Environmental and Social Impact Assessment(ESIA) Study Report for the Proposed Asbestos Corrugated Sheets Disposal Site on Plot L.R. No. 12177/68 in Sagalla, Taita Taveta County.

Proponent	Firm of Experts
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Date: August 2022

CERTIFICATION

Certification by Lead Experts

We, Envasses Environmental Consultants Limited hereby confirm that this Scoping Report and Terms of Reference has been prepared by ourselves pursuant to Section 58 of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya.

Signed for and on behalf of: **Envasses Environmental Consultants Limited**
Firm of Experts No. 6175

Name: Mr. Simon Nzuki

Designation: Chief Executive Officer & Lead Expert No. 1350

Signature: _____ **Date**: _____

Certification by Proponent

We, Tai Lifestyle Limited, hereby confirm that this Scoping Report and Terms of Reference has been prepared and submitted to NEMA with our authority pursuant to Section 58 of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya.

Signed for and on behalf of: **Tai Lifestyle Limited**

Name: _____

Designation: _____

Signature: _____ **Date**: _____

ACKNOWLEDGEMENTS

This Environmental and Social Impact Assessment Study Report was prepared with support of the proponent i.e. Tai Lifestyle Limited, who provided personnel to facilitate a reconnaissance survey of the proposed site, introducing the EIA consultants to the local community and facilitating the community meeting. The proponent further provided the relevant documents to support the SPR process. We thank Mr. Peter Gichuhi, Mr. Caleb Omwenga, Mr. Justus Kaleli and Ms. Sabina Mwadisha.

We thank the Sagalla Location Chief, Mr. Michael Mwapea, for facilitating the community engagement meeting. We also acknowledge the community for participating in the meeting and providing their views, comments and concerns with respect to the proposed project.

Sampling and analysis of environmental media which included air quality, noise levels, water quality and soil tests were undertaken by Lahvens (K) Limited. The consultants are grateful for their invaluable input in the preparation of the ESIA report.

The Envasses Environmental Consultants Limited staff assisted the lead experts in data collection, facilitating the community consultative meeting and report writing. We are particularly grateful to Mr. Said Omar, Ms. Jecinta Nthenya and Ms. Rhoda Mutua.

EXECUTIVE SUMMARY

The proponent, Tai Lifestyle Limited, proposes to establish an asbestos corrugated sheets disposal site on Plot L.R. No. 12177/68 in Sagalla, Taita Taveta County. Waste disposal works including hazardous waste treatment or disposal facilities are listed under the Second Schedule (12e) of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya as high risk projects. Pursuant to Section 58 of the Act, all high risk projects listed under the Second Schedule should undergo an Environmental and Social Impact Assessment (ESIA) Study process. Hence, the proponent contracted Envasses Environmental Consultants Limited which is a Firm of Experts Licensed by NEMA to prepare an ESIA Study Report for the proposal. In addition to compliance with the law, the output of the EIA process will provide a baseline of the environmental and social conditions of the project area to enable future monitoring of the environmental performance of the proposed project

The methodology for preparing the ESIA study report was guided by the Third Schedule of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. Site visits were undertaken in July 2022 for purposes of area reconnaissance, assessing the baseline and environmental risks associated with the proposed project as well as applicable environmental safeguards and standards. Environmental screening criteria was informed by the Second Schedule of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. As per this Schedule the issues considered by the experts included; ecological and socio-economic issues, landscape changes, land use character and water. Data collection methods included literature review of relevant documents, observations during site visits and photography. The stakeholder engagement strategy included community consultative meeting and administration of questionnaires to the neighbors. Baseline environmental data was collected on ambient air, noise levels, water quality and soil tests in collaboration with Lahvens (K) Limited.

The findings of the ESIA study demonstrate that the proposed project is expected to have both positive and negative environmental and social impacts. The positive impacts include; provision of safe disposal services for asbestos corrugated sheets, creation of employment opportunities, income to the proponent and generation of revenue to the government. Alongside the positive impacts, several environmental and social impacts will arise at different phases of the project cycle.

