an environmental expert and invited by the

proponent to shed more light to the residents/stakeholders. The original minutes and the attendance list of the meeting are attached in the annex.

The meeting was held in the midst of the ravaging third wave of the Covid-19. However, all the MOH guidelines and restrictions issued by the government were adhered to.

While the majority of the respondents had no objection to the proposed project, some of the respondents raised objections to the proposed project particularly those representing Broadways and Kenblest with special reference to the issue of potential air pollution.

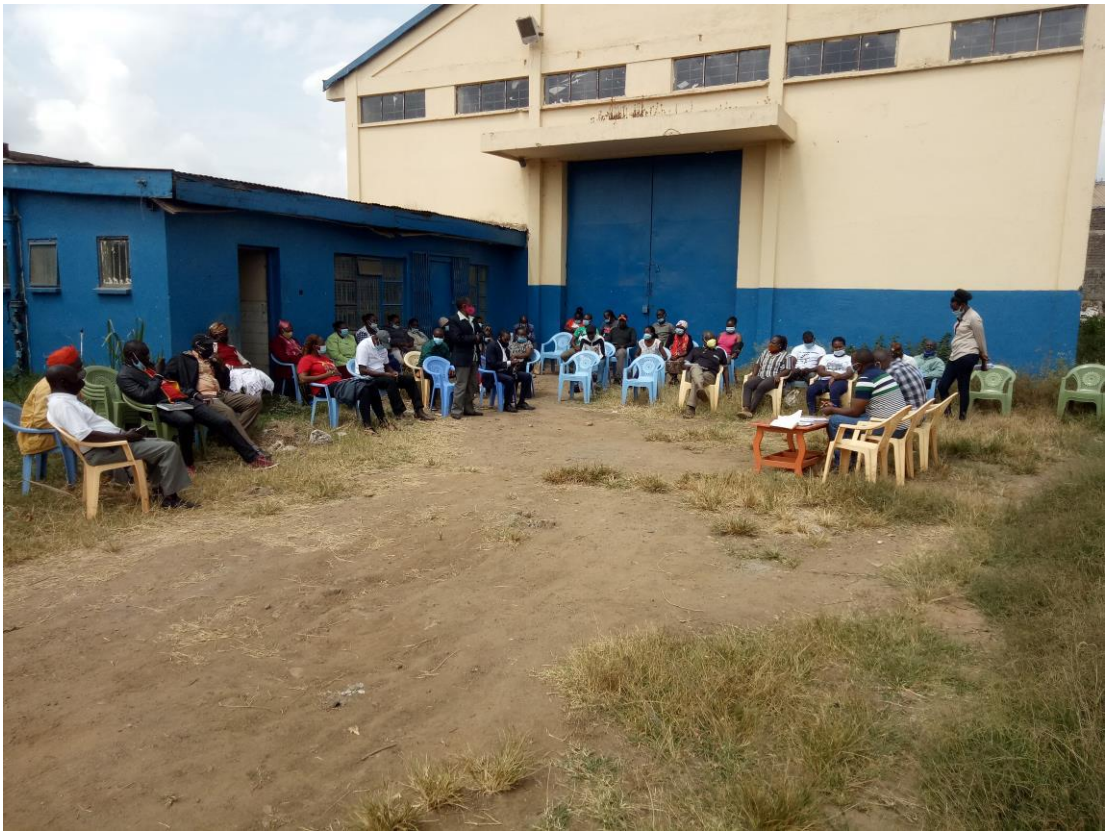
In summary, over 80% of the participants welcomed the project because of the various advantages associated with such project but also indicated of the need the relevant agencies to ensure everyone enjoys a clean environment and the government to look into infrastructure including roads, water, electricity, sewer, and surface runoff. Respondents indicated the need to protect the area residents from various potential forms of pollution such as offensive odours associated with tanneries in other areas, wastewater and solid waste management challenges. Reported potential advantages include market for the skins and hides from the slaughterhouses, leather production, increase in business to those running businesses around the proposed site, increased security and employment but some indicated that the potential benefits will only accrue to the proponent and the trickledown effect to them is negligible. Some decried the lack of employment opportunities to the local community by the industrial ventures already existing.

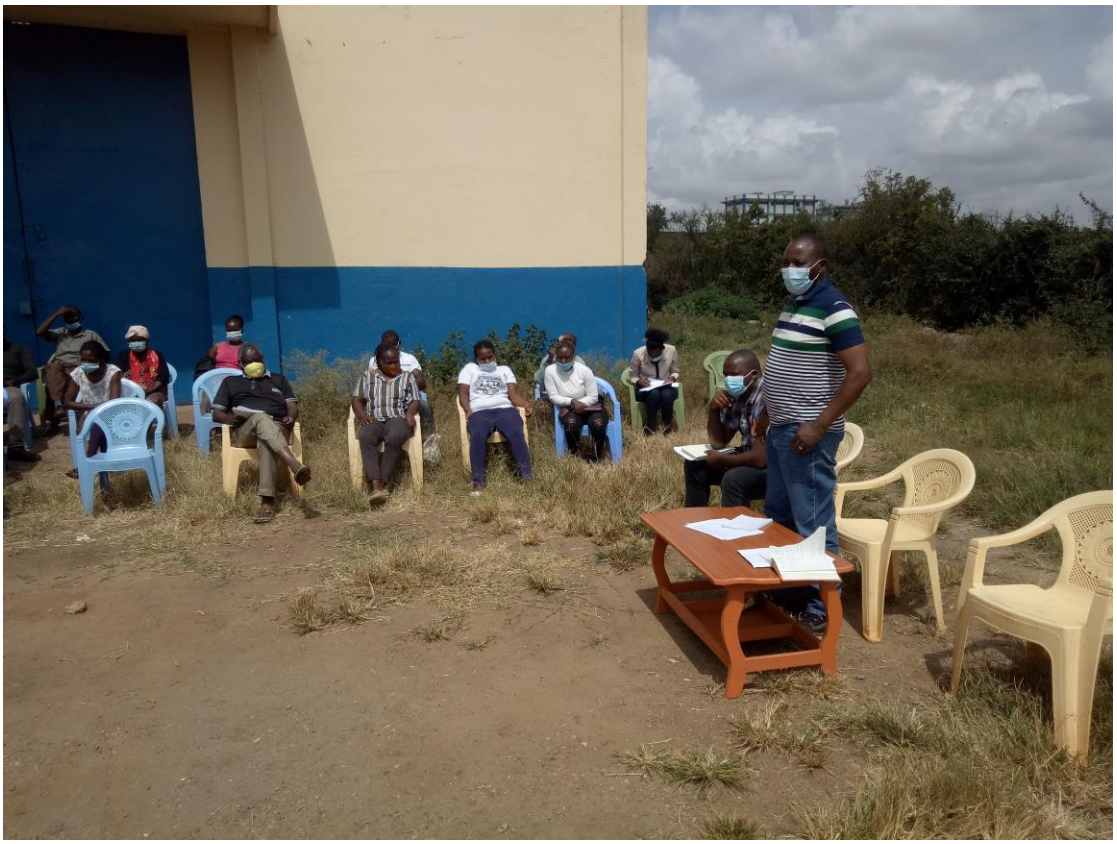
Going by simple majority rule, those who want the proposed project to proceed carried the day though it is only fair and inclusive to mention that a few representing some organizations raised an objection (as mentioned above) while a few also were indifferent. As mentioned in the meeting, ALL shall have an opportunity to peruse/review through the EIA Study Report and make comments after report submission.

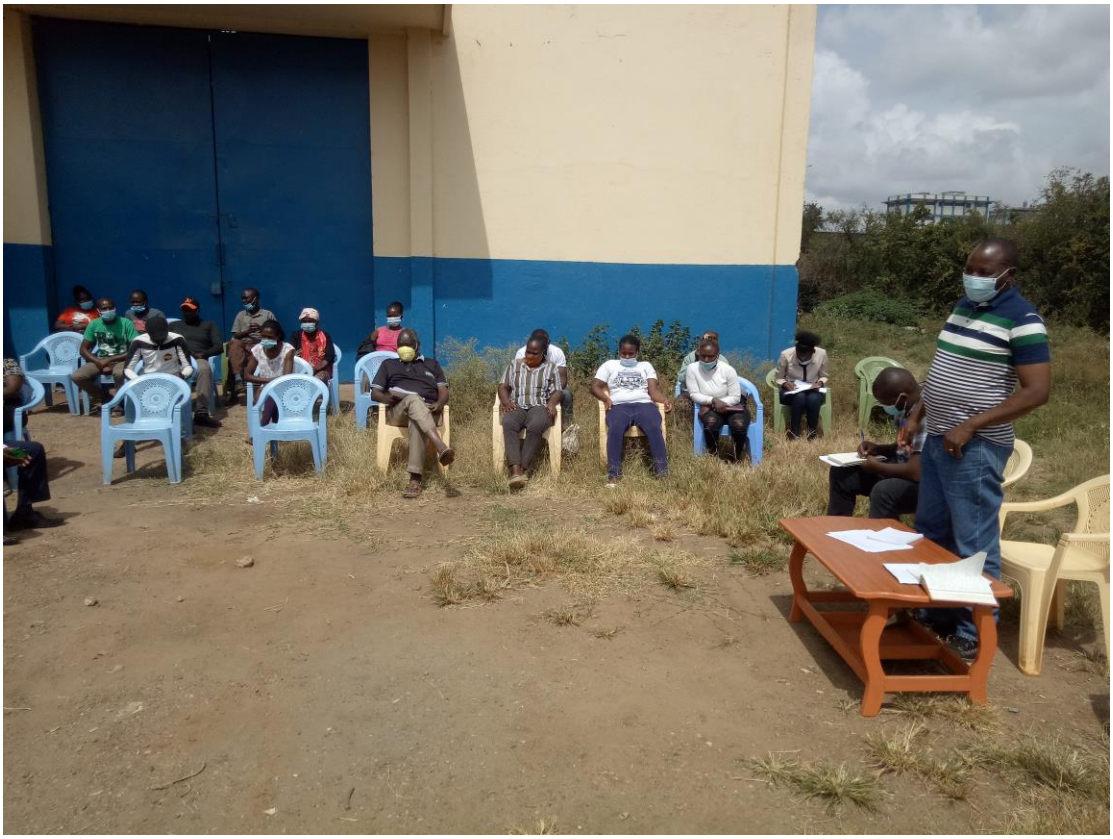
Consultation and public participation is very important and thus all parties and stakeholders must be heard and their opinions and views taken into consideration in decision making. Where there are objections like in this case, the reasons must be stated and a decision reached based on the weight of the reasons, their nature and if they are mitigatable or not among other factors. In our objective opinion, historical pollution by tanneries does not wholesomely warrant denial of a new proposed project such as this one which is in support of the sitting president's four agenda – industrialization UNLESS the extreme negative impacts are not adequately mitigatable and/or further if there are sites or functions with cultural importance or sensitivity which is not the case here. On the same note, it is good we remind ourselves that any change in ambient air quality, whether pleasant or unpleasant, constitute air pollution. At this point in time and era, there are various new technologies and equipment that can be adopted to prevent and/or manage the adverse mentioned potential environmental impacts (particularly potential offensive odour) and no one rational person would want to invest and waste resources that will be later stopped for non-compliance with prevailing set standards, legislation and Regulations. For success, monitoring is key.
For amicable and long term solutions, there is urgent need for cooperation of the area residents, all stakeholders, all relevant government agencies the CGK and other service providers. We need to appreciate that environmental problems are accumulative and contributory by every actor and therefore everyone has responsibility for environmental enhancement.