At construction phase, the main environmental issues will include loss of grazing areas and wildlife habitat, destruction of physical environment, occupational safety and health risks, air and noise pollution, solid waste and effluent generation and water demand.

The proposed project site falls within the Izera Ranch. Izera ranch is privately owned and a home to wildlife including Zebras, elephants, monkeys, baboons and birds among others. Additionally, controlled livestock rearing is practiced within the ranch. Implementation of the project would lead to loss of the grazing areas and wildlife habitats. However, Izera ranch covers a total area of 439.9 hectares and only 40.47 (10%) hectares will be utilized for the establishment of the disposal site. The proponent will preserve much possible indigenous trees and other vegetation cover that need not be removed.

The establishment of the disposal site will involve clearing of trees, bushes, grasses and other vegetation cover within the project site. Vegetation cover at the site provides several environmental and socio-economic benefits which include preventing soil erosion, carbon sequestration and provision of wood fuel to the local community. Hence clearance of the vegetation would lead to the loss of these benefits. The proponent should restore degraded areas through landscaping by sediment binding grasses and trees and retain the excavated soil to be used in backfilling the disposal pits.

Workers undertaking preparatory activities at the site will be exposed to health and safety risks from the use of machinery, air and noise pollution and accidental falls among others which could cause injuries, permanent disability or even death. To ensure the safety of the workers and visitors to the site the proponent should register the site as a workplace with the Directorate of Occupational Safety and Health Services (DOSHS), obtain insurance cover for the workers at the site, provide adequate and appropriate Personal Protective Equipment (PPE) to workers and visitors to the site and enforce on their use, ensure moving parts of machines and sharp surfaces are securely protected with guards, provide first aid services and emergency vehicle at the site and comply with the provisions of the Occupational Safety and Health Act, 2007.

Both air and noise pollution are inevitable during establishment phase. Air pollution will be as a result of dust generated during excavations, concrete mixing activities and exhaust fumes from machinery use and Heavy Commercial Vehicles (HCVs) accessing the site. Air pollution will have health implications on the workers and visitors to the site as it causes respiratory diseases and is a visual irritant. On the hand, noise pollution will emanate from the excavation works, delivery of materials by HCVs and the use of machinery. The noise levels produced may be above the stipulated EMCA limits and are a health hazard. The proposed mitigation measures include providing PPE such as dust masks and ear muffs to the workers and visitors to the site, sprinkling water at the excavation areas to suppress dust and monitoring fugitive emissions. Additionally, the proponent should sensitize truck drivers to avoid unnecessary hooting and running of vehicle engines and comply with provisions of the Environmental Management and Coordination (Air Quality) Regulations, 2014 and Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

The site preparatory and construction of the burial pits will generate significant quantities of solid waste in form of biomass, overburden, domestic waste such as plastic containers and construction materials such as building blocks and wrappings among others. These will need to be disposed off appropriately. The proponent is advised to use the generated overburden in backfilling and landscaping, procure and strategically place adequate solid waste collection bins with a capacity for segregation, provide a sizeable central solid waste collection bin with chambers to accommodate separated waste, sensitize construction workers on the proper waste management, procure services of a NEMA licensed waste handler to dispose off the solid waste and comply with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006.

Water will be required for concrete mixing, casting and curing works, drinking and sanitation purposes and will be sourced from an existing borehole within the ranch. Based on the projected workforce of 20 people at establishment phase, water demand at the site will be at most $2m^3$ per day. Out of these, 10% ($0.2m^3$) will be used for domestic purposes and will generate $0.14m^3$ of effluent which will need to be disposed off. The rest of the water soaks into ground areas within the project site. Poor disposal of the effluent generated has the potential to pollute underground aquifers. The recommended mitigation measures include; sensitizing the workers on the need to conserve the available water resources, monitoring the amount of water being abstracted from the borehole, delivering to the site mobile toilets from a NEMA licensed waste contractor and ensuring compliance with the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006.

At operational phase, the main environmental concerns include littering during transportation, safety and health risks, air and noise pollution, contamination of surface and ground water, soil contamination, waste generation and water demand.

Asbestos sheets will be brought from various areas in the country by trucks to the disposal site. Non containment of the asbestos being transported will lead to littering which exposes residents within the roads to the harmful asbestos waste. The proponent should ensure the Asbestos Containing Materials (ACMs) waste is transported to the disposal site in an enclosed vehicle or container, vehicles transporting the asbestos waste are licensed as per the Environmental Management and Coordination (Waste Management) Regulations, 2006 and must be accompanied by a waste tracking document. Additionally, all persons involved in handling and disposal of asbestos should adhere to the stipulations set under the National Guidelines on Safe Management and Disposal of Asbestos, 2011.

Impacts on safety and health are expected to arise from potential exposure to asbestos and accidents occurrence to workers at the disposal site. Uncontrolled access to the site by the public may also pose similar health hazard. The recommended mitigation measures include; training workers on asbestos handling, ffencing the disposal site using a chain link with an access gate to control access with clear hazard demarcations, providing adequate and appropriate PPE to all workers, train them on correct use and enforce their use and ensuring compliance with the provisions of the Occupational Safety and Health Act, 2007 and the National Guidelines on Safe Management and Disposal of Asbestos, 2011.

Airborne dust is likely to be present in the environment where asbestos is handled due to its fibrous nature. During handling operations, they are bound to be breakages that will generate dust which is harmful. On the other hand, noise is expected to be generated by the trucks in and out of the site, as well as machinery that may be used at the site to aid in the deep burial undertaking. The impact of noise is however expected to be minimal. To mitigate against air and noise pollution the proponent should pprovide adequate and appropriate PPE to all workers, train them on correct use and enforce their use, lower the ACMs gently into the disposal site to avoid breakages, wet any cracked pieces of ACMs to prevent release of the asbestos fibers and ccomply with the provisions of the National Guidelines on Safe Management and Disposal of Asbestos, 2011, the Environmental Management and Coordination (Air Quality) Regulations, 2014 and Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

The buried asbestos has a potential to contaminate both surface and ground water resources. This may occur due to excessive excavation of the pit into the water table, poor pit lining and erosion of the pits by surface runoff thus exposing asbestos material. To prevent surface and ground water contamination the proponent should ensure the burial pits area shallow and as such do not pose a threat to the water table, construct appropriate drainage channels so as to divert surface runoff from the disposal area and comply with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006 and the National Guidelines on Safe Management and Disposal of Asbestos, 2011.

There is potential to contaminate the soils in the area if the asbestos sheets are not well covered with the HDP liner and the pits not lined with concrete. Additionally, clean-up of the asbestos contaminated PPE and the truck may contaminate the soil. The recommended mitigation measures include; lining the burial pits with concreate, covering the burial pits fully with the HDP liner and constructing a concrete paved area to be used for clean-up activities. Additionally, waste water from the clean-up area should be directed towards the established water drains and the contaminated soil during clean-up activities to be removed and disposed of at the disposal site.

Asbestos contaminated PPE that will be discarded will become hazardous waste, and if disposed incorrectly on the site or surrounding areas may pose health risk to people who come into contact with the waste. The proponent should dispose asbestos contaminated PPE in the disposal pits and

comply with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006 and the National Guidelines on Safe Management and Disposal of Asbestos, 2011.

Water at the disposal site will be required for sanitation and clean-up activities to ensure decontamination of the workers, PPE, machinery and trucks that come into contact with asbestos. Water for use will be sourced from an existing borehole within the ranch. Seventy percent (70%) of the domestic water use will be generated as effluent and will need to be disposed appropriately. The proponent should sensitize the workforce at the site on the need to conserve the available water resources, construct sanitation facilities for use by workforce, install and commission a bio-digester to manage the generated effluent and comply with the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006.