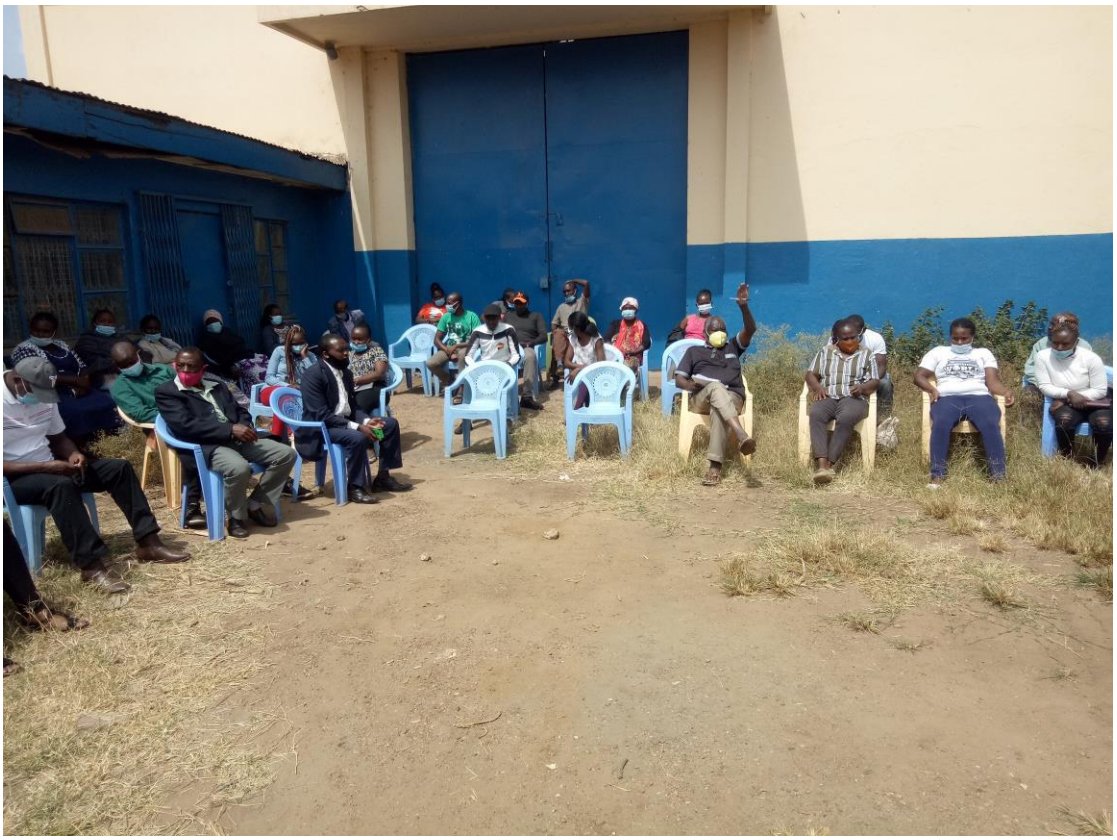
It is important to remember that the stakeholder engagement does not end at the point of the meeting. As per the legal provisions, the public is given another opportunity through mass media (Kenya Gazette, two daily newspapers and radio) which shall call upon any stakeholder to submit to the Authority any comments or opinion thus the window is still open for anyone who missed the initial phase. Further, any unforeseen or unanticipated matters arising may also be addressed as the project progress during monitoring.

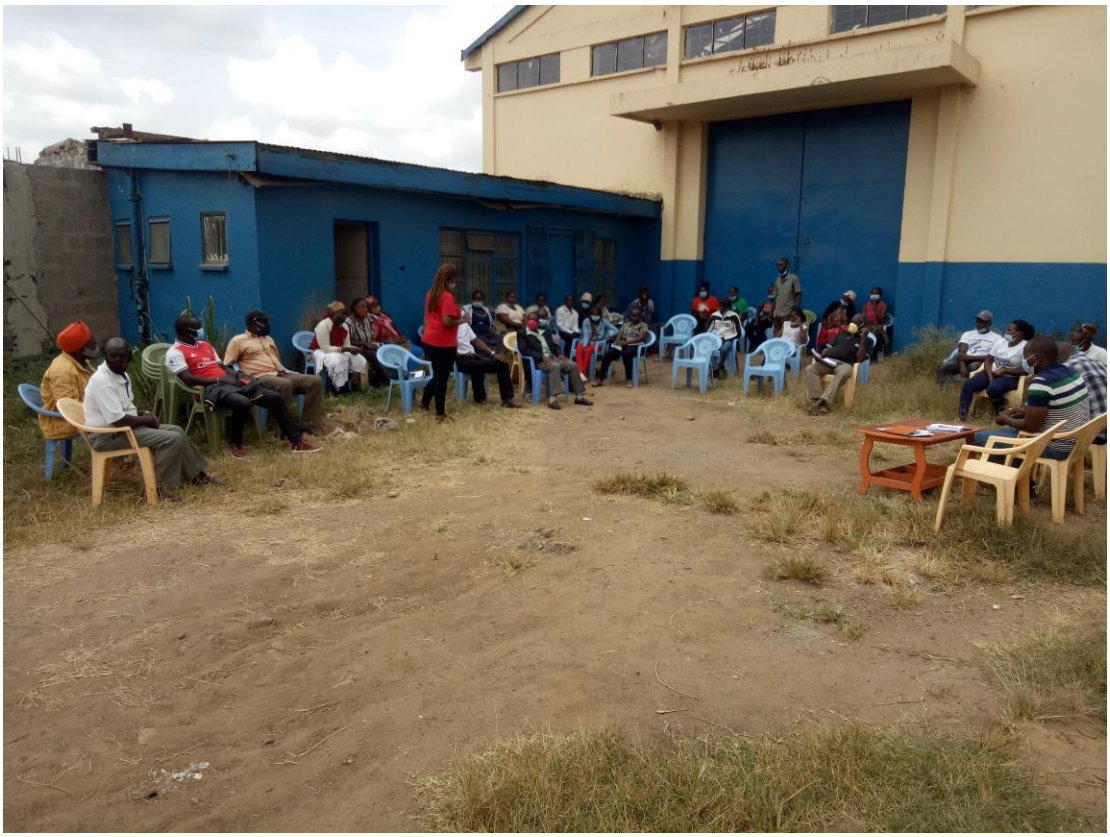
Some of the photos taken during the consultative meeting held on 19/06/2021

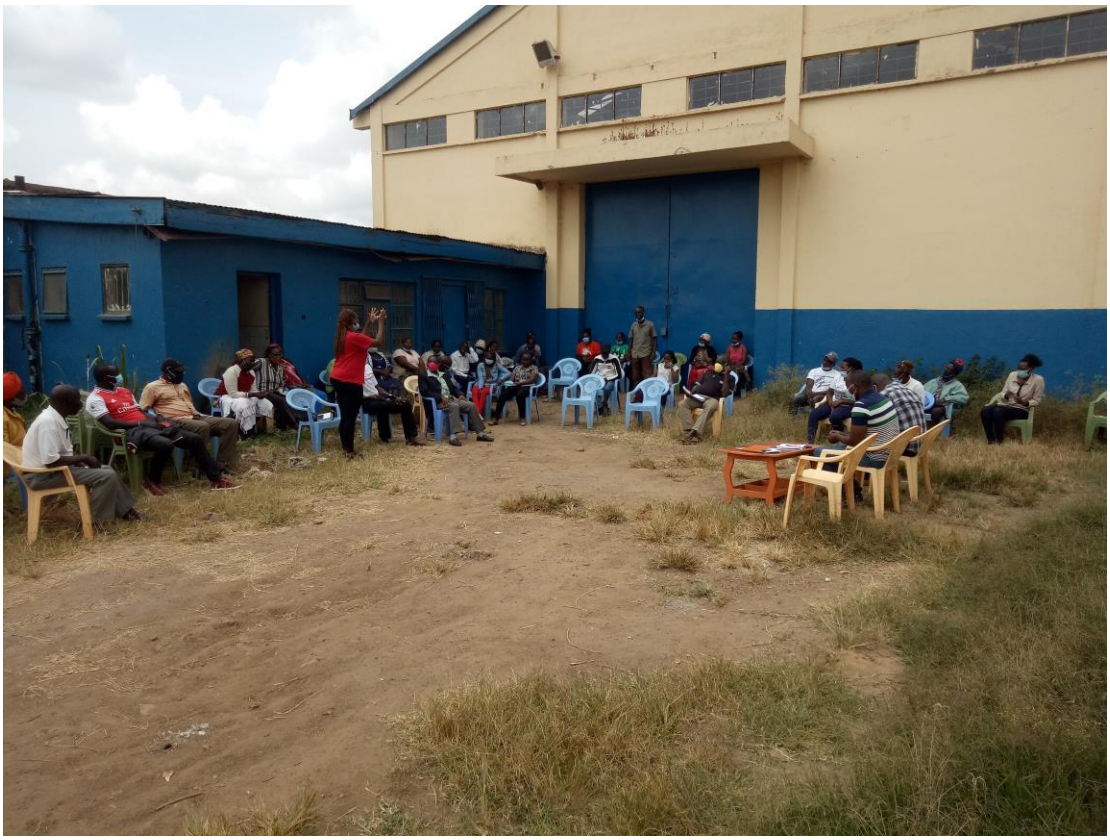


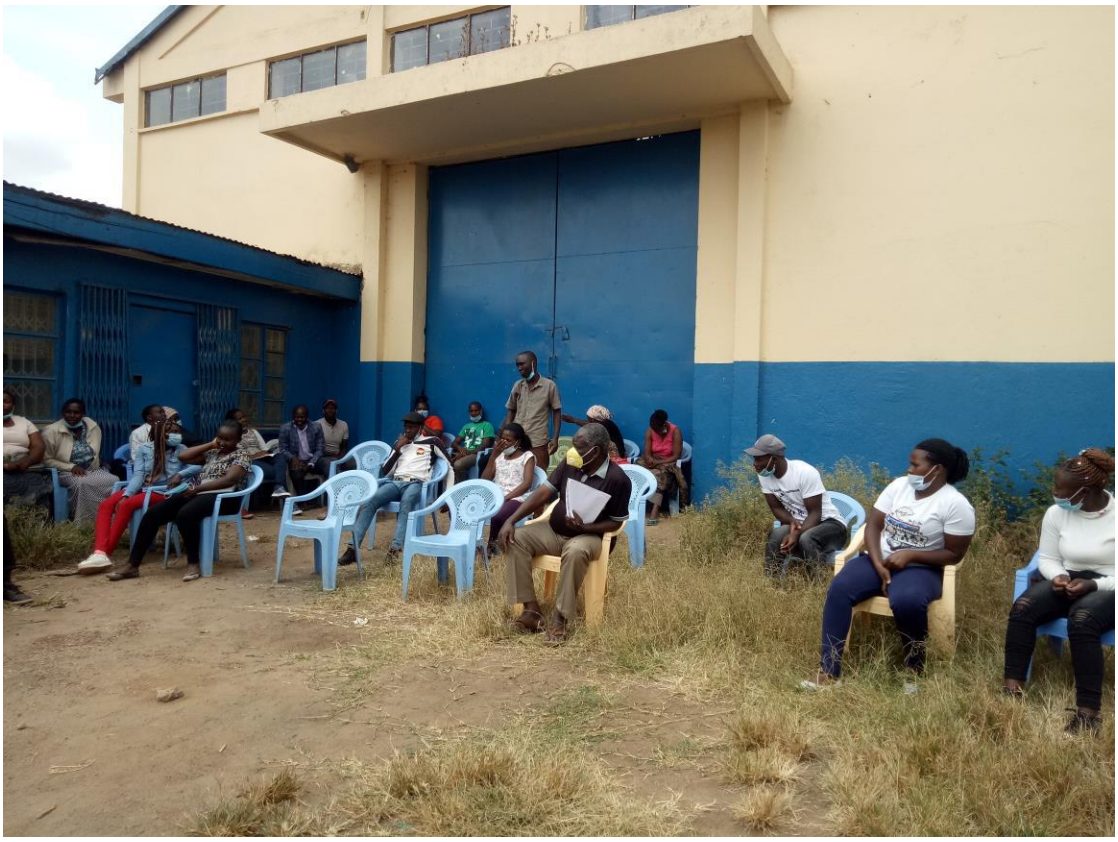


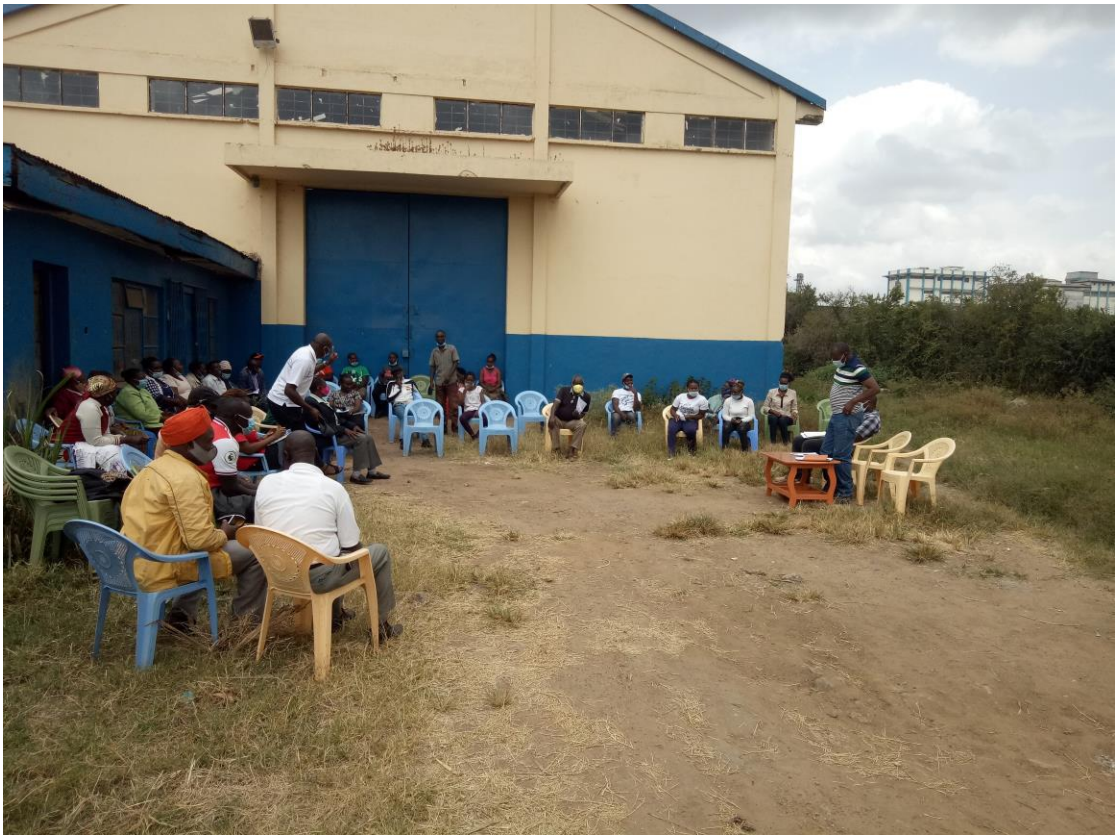


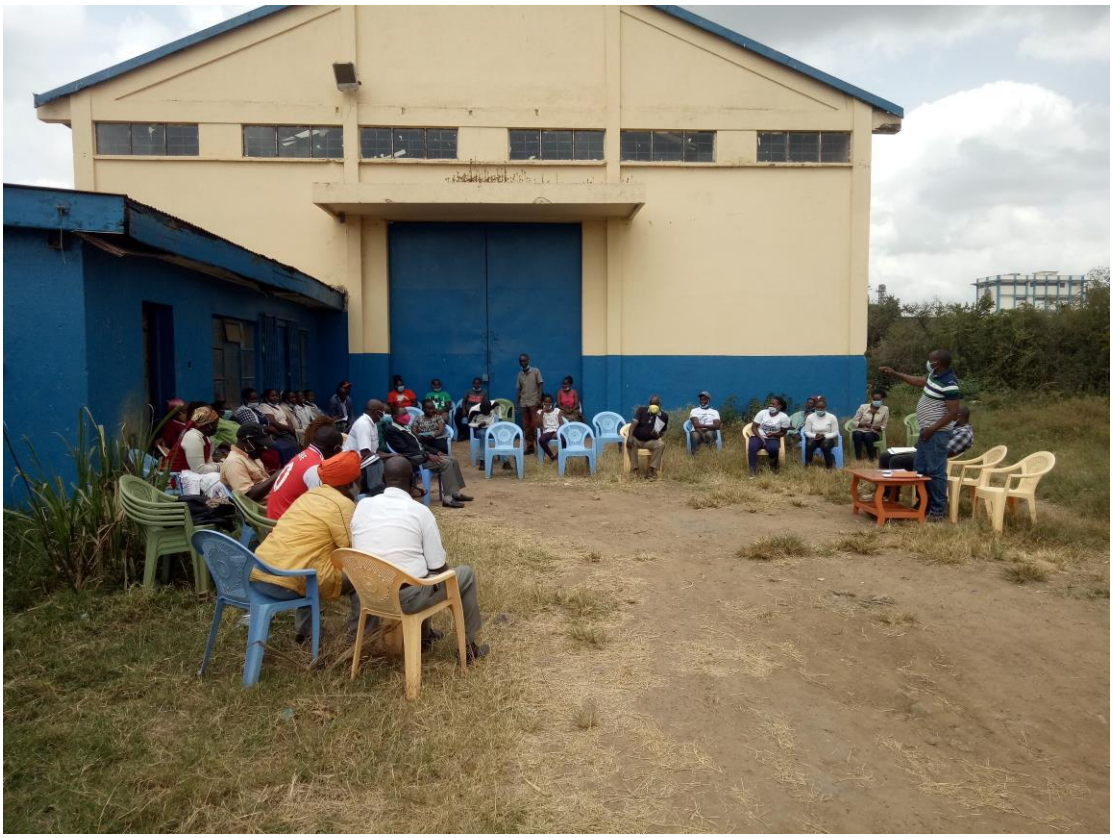


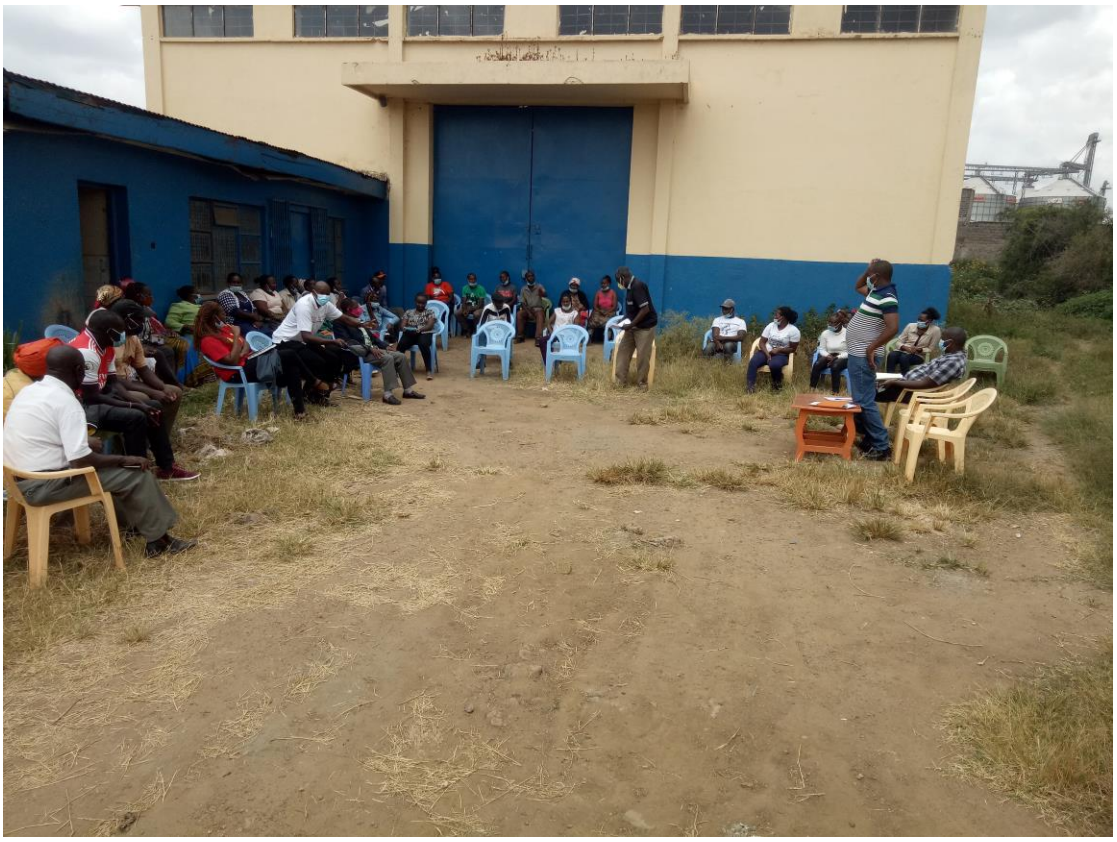


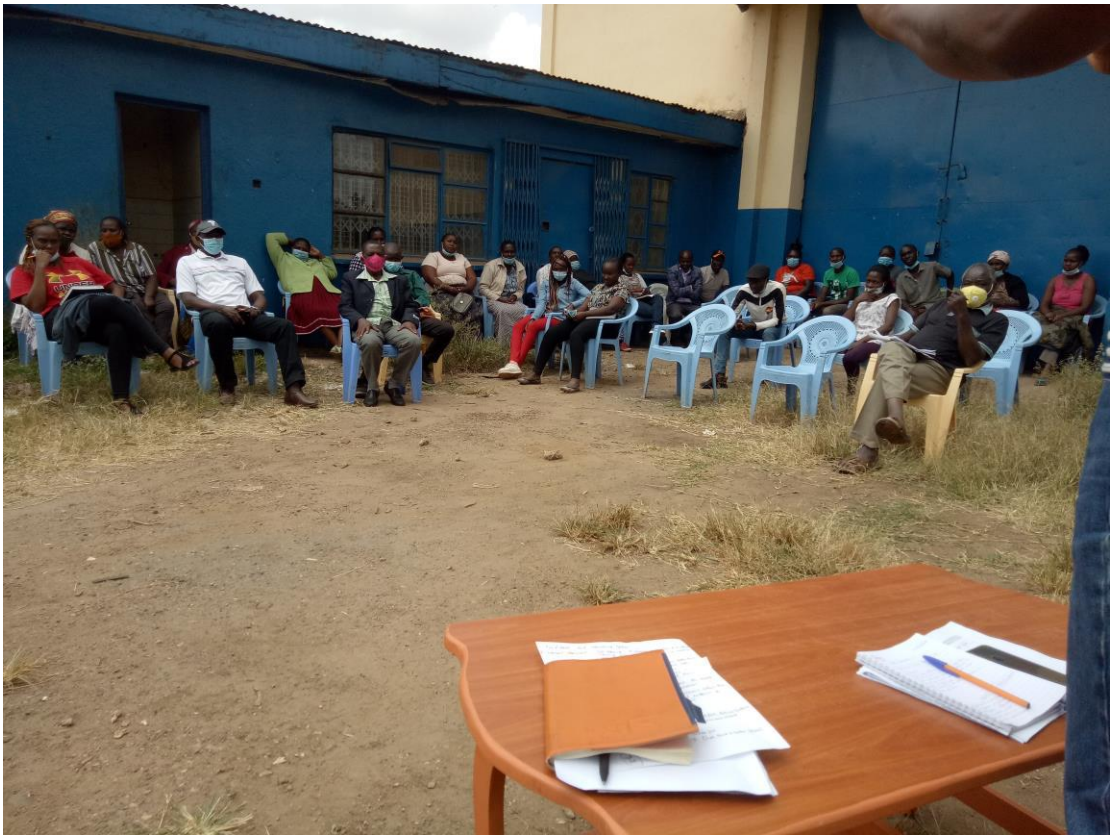


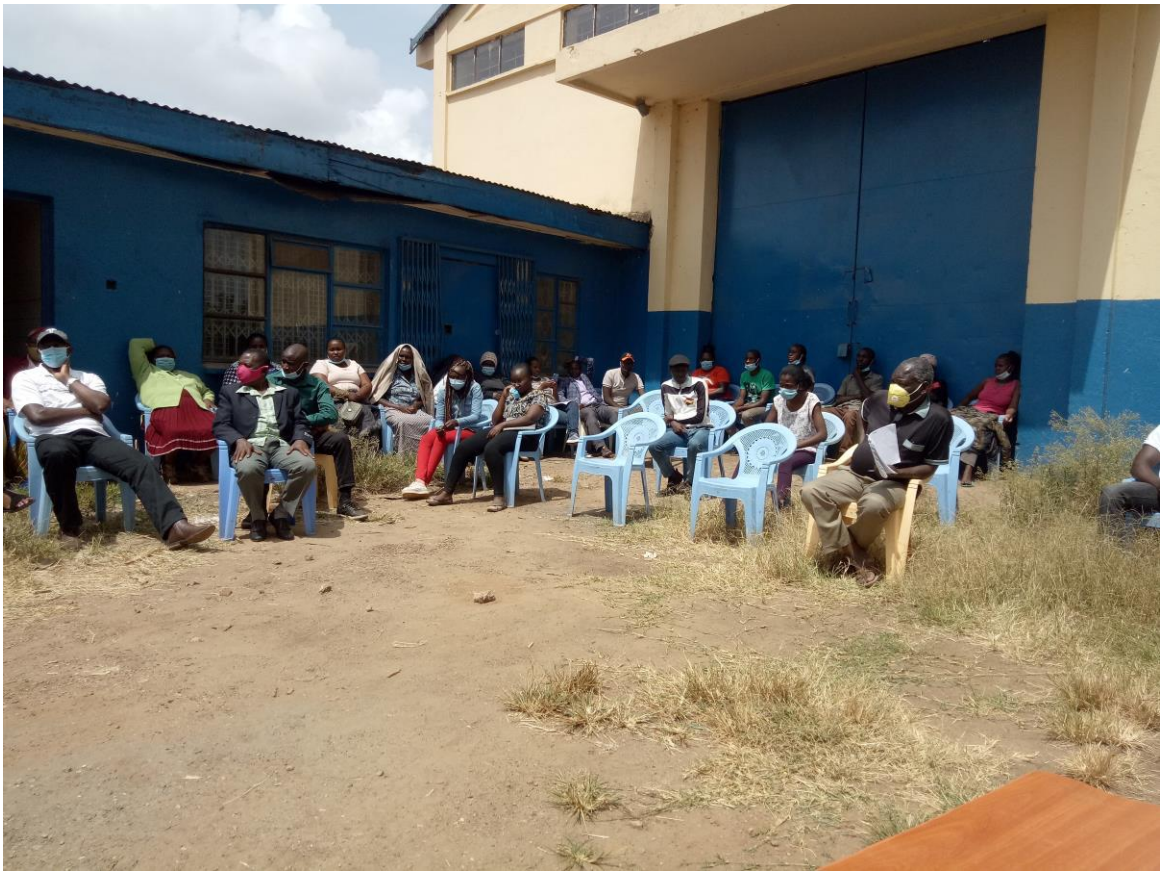












Source: The proponent as obtained from an amateur camera-man in attendance

PROPOSED PROJECT LOCATION, DESCRIPTION, AND ACTIVITIES

NATURE, DESIGN AND DESCRIPTION OF THE PROPOSED PROJECT

The proposed project involves setting up and subsequent operation of a leather tannery on an existing godown. The project is unique in the area. The site is very ideal for the proposed project since it is near the slaughterhouses, which are the suppliers of the major raw material for the tannery - the skins and hides. Tanning may be defined as the treatment of skin for preservation.

Schematic diagram/flow of the tanning process

Raw hides/skins
↓
Soaking
↓
Unhairing/liming
↓
Lime fleshing
↓
Lime splitting
Trimming
↓
Deliming
Bating
↓
Degreasing
(sheep-pigskins)
↓
Pickling
Tanning
↓
Chrome splitting
↓
Shaving
↓
Retanning
Breaching and dyeying
Fat liquoring
↓
Drying
↓
Batting
Trimming
↓
Leather

Modified schematic diagram indicating type of pollutants during the tanning process (UNEP, 1994)

Leather processing starts at the point where the animal is skinned or the collection points whereby salt is applied on the flesh side of the skin/hide. On arrival at the tannery, skin trimming is dome to remove unwanted parts. Skins and hides are made flaccid by soaking them in water. After soaking, hair is removed with the help of lime which is used to make hair loose. Unwanted flesh is removed with