The site will be decommissioned once the land available for asbestos disposal is exhausted or due to other reasons such as lack of asbestos for disposal, court order or change of business strategy by the proponent. At this phase, the proponent will prepare and submit a due diligence decommissioning audit report to NEMA for approval at least three (3) months in advance.

In conclusion, the proposed project is considered important and beneficial to the economy as it will ensure safe disposal of asbestos corrugated sheets, promote socio-economic growth of the area through employment creation and revenue generation to the government. The ESIA study proposes a suite of comprehensive Environmental and Social Management and Monitoring Plans to address the anticipated negative impacts during the entire project cycle and improve the environmental performance of the proposed project. It is on this basis that we recommend that the project be allowed to proceed alongside conditions which will ensure compliance with the provisions of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya.

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ACRONYMS

CO	Carbon Monoxide
DOSHS	Directorate of Occupational Safety and Health Services
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GRM	Grievances Redress Mechanism
HCVs	Heavy Commercial Vehicles
HDP	High Density Polyethylene
KNBS	Kenya National Bureau of Statistics
NEMA	National Environment Management Authority
NO_2	Nitrogen Dioxide
O_3	Ozone
OSHA	Occupational Safety and Health Act
PM	Particulate Matter
PPE	Personal Protective Equipment
PPM	Parts Per Million
TORs	Terms of Reference
TVOC	Total Volatile Organic Compound
UDDTs	Urine Diverting Dry Toilets
WRA	Water Resources Authority
WRB	Water Services Regulatory Board
WRUAs	Water Resources Users Associations
WSBs	Water Service Boards
WSPs	Water Service Providers

1 INTRODUCTION

1.1 Background information

The Government of Kenya is committed to ensuring a clean and healthy environment for its citizenry. The constitution of Kenya advocates the principles, duties and responsibilities of the state and its institutions to eradicate all forms of environmental degradation to promote sustainable development. As Kenya develops towards achieving Vision 2030 its imperative that all forms of development and waste associated with it is managed in a responsible manner. The development of National Guidelines for Safe Management and Disposal of Asbestos,2011 has been necessitated by the need to safeguard human health and environment from adverse impacts related to asbestos containing materials (ACMs).

Asbestos is a group of six natural occurring fibrous minerals found in metamorphic deposits around the world. The six types include tremolite, actinolite, anthophyllite, chrysotile, amosite and crocidolite. It is a chemically inert mineral that is fire resistant and a poor conductor of heat and electricity consequently making it a commonly used insulator. However, when asbestos-containing materials deteriorate or are damaged, asbestos fibers are released into the air. Fibers that are inhaled can lodge and remain in the lungs, or migrate to other locations in the body. Asbestos fibers have been shown to cause asbestosis, lung cancer and mesothelioma. They are hence classified as carcinogenic under UN Class 12 and CODE H16 and hazardous under both the Fourth Schedule of the Environmental Management and Coordination (Waste Management) Regulations, 2006 and the Factories and Other Places of Work (Hazardous Substances) Rules, 2007.