the help of machines of fleshing machines after liming process. To prepare limed skin for tanning, the skins are delimed mainly using Ammonium Sulphate and then skins are washed. Bating is done for further purification of skins and hides. Thereafter, degreasing is done with the help of detergents. Tanning process starts with pickling which is the treatment of skin with acids and salts to bring it to desired level of pH. Tanning process stabilize the collagen network of the skin. Chrome tanning is the most common used in many tanneries where chromium sulphate is used as the tanning agent.

After tanning, the hair side of the skins are shaved to give the desired thickness. In order to give desired softness, colour and strength and quality to the leather, skins are processed further through wet finishing process. Fat liquoring process is carried out to impart desired softness and dyeing is done to give it a colour. After wet process different drying processes are carried out to dry the processed leather.

Various chemicals are used for the entire process. The chemicals can be categorized into three: pre-tanning chemicals; tanning chemicals and post tanning (finishing) chemicals. Pre-tanning chemicals are used to clean and prepare skins for tanning and are mostly washed away with wastewater. Tanning chemicals react with collagen fibres of the skin to convert them into leather. Most of these chemicals are retained in the skin but some are still washed away with wastewater. Chrome Sulphate is the basic tanning chemical and unfortunately is also a major environmental pollutant. Finishing chemicals are used to impart certain attributes to the leather such as colour, softness etc.

The main chemicals used include sodium sulphite and basic chromium sulphate including non-ionic wetting agents, bactericides, soda ash, CaO, ammonium sulphide, ammonium chloride and enzymes. Others are sodium bisulphate, sodium chlorite, NaCl, H2SO4, formic acid, sodium formate, sodium bicarbonate, vegetable tannins, syntans, resins, polyurethane, dyes, fat emulsifiers, pigments, binders, waxes, lacquers and formaldehyde. Various types of processes and finishing solvents and auxiliaries are used, as well

Since the godown is already existing, there will be no construction save for installation of various equipment and machinery as may be required for the tannery operations.

The tannery will consist of the following main elements:

- The godown and other structures (where need be and as within the terms and conditions of the lease) – to house the tannery plant and equipment;
- Sanitary conveniences for both gents and ladies;
- Receiving, preparation and Production areas;
- Chemical storage area
- Fire extinguishers and related facilities;
- Loading spaces;
- Administrative/management and operations offices.
- Wastewater treatment plant/system
- Solid waste collection and temporary area

The buildings and structures shall be fitted with appropriate extractors for ventilation and air supply. The buildings and structures shall have a filtered mechanical ventilation system to augment natural ventilation.

The proposed project shall involve installation of state-of-the-art machinery and installation of relevant auxiliary services and facilities. The need for installation of state-of-the-art plant and equipment is informed by knowledge that in any industry, control of the market cannot be expected just by possession of an industrial process but rather the prize goes to the most efficient producer: the one that operates an energy-efficient workflow, processing great quantities of raw materials, producing finished materials within tightly controlled specifications at the lowest cost. Adding to the already intense pressure on primary producers to minimize production costs are two further factors:

- The growing availability of alternative materials and technologies for many applications;
- The development of an extensive and technically advanced technology for production of useful products from skins and hides and other wastes. Remember that skins and hides are 'wastes' to the slaughter house.

Design standards to be used for the proposed industrial facility

From the outset, the new facility will be designed to meet international standards and will comply with the full requirements of local and international regulations.

The design standards shall include appropriate equipment design and operation to protect the environment through the application of "Best Available Techniques" (BAT). This means that emissions to air, water and land, plus a range of other environmental impacts must be considered together. Operators have to assess emissions to all environmental media in the design of the whole plant using "clean technology" rather than relying on "end-of-pipe" techniques.

PROPOSED LOCATION OF THE PROJECT

The proposed project site is Land Reference Number 4953/633 in Thika Industrial area, Kiambu County. GPS coordinates are -1.048005, 37.101090 and in UTM the defining coordinates are 37M 288696, 9884099 at an elevation of approximately 1832m ASL. *See sketch plan of the proposed project location (not to scale) attached in the annexed.*

SITE OWNERSHIP AND ZONING

The proposed project site (L.R No. 4953/633) is in the name of Kenya National Trading Corporation who has leased out the building (godown) to the proponent *(refer to the copy of the lease and title deed).* Mr Solomon Muriithi teamed up with other interested investors to form a company as the investment vehicle for the proposed project. The area was agricultural in the past but the numerous subdivisions of land into subplots for industrial purposes is the trend due to demand for the same in an effort to make the best and highest use of the land.

PROJECT BUDGET

According to the proponent, the installation of the machinery and equipment is estimated to cost approximately kshs **Twenty Million (Kshs 20, 000,000)** and is estimated to take approximately six (6) calendar months to complete.

ACTIVITIES DURING OPERATION PHASE

The activities to be conducted in the proposed project's operation phase are processing of skins and hides into leather (tanning). Other support services include general maintenance and cleaning of the premises and laundry. The proposed activities shall definitely generate some liquid and solid waste. Liquid waste shall include wastewater from the tanning process, sanitary facilities and general cleaning activities among others. These wastes shall be handled as recommended in mitigation measures in handling wastes.

ACTIVITIES DURING DECOMMISSIONING PHASE

Quality and standard projects (buildings) of this nature have a lifespan of between 50 and 100 years which is much dependent on the maintenance quality. This is long period of time and there may be many changes which may not be foreseeable including the technological and legal aspects. The decommissioning may also come earlier than the lifespan of the buildings again due to various reasons like change in physical planning policy or the discovery/realization of a more optimal use of the land. It is therefore recommended that an EIA be conducted when the time for decommissioning comes so that all aspects will be looked at against the prevailing conditions and requirements. However, the purpose of decommissioning is mainly to rehabilitate the project site to an acceptable standard and all efforts should be geared to making the site as close as possible to its original state before the project was implemented.

The decommissioning will in brief involve demolitions of the structures, removal of debris and landscaping. The other social implications involve the laying off workers who may be employed thus will loose their income, issues of safety and health etc. due to the fact that nobody knows the future, it is highly recommended that an EIA be prepared when the time comes since quit may come earlier or later due to the vagaries of weather, human behavior and policy changes among other factors and quantification and accurate prediction of the likely potential impacts is quite difficult. In view of the foregoing and in line with the principles of sound environmental management, it is paramount that the appropriate controls and procedures be put in place at the design, implementation and operational phases of the proposed project to control environmental degradation as this is the only way of simplifying the decommissioning. These measures are recommended elsewhere in the report and in the EMP.

Decommissioning of the tannery may also come earlier than that of the building since just as it has been existing, the proponent or the land landlord may exercise the option to discontinue the lease. The proponent may also identify an alternative site and decide to relocate. In the event of decommissioning the tannery, an EIA should be conducted.

PRODUCTS, BY-PRODUCTS AND WASTES

The final product from the proposed project shall be the leather for various other uses such as shoes, clothing etc offsite. There will be no by-products but wastes shall be diverse. Wastes are well covered in the impacts and mitigation chapter herein after, All wastes shall be disposed off appropriately as discussed in mitigation measures elsewhere in this report.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

The proposed Alternative

The EIA Study report has been prepared for submission to NEMA; facts, findings and recommendations/proposals of which are based on the proposed site, design, materials and proposed technologies. This helps in evaluating and examining the foreseeable effects of the project on the environment and therefore assisting in addressing how the proposed development has to ensure that all environmental measures are complied with during the premises preparation and during operational phase.

The alternative consists of the proponent's/applicant's final proposal with the inclusion of the legal guidelines, regulations and procedures as stipulated in the EMCA, 1999 which aims at reducing environmental impacts to the maximum extent practicable. Appropriate Environmental Management

Relocation alternative

Relocation option to a different site is an option for the project implementation. At the moment, the proponent has no alternative sites for relocation. Finding and acquiring land to accommodate the scale, type and size of the project and completing official transaction on it may take a long period. Besides, there is no guarantee that such land would be available and suitability is another very important factor, which cannot be ignored. The land may also be available elsewhere but there could be challenges regarding raw material sourcing, market and also the basic required infrastructure and services.

Although monetary costs should not be used to justify a wrong project, this would also call extra costs in terms of money and time for example whatever has been done and paid to date would be a direct loss to the proponent. This may also lead to a No Action Alternative situation. The other consequence is that it would discourage both foreign and local investors especially in the industrial sector which still lagging behind in a country that needs to industrialize very fast for development. In consideration of the above concerns and assessment of the current proposed site, relocation of the project is not a very viable option and may not be recommended. The problem is further aggravated by the fixed characteristics of land and the bottlenecks of the planning policy for example a plot within the environs outside the area may only be developed with residential units or commercial ventures.

The No Action Alternative

The No Action Alternative in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. The anticipated insignificant environmental impacts resulting from the entire project cycle would not occur.

This option will however, involve several losses both to the project proponent/land owner and other stakeholders; society and Government. The landowner will continue to pay high taxes on the underutilized property. The No Project Option is the least preferred with reasons such that there will be no incremental tannery, forfeiture of economic benefits that would accrue to the proponent, the public and the government, and it could also discourage investors wishing to invest in the industrialization sector.

From the analysis, it becomes apparent that the No Project Alternative is not the appropriate alternative.

Alternative design and technology

Various alternative designs and technology has been evaluated by the proponent and various professionals involved. After extensive discussions and relevant considerations, the various options were assessed and the most optimal design and technology were agreed as per the proposal, materials and technology.

Waste Water Management Alternatives

Alternative one: connection to Municipal sewer system

Connection to the main sewer line will solve the waste water management issue at a very minimal cost and in an environmental efficient manner. However, the load in wastewater from the tannery is too high and should be pre-treated before discharge into the sewer as per the set parameters. This is the preferred alternative since the area has a sewer.

Alternative two**:** lagoon/ponds wastewater treatment plant/system

This involves the construction of either a series of lagoons (ponds) for digestion of microorganisms and subsequent treatment of the waste water. This alternative comes with one main advantage in that the treated water could be used for irrigation either in farmland or the compounds. However, it comes with one disadvantage in that in the case of lagoons, it requires a bigger area of land and requires a lot of monitoring so as to ensure that the waste water is treated to the standards before being released to the environment. Underground concrete-made tanks to store the sludge points like the proposed project is also expensive and time consuming. A bio-digester or a chamber based system is better since it takes much lesser space.

Alternative four**:** Bio-digesters

The use of a bio-digester is also another environmentally friendly alternative since it will "digest" the wastewater and make it useful (recycling). However, many of the available bio-digesters in the past used more energy due to their heavy electric mortars and thus their use was counter-productive in environmental sustainability. However, the systems are improving by the day and there are some such systems which are very effective and efficient and thus quite viable and should be explored if the need arises.

The comparison of alternatives

Under the proposed Development Alternative, the project would create a tannery and would provide employment directly and indirectly to the public. Under the No Action Alternative, there would be no development at all. There would be no benefits from the site and neither would there be the insignificant environmental Impacts.

Provided the Environmental Impact mitigation measures are implemented as well as adoption of sound operational management practices, negative impacts will be avoided /minimized. However, commitments related to development alternative would ensure that potential impacts are minimized to levels of insignificance as envisaged in the EMP.

Mitigation for the proposed Action

Mitigation measures for the proposed action are included in herein after in this report.

POTENTIAL IMPACTS

Positive Impacts

Provision of leather and income generation

Skins and hides have limited use in their raw form. The tanning process produces leather that can be used for various other uses such as in production of shoes, clothing, belts, bags etc which are normally very durable. The proposed project shall also increase cash flows to the proponent and others in the chain.