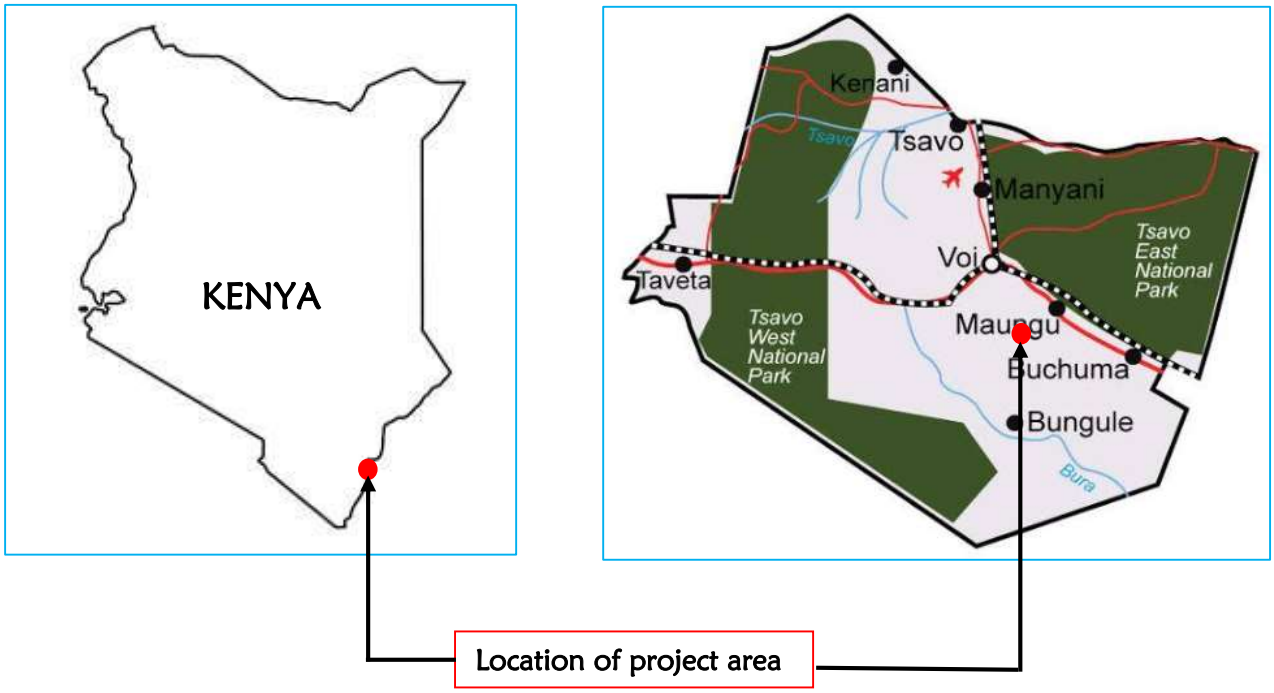
The proponent, Tai Lifestyle Limited, proposes to establish an asbestos corrugated sheets disposal site on Plot L.R. No. 12177/68 in Sagalla, Taita Taveta County. Waste disposal works including hazardous waste treatment or disposal facilities are listed under the Second Schedule (12e) of the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya as high risk projects. Pursuant to Section 58 of the Act, all high risk projects listed under the Second Schedule should undergo an Environmental and Social Impact Assessment (ESIA) Study process. Hence, the proponent contracted Envasses Environmental Consultants Limited which is a Firm of Experts Licensed by NEMA to prepare an ESIA Study Report for the proposal. In addition to compliance with the law, the output of the EIA process will provide a baseline of the environmental and social conditions of the project area to enable future monitoring of the environmental performance of the proposed project.

1.2 Project location and neighbourhood

The proposed asbestos corrugated sheets disposal site will be located in Sagalla, Taita Taveta County. It is geo-referenced at Latitude 3°38'22.69" South and Longitude 38°37'6.83"East (Figure 1). The proposed project falls within the Izera Ranch where controlled livestock rearing (ranching) is practiced. It neighbours Sagalla Hills to the North West, Rukinga Wildlife Sanctuary and Maungu town to the North East.

1.3 Proposed project site status

The proposed project site is currently undeveloped and used as grazing areas for livestock (ranching) as well as habitat for wildlife such as baboons, monkeys, elephants, zebras and birds among others. The dominant vegetation types observed is predominantly grass, thickets and acacia trees (Figure 2).