Optimal utilization of the land

The existing godown (proposed to house the tannery) has been vacant for a long time therefore not of any economic value to the owner but the proposed project shall thus raise the utility of the land.

Employment

The proposed project will provide direct and indirect job opportunities to a significant number of the population during the entire project cycle (all phases) thus reducing the unemployment and in the process provide livelihood.

Land Values

The opening up of the area by the planning policy and the rush for the plots by commercial developers has led to a sharp increase in land values in the area and in the neighborhood due to the potential high returns after development. This has also led to attraction of middle income groups with improved economic status.

Promotion of development

The proposed project has the potential to influence the commercial trends in the area in various ways and in the long run the multiplier effect will lead to development and reduction of poverty. The proposed project shall contribute in overcoming the challenges of today's life including strategies for alleviating poverty and promoting sustainable development.

Increase government revenue

The proposed project shall generate tax revenue for the government directly and indirectly.

Creation of market for goods and services and secondary businesses

The proposed project shall consume various materials. Various professionals have and shall continue giving their services during both the installation and operational phases and thus making livelihoods. Those doing commercial activities in the neighbourhood shall also have their market widened by the workers.

Promotion of social cohesion

The development will bring together people with diverse traditions and culture. It will lead to promotion of cultural interaction.

NEGATIVE IMPACTS AND MITIGATION MEASURES

The ideal strategy to counter identified adverse effects is avoidance but when this is not possible, not possible, alternative strategies of reduction, remediation and compensation should be explored. This can be achieved through primary measures that intrinsically comprise part of the development design; or secondary measures designed to specifically address the remaining (residual) adverse effects of the proposed project. The potential impacts can be greatly reduced and this will be much determined by the technology used, nature of the materials, equipment used and level of diligence among others. The foreseeable impacts identified that may not be completely avoided are addressed here below and potential recommended measures provided. As such, the proposed measures also explore opportunities available for improving the situation wherever possible. The initial design should facilitate a high degree of mitigation, built into the scheme from the onset so that the potential for adverse effects is substantially reduced. If consideration of mitigation measures is left to the later stages of proposed project design, it can result in increased mitigation costs because early opportunities to avoid the need for such measures have been lost. In general, primary mitigation measures are likely to be more effective and less likely to cause secondary adverse effects (i.e. the mitigation measures themselves may in turn cause adverse effects.

Increased water demand

The importance of water can never be overemphasized and in fact, is increasingly becoming a very hot issue due to the dwindling amounts and the ever increasing demand in several cases culminating to being source of fights amongst communities/users. The proposed development may cause a major strain to the existing water supply since tanning process is known to be heavy water consumers and the increase in population proportionately increases water demand thus direct impact to the water supply.

Mitigation

- Avoid wastage of the water. Approvals for water supply and use should be sought from the relevant authorities.
- Roof catchments should be provided with rainwater harvesting systems (gutters, down pipes and water storage facilities) to enhance collection and storage of the run-off.
- Sensitize all stakeholders on means and need to conserve water resource. Water conserving taps should be installed that turn-off automatically when water is not in use. They should be encouraged on water reuse/recycling during entire project cycle.
- Explore options for recycling of wastewater from the tanning process. This shall not only save costs on water but shall also reduce costs of buying tanning chemicals and save costs for pre-treatment of the wastewater.
- Install grease trap for trapping and subsequent scheming of greases and fats
- Installation of state-of-the-art tanning plant and equipment and use of the latest technologies that use less water and are more efficient

Noise and vibration

Some of the activities generally generate noise and hence affecting the immediate environment particularly noting the proximity to the mixed developments of residential and commercial. Such

noise emanate from the personnel, machinery and equipment. A perimeter stonewall will provide some buffer against noise propagation but the following precautions should be taken in addition. The noise and excessive vibrations Regulations should be strictly adhered to.

Mitigation

- Works should be carried out only during the specified time i.e. from 0800 hrs to 1700 hrs and should avoid working on Sundays when many area residents are expected to be within the environs.
- Sensitize drivers and machinery operators to switch off engines of vehicles or machinery when not in use
- Machineries should be maintained regularly to reduce noise resulting from friction.
- The generators and other heavy duty equipment (if present) should be insulated or placed in enclosures to minimize ambient noise levels
- There should be no unnecessary horning of the involved machinery and vehicles.
- Workers should be provided with relevant personal protective equipment (PPE)/ materials.
- Compliance with the Noise and Vibrations regulations

Increased energy demand

There will be increased use of energy due to increased energy uses during operation phases and potential wastage. Machineries will require fuels (petroleum or electricity). Energy, mainly electricity will also be needed.

Mitigation

Energy conservation involves optimum use of petroleum products (diesel and gasoline), electrical appliances (equipment), lighting systems and other electric machinery as used for different purposes. It also includes use of renewable energy sources.

- Switch electrical appliances when not in use and optimize operations of electrical equipment or energised machinery to enhance energy conservation.
- Install or Use energy conserving electric lamps for general lighting. Put off all lights immediately when not in use or are not needed.
- Make use or install alternative source of energy such as solar power, which is renewable. The proponent should include solar power systems, which can be used for lighting purposes
- Installation of plant, equipment and appliances that are eco-friendly and thus use less power

Wastewater (effluent)

Wastewater resulting from the tanning process is of significant concern with respect to the environment and particularly to soil, surface water bodies and underground water. The wastewater is laden with various chemical from the tanning process. Of very serious intention is chromium sulphate which unfortunately the main and most common tanning chemical. The chemical load in the wastewater is so high with high BOD, COD and suspended solids among others. Sulphide in the

wastewater releases the hydrogen sulphide gas which has an offensive smell (rotten-egg smell) and also highly toxic to many life forms. In its raw form, it is serious health hazard and emits bad odours. It must always drain effectively into the sewer systems; via high quality, well designed and laid pipe networks.

Mitigation

- The waste water should be pre-treated to meet the set standards for discharge to the sewer. The proponent shall put in place a suitable wastewater treatment system for the purpose. the pre-treated water should be regularly tested in an accredited laboratory
- The design of the proposed wastewater treatment system should consider the estimate discharges from individual sources and the cumulative discharge of the entire project even during peak volumes. The gradient should be sufficient to ensure and maintain maximum depth of flow. Branches should be streamlined in the direction of flow. The wastewater treatment system should be constructed to the relevant standards and appropriate quality materials.
- The internal and external wastewater system should be made of hard, strong, durable, smooth, impervious, and non-corrodible materials. All drain pipes passing under building; driveway or parking should be of heavy duty UPVC pipe tube encased in 150mm concrete surround. All manholes on drive ways and parking areas must have heavy-duty covers set and double sealed airtight; as approved by specialists. All waste pipes must have cleaning roding eyes which must be accessible
- Sanitary facilities must be kept clean always, through regular washing and disinfecting.
- Periodic monitoring of the wastewater treatment system for compliance and any remedial and emergency action

Air quality

The proposed activities have the potential to generate air pollutants in the form of dust particles and gas emissions (fumes) from machinery, standby generator and vehicles. Some machinery and boilers may generate hazardous exhaust fumes such as Carbon Oxides (CO_x), Sulphur Oxides (SO_x) and Nitrogen Oxides (NO_x).
Dust (particles) as caused by vibrations of machines and vehicle movement suspends in the air mostly during dry spells. Such dust and gases have direct negative impact to the ambient air quality. Whereas the above may pose no significant threat to environment, hydrogen sulphide and ammonia gas from the leather processing poses a real danger to workers and general public.

Mitigation

- Provide personal protective equipment (PPE) / full protective gear to workers. They should also be trained on occupational health and safety and should be encouraged to go for regular health check-ups

- Regular and prompt maintenance of machinery and equipment and the standby generator. This will minimize generation of noxious gases and other suspended particulate matter.
- Ensure that there is free air circulation. The generator room and all potentially polluting area should be fitted with appropriate stacks and should be adequately ventilated and the exhaust appropriately located so as not to direct the exhaust to sensitive environment
- Control over areas generating dust particles through regular cleaning or sprinkling of water to reduce dust. The areas can be enclosed to mitigate effects of wind on them.
- Regular air monitoring and tests to analyze the quality of air.
- Create a buffer zone with trees and suitable vegetation to help clean up the air
- Installation of a suitable wastewater treatment system and use of techniques and processes that avoid production of hydrogen sulphide and ammonia gases

Fats and greases

It is anticipated that wastewater from the tannery operational areas may be laden with fats and greases which if they find their way into the wastewater treatment system and sewer hamper and/or impede effective breakdown and treatment of the wastewater.

Mitigation

The proponent shall install a grease trap which shall be regularly schemed to eliminate the fats and greases before the wastewater is discharged to the wastewater treatment system and disposed into the wastewater disposal system.

Oil Leaks and Spills

It is important to note that oil/grease spills/leaks are prevalent wherever there is machinery and equipment that derive energy mostly from petroleum products to run. These contain hard/hazardous elements that are detrimental to the environment. There shall be a standby generator which shall be using oils/greases and fuels

Mitigation

- All machinery (if any) must be keenly observed not to leak oils on the ground. Maintenance must be carried out in a designated area (protected service bays more suitably outside) and where oils are completely restrained from reaching the ground. Such areas should be covered to avoid storm water from carrying away oils into the soil or water systems by installation of oil interceptors and other suitable facilities.
- All oil products and materials should be stored in site stores and should be handled appropriately to avoid spills and leaks.
- Fuels and oil/grease for the machinery, standby generator should be safely kept and handled
- Oil interceptors should be installed in the channels leading from areas prone to potential leaks and spills and should be regularly monitored.

Solid Waste

Millions of tonnes of solid waste is generated annually by human beings and may therefore pose great hazard if there are no proper disposal and handling systems. Tanning process and its activities contributes to increased solid wastes including dusted curing salts, wet and dry trimmings, wet shavings, buffing, fleshings, hair etc. it is estimated that solid waste during the tanning process, solid waste produced is approximately half of the volume input of the skin.

Mitigation

- The proponent should work hand in hand with private refuse handlers, NEMA and the CGK to facilitate sound waste management as per the prevailing regulatory provisions.
- The wastes should be properly segregated to encourage recycling of some useful waste materials. This calls for source reduction, recycling, composting and reuse. The receptacles (bins) must be kept in a good condition, and frequently washed and disinfected.
- The collection of waste materials should be made at least once in 24 hours, and it should be done in such a way to minimize nuisance of smell and dust during filling into carts or vans.
- Train or educate the involved stakeholders/tenants on the importance and means of waste (garbage) management and handling especially during operation phase.
- The proponent should explore a better use of fleshings such as glue production

Flora and Fauna

Vegetation has a great effect on the general and localized environment and normally can modify microclimate. Usually, the flora creates a good environment for habitats thus the two may go together more often than not. In consequence, de-vegetation may result to negative effects on the fauna. Singly, the proposed project may appear of no significant impact but the cumulative effect in concert with other current and future projects are capable of significant and serious effects including but not limited to soil erosion, hydrological regime imbalance, decreases in air purifiers (carbon sinks) and thus contribution to global warming etc.

Any potential impacts have already occurred since there is no vegetation.

Mitigation

- Landscape and plant vegetation in all open areas after the completion of the project and manage the introduced vegetation on completion of the development to restore or improve the site.

Occupational safety and health (OSHA) and traffic

The leather processing activities pose various threats to the safety and health of the workers and the general public at large. These plus other safety hazards such accidents, falling objects, risks from various chemicals, machinery and equipment are considered negative impacts. Inadequate skills in machinery operation and stress are serious safety hazards. Most of the operators prefer to hire on casual basis and therefore do not take responsibility of training the workers on health and safety. The entry and exit points to the proposed project may also pose the danger of imminent accidents if not properly designed.

The immediate neighbours and workforce involved would be exposed to these hazards. Food for the workforce is usually provided by mobile individuals who usually operate without licenses. This can compromise health of the workers especially if such foodstuffs are prepared in unhygienic conditions. There is also the potential risk of traffic accidents along the road around the entry point due to the many vehicles entering and leaving the site. It is important to note that the proposed design has taken care of all the basic set standards in a work place such as space, lighting, ventilation etc.

Potential Mitigation Measures

- All workers should be provided with full protective gear. These include working boots, overalls, helmets, goggles, earmuffs, masks, and gloves among others. OSHA abstract should be posted at a strategic point on site. The requirements of the **OSHA and the labour legislation** should be strictly adhered to and other relevant regulations. Only specialised machine operators should operate machinery and specialised equipment and all moving parts should be provided with appropriate guards.
- Provide material data sheets for all chemicals used. The chemicals should be under lock and key and their movement/use under strict control
- Appropriate traffic controls
- A first aid kit(s) should be provided within the site. This should be fully equipped at all times and should be managed by a trained person. The contractor should not expose workers to stress inducing factors.
- The proponent should have workmen's compensation cover. It should comply with workmen's compensation Act, as well as other ordinances, Regulations and union Agreements.
- Sanitary facilities should be provided and standard cleanliness of the facilities maintained.
- Individuals preparing food for the workers at the site should be controlled and monitored to ensure that food is hygienically prepared.
- Workers should always be sensitised on social issues such as drugs, alcohol, diseases particularly HIV/AIDs etc. There should be a training program to facilitate this by the contractor.

Accident prevention and Emergency Response Plans- ERPs

Emergencies and disasters are a reality of everyday life. Workers/ people must therefore be sensitized and prepared on how to react. Absence of such plans may be risky since there would be no guidelines to handle or control emergencies should they occur.

Mitigation

- The contractor/proponent should initiate and develop effective ERPs to cater for various eventualities such as various chemical spillage/leakage, fire outbreaks, and other accidents/incidents that are likely to occur. Training is prerequisite in planning ahead. Such plans must be properly documented and made available to all
- Regular drills should be conducted on possible incidences
- Strict adherence to the OSHA and due diligence

Absence of ERPs may be risky since there would be no guidelines to handle or control emergencies if they occur. The proponent and the contractor shall take all necessary steps to prevent accidents in the entire project cycle. All operation safety procedures shall be followed as discussed elsewhere in this report while measures to prevent and manage fires shall be taken as discussed elsewhere in this report. For further management of any foreseeable accidents and incidents, the proponent shall develop an ERP which shall be documented and all the operators and workers shall be provided with the requisite training and annual drills conducted. Chances of accidents and other safety hazards can be considerably reduced by adherence to set standards and use of the right quality materials to the specifications and observance of safety procedures.

The ERP shall typically contain all information on all likely types of emergencies likely to be encountered mainly accidents and fires. The ERP shall include actions to be taken in case of emergencies and shall display emergency contacts (ambulance, doctors, police and fire engines) telephone list; simple instructions on do and don'ts in various emergencies such as fires, incidents, etc. On traffic safety, the road shall be constructed to adoptive standards and all entry and exit points provided with clear views. Bumps shall erected to control speed along the driveway and the parking. The ERP shall also provide for basic First aid training to some of the potential workers. The ERP shall also promote good neighbouriness which shall go a long way in emergency response. Such plans must be properly documented and made available to all. A fire assembly point must be identified and clearly marked for example.

Soil disturbance

Though the main godown is existing, it is anticipated that some excavations shall take place mainly during construction of ETP and hence soil disturbance; exposing and setting it loose to the agents of soil erosion. However, the issue is not as significant because the land is level and the soils are stable.

Mitigation

- Avoid unnecessary movement of soil materials from the site and provide soil conservation structures on the areas prone to soil erosion mostly to reduce impact by the run-off.
- Depending on the period, monitor excavation and construction activities for appropriate and effective control measures of erosion e.g. during rainy / wet conditions, ensure suitable barriers on potential water erosion paths while avoiding wind erosion during dry conditions.
- Conduct standard landscaping after project completion i.e. resurface (pave) open areas neighbouring the building where possible after the completion of the project and introduce suitable and well-managed vegetation to generate surface covers on the open areas; to control soil movement by erosion agents i.e. water, animals and wind. It is recommended that landscaping be done on completion of proposed works and introduce appropriate vegetation in open surfaces

Ensure suitable storm water drainage channels to effectively discharge water safe to existing area drainage system. Drainage channels need to be regularly maintained and repaired to avoid point discharges (have pronounced effect to soil erosion) in case of breakages or blockages.

Enhanced Social crime risks

Due to the influx of workers on site, there are chances of introduction of individuals with potentially anti-social behaviours such as thieves/thugs, drug users and traffickers and may pose a risk to the community both during the implementation and occupational phases.

Mitigation

Adopt strict hiring guidelines to lock out the bad elements and limit movement outside the site. The proponent has a responsibly of sensitising the workers on social issues such as HIV/AIDS, drugs and other social issues through regular training and social gatherings and strict monitoring. Workers should not be housed on site.

Security

The need for security can never be overemphasized whether personal or for property. Security ensures that all inputs and raw materials and finished products are safe. It also controls movement within the site especially for the intruders who might be injured by the materials and other hazardous features available within the site.

Mitigation

- Enclose the site using suitable walls to beef-up security and to control movement and employ security guards who must always guard the site/property and document movements on the site/ property
- Strategically install lighting as well as security alarms

Fire Preparedness

Potential causes of fire are many and varied electrical faults, smoking, gas leaks, carelessness etc. Fire incidences result to economic and social drawbacks. It is therefore always important to consider the issue of fire by bringing in the element of preparedness. In this regard, the design should provide and recommend implementation of fundamental fire-fighting measures and control facilities.

Mitigation:

- Install an automatic fire alarm system for the entire project mostly on occupation, provide 2No. 30m hose reels and provide for adequate fire reserve water storage tanks with an automatic booster pump for hose reel and 4No. 9kgs portable dry powder or water extinguisher.
- Provide appropriate Fire Hydrant Ring main with suitable outlet points.
- Install heat and smoke detectors
- Install manual electric break-glass fire alarm system with secondary power
- All installation to follow Fire Masters requirements approval.
- Conduct regular fire-fighting drills/simulations to sensitize workers and adapt an emergency response plan for the entire project during operational phase.
- Ensure that all fire-fighting equipment are strategically positioned, regularly maintained and serviced.
- Provide fire hazard signs such as ‘No Smoking’ signs, Direction to exit in case of any fire incidence and emergency contact numbers should be provided as well as the Fire assembly point(s).

Industrial Safety

The proposed works, like any industrial operation, can be hazardous if correct procedures, training programs and counter-checks are not implemented. Personal protective equipment, fire safety, electrical safety, and other precautions are also essential for safe operation. The proponent has taken the above and more into consideration whilst planning the project, and furthermore, intends to involve professionals to create an admiral workflow. Some (but not all) the basic principles that will be implemented are as follows:

- Avoid placing unusual strain on equipment or materials;
- Be prepared for unexpected hazards. BE ALERT!
- Proper personal protective equipment (i.e. safety shoes, hardhat, goggles, respiratory equipment and gloves) must be used at all times on the site or as conditions warrant. Jewellery should be avoided;
- Workers should be trained on the proper use of tools and protective equipment;
- Great care must be given to the safety of the machinery, plant, tools and other equipment and their safety must be guaranteed;
- Accident prevention should be the overriding safety precaution;
- A qualified person should always be on site to oversee the working;
- Any area that poses a potential physical threat to workers and/or visitors requires clear marking and signage. Areas that typically require permanent or temporary protection include the following: Stairways; Open Manholes; Elevated platforms; Areas with moving machinery; Temporary wall or floor openings; Doors opening into construction.

ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS

The environmental management plan involves risk management strategies that should be undertaken by the project proponent and all the stakeholders to mitigate environmental degeneration. They are approaches to monitor, control, reclaim and restore the environment to a sustainable state. EMPs for projects thus provide logical frameworks within which the identified issues of environmental concern can be mitigated or monitored i.e. provide a checklist for project monitoring and evaluation. The EMP is meant to address the existing impacts and the potential foreseeable impacts. Currently, there are no significant existing impacts on the proposed site since the property was vacant.

Environmental monitoring involves measurement of relevant parameters, at a level of details accurate enough, to distinguish the anticipated changes. Monitoring aims at determining the effectiveness of actions to improve *environmental quality*.

The environmental management and monitoring plans have been developed and outlined to bring home the key findings of the *Environmental Impact Assessment*; recommending necessary mitigation actions, defining roles, monitorable indicators and the estimated cost.

The EMPs addresses the identified potential negative impacts and mitigation measures that can help to determine the effectiveness of actions to upgrade the quality of environment; as regards the proposed tannery. The EMPs have considered mainly the operational phase of the proposed project though good practices shall influence decommissioning.

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

Environmental/ Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility during design, installation and defects liability period	Responsibility after defects liability period	Monitoring means	Estimated Costs (Kshs)	Monitoring indicators and frequency
Effluent (Wastewater) management	• Installation of effluent treatment plant/system (ETP) to pre-treat the tannery wastewater to set standards before discharge into sewer. Wastewater quality monitoring • Explore various available ways of recycling the wastewater • Chromium recovery from effluent and recycling • Installation of appropriate grease/fats traps • ETP Design to factor effluent volume, gradient, materials and standards. ETP to be strictly monitored for efficiency	Proponent	Proponent	Inspection and laboratory tests	10,000 monthly	• Laboratory tests results
Waste management	• Engage the services of NEMA registered waste collector for disposal of solid waste • Adopt sound waste management by incorporating suitable facilities for collection, segregation and safe disposal of solid wastes to support recycling & reuse. Waste to be reduced at source, segregated and disposed to approved dumpsites • Explore various options for recycling and reuse of the various waste streams • Waste collection and disposal every 24 hour • Strict adherence to Waste Management Regulations, 2006	Proponent	Proponent	Inspection/ observation	2,500,000	• Properly working sewage system • Monitoring records • No leaks • NEMA registered waste handler • Compliance with legislation
Air pollution	• Enclose the site with a suitable buffer zone & suitable screens as may be appropriate • Switch of machinery and equipment when not in	Proponent	Proponent / Contractor	Inspection/ observation	400,000	• Amounts of dust • Extent of paved

	use & Ensure sound condition of machinery and equipment • All processes and ETP to be suitably well designed & strictly monitored to avoid formation of hydrogen sulphide and ammonia gases • Timely collection & disposal of fleshings, trimmings and other waste to avoid decomposition on site. • Sound practices, wastewater treatment and solid waste management • Strict adherence to Air Quality Regulations, 2014					area • Type of machinery • Amounts of emission
Noise pollution	• Erect suitable barriers to control noise • Sensitize machinery operators on effects of noise • Maintain plant & equipment • Operations & activities to be restricted to daytime • Workers in the vicinity of or involved in high-level noise to wear safety & protective gear. • Adherence to Noise and Excessive Vibration Pollution (Control) Regulations, 2009	Proponent	Proponent	Inspection/ observation	250,000	• Ear muffs/ Buffers/ Mufflers
Water resources	• Liason with water service provider • Adoption of sound conservation practices and Sound management of water usage by avoidance of unnecessary wastage, Installation of water conserving taps & recycling among others • Harvesting and storage of roof catchments to provide water	Proponent	Proponent	Inspection/ observation	1,000,000	• Water amounts used • Roof catchments and storage
Energy resources	• Installation of energy-efficient and eco-friendly plant, tools, appliances and equipment • Liason with Energy provider and adoption of sound conservation practices; installation of solar energy systems • Regular internal energy inspections/audits on the plant by competent experts	Equipment supplier	Proponent	Inspection	Contract	• Efficiency • Low energy consumption
Oil pollution	• Proper storage, handling and disposal of new oil and used oil wastes; Provision of oil interceptors along the drains leading from oil prone areas	Proponent	Contractor	Inspection/ observation	150,000	• Incidences of spillage

	• Maintain plant and equipment to avoid leaks					
Public health, occupational health and safety	• Train staff/workers on occupational health and safety; Provide full PPEs & workmen's compensation cover in addition to the right tools and operational instructions & manuals • Design and disseminate appropriate emergency response plans; Adopt sound housekeeping practices • Ensure use of standard materials and to the specifications. Avoid undesirable, substandard, hazardous or unauthorized materials and products • Ensure machinery and equipment servicing and maintenance as per schedules & legal requirements • Installation and maintenance of fire prevention, control and management measures • Strategic Installation of appropriate fire equipment and regular servicing • Training on fire fighting, evacuation and emergency response; Sensitize the operators and workers on fire risks; regular fire drills • Post clear warning signs e.g. 'No unauthorized use of machines', ensure there are guards on moving parts e.t.c • Provide fully equipped First Aid kits & train staff on its use; strategically post emergency numbers • Strict adherence to OSHA; Post strategically the OSHA Abstract & provide material safety data sheets	Contractor, supervising Foreman	Proponent where relevant	Observation	150,000	• Training records • Waste receptors • Clean sanitary facilities • First aid kits and training • Sensitive workers • Standard , adequate and effective conservancy tank with no leakage and overflows of leaking offensive odours

ENVIRONMENTAL MANAGEMENT/MONITORING PLAN FOR THE DECOMMISSIONING PHASE

Expected Negative Impacts	Recommended Mitigation Measures	Responsibility Party	Time Frame	Cost (ksh)
1. Construction machinery/structures & wastes				
• Scraps and other debris on site	• Use of an integrated solid waste management system i.e. through a hierarchy of options: • Wastes generated as a result of facility decommissioning activities will be characterized in compliance with standard waste management procedures. Disposal locations will be selected by the contractor based on the properties of the particular waste stream. • All buildings, machinery, equipment, structures and tools that will not be used for other purposes should be removed and recycled/ reused say in other projects • Where recycling/reuse of the machinery, equipment, implements, structures, tools and other waste is not possible, the materials should be disposed to approved dumpsites.	Contractor, Proponent/property manager	One-off	3,000,000
• Potential Pollution	• procedures for finding contaminated material during excavations will be established • covering and damping of excavated materials • Appropriate storage of contaminated material if found. Ground contamination and storm water contamination will be limited on site by proper handling and storage of materials and equipment.	Contractor, Proponent/property manager	One-off	2,500,000
2. Rehabilitation of project site				
• Vegetation disturbance • Land deformation: soil erosion,	• Implement an appropriate re-vegetation programme to restore the site to its original status	Contractor, Proponent/property manager	One-off	5,000,000

drainage problems • Restoration of site	• During the re-vegetation period, appropriate surface water run off controls will be taken to prevent surface erosion; • Monitoring and inspection of the area for indications of erosion will be conducted and appropriate measures taken to correct any occurrences; • Fencing and signs restricting access will be posted to minimize disturbance to newly-vegetated areas; • Carry out soil tests foe contaminants & if need be scoop out any contaminated soils and replace with uncontaminated soil from another source Comprehensive Landscaping	Contractor, Proponent/property manager	One-off	2,500,000
3. Safety of the project				
Occupational hazards	• Ensure that safety measures have been effectively integrated and positioned in respective areas of the project to control and manage fire outbreaks • Staircases and other hazardous areas shall be suitably protected say using strong rails to avoid occurrence of incidences	Contractor, Proponent/property manager	One- off	1,000,000
4. Safety and Social-Economic impacts				
• Loss of income • Reduced ability to support dependants • Loss of quality of life • Loss of benefits i.e. medical, insurance cover etc	• The safety of the workers should surpass as a priority of all other objectives in the decommissioning project • Adapt a project – completion policy: identifying key issues to be considered. • Assist with re-employment and job seeking of the involved workforce. • Compensate and suitably recommend the workers to help in seeking opportunities elsewhere. • Offer advice and counseling on issues such as financial matters. • Encourage workers to register with retirement benefits scheme of their choice	Contractor, Proponent/property manager	One- off	5,000,000

CONCLUSION AND RECOMMENDATIONS

The desire to implement any project is normally driven by the potential foreseeable/predicted benefits. However, all human activities are associated with some shortcomings whether significant or insignificant thus the need for subjecting projects to the EIA is to identify potential negative impacts with the intention of avoiding them at the design and planning stage or if not possible, provide for appropriate remedies or compensation.

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

This study indicates that the proposed (tannery) project will have positive impacts, which include employment, availability of locally produced leather, promotion of industrialization and thus development, an opportunity for waste recycling, income generation, increase in Government revenue, better use of the currently vacant godown and improvement of standards of living among others. However, despite the outlined positive impacts, the proposed development will come up with some negative impacts mainly generation of high volumes of wastewater and solid waste; air pollution and challenges in management of the same. The tanning process is a heavy water consumer and thus may affect area water supply unless water recycling options are explored and may be rainwater harnessing. Chromium, which is conspicuously present in tannery wastewater and hydrogen sulphide gas produced poses a serious health hazard. In addition, Hydrogen sulphide gas and fleshings emit unpleasant odours also.

The proposed project design has integrated mitigation measures with a view to ensuring compliance with the applicable laws and procedures. The structures should be built to the required planning/architectural/structural standards of the building code and the CGK. During entire project cycle, sustainable environmental management should be ensured; avoiding inappropriate use of natural resources, conserving nature and guaranteeing health and safety of all people, working on the project, general public and inhabitants of the project and the general area residents.

Adoption of best practices shall eventually increase productivity, improve cost-efficiency; without adversely affect the community and the environment thereby promote sustainable development. By opting for state-of-the-art machinery, the use of Best Available Techniques, adopting techniques for the prevention of untreated emissions to environment and untreated discharges into water etc. (which are achievable), the proponent is creating a stable, well thought out business that fills a fundamental gap in the country's vision of a healthy environment and industrialization.

From the foregoing and taking into consideration of all the foreseeable and relevant aspects, the proposed project is a timely venture with a positive and significant contribution to the sustainable development goals and industrialization. It is thus our recommendation that the project be allowed to go ahead with the implementation provided the outlined mitigation measures are adhered to. Major concerns should nevertheless be focused towards avoidance or minimizing the occurrence of impacts that would degrade the general environment. This will however be overcome through close following and implementation of the recommended Environmental Management and Monitoring Plans (EMPs).

We also recommend that the proponent also work closely with the relevant professionals, NEMA, CGK and other bodies to enhance the facilitation of the issues of concern identified. This will also help in solving any problem arising and which may not have been foreseeable during the EIA study. This will ensure that environmental concerns are integrated into the project at every stage of the implementation phase. It will enhance the co-existence of the proposed project with the environment, during the entire project cycle. The various service providers (power, sewer, water, garbage collection e.t.c.) must assess the respective requirements. Conservation of resources such as energy and water should be encouraged. Sound practices aimed at environmental conservation should also be adopted and special attention should be paid to the extended sources of raw materials such as water and energy. Some 'waste' materials can be re-used in other areas and forms

Wastes should be reduced to the minimum as this will save on costs and at the same time preventing environmental pollution. The operators should exercise diligence in all activities to ensure environmental sustainability.

The purpose of the EIA is to ensure that development options under consideration are environmentally sound and sustainable and that any environmental consequences are recognized early and taken into account in project design. In addition, the ultimate success of the EIA depends upon development of environmental capability and understanding in the agencies concerned.

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ANNEX: ATTACHMENTS

Sketch map showing location of the proposed site

Copy of lease, Title deed and PIN number certificate

Copies of minutes of the consultation and public participation meeting

Copies of lists of consultation and public participation meeting attendants