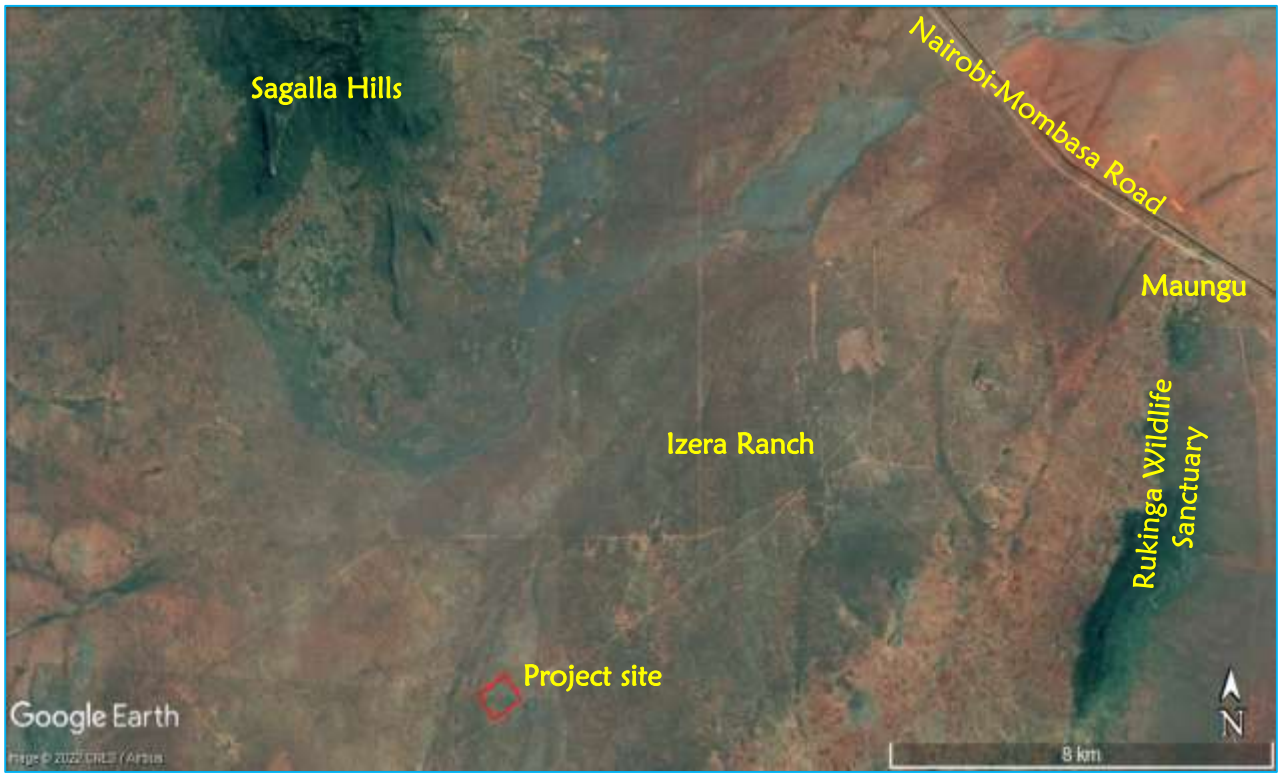


Figure 1: The location of the proposed project site (Source: Google Earth, 2022).

Figure 2: A section of the proposed project site (Source: Site visit, June 2022).

1.4 Project design and description

The proposed project will involve establishment and management of an asbestos corrugated sheets disposal site. The strategy for disposal will be pit burial at a depth of 3meters which will be excavated and lined with concrete and High Density Polyethylene (HDP) to prevent soil and underground water contamination. The disposal of the sheets will be sectional, using and closing up filled up sections accordingly. Pilling of the asbestos sheets will be up to 2meters from the excavated ground, closing up the HDP and backfilling the remaining one meter as per National Guidelines for Safe Management and Disposal of Asbestos,2011 (Figure 3). The number of pits to be constructed will be on asbestos disposal need basis. The dimensions for each pit are as follows; Length 36m, breadth 14m and height 3m. The expected volume of the asbestos corrugated sheets is approximately 300,000 tones. The site will then be fenced off, rehabilitated by planting casuarina trees and marked as hazardous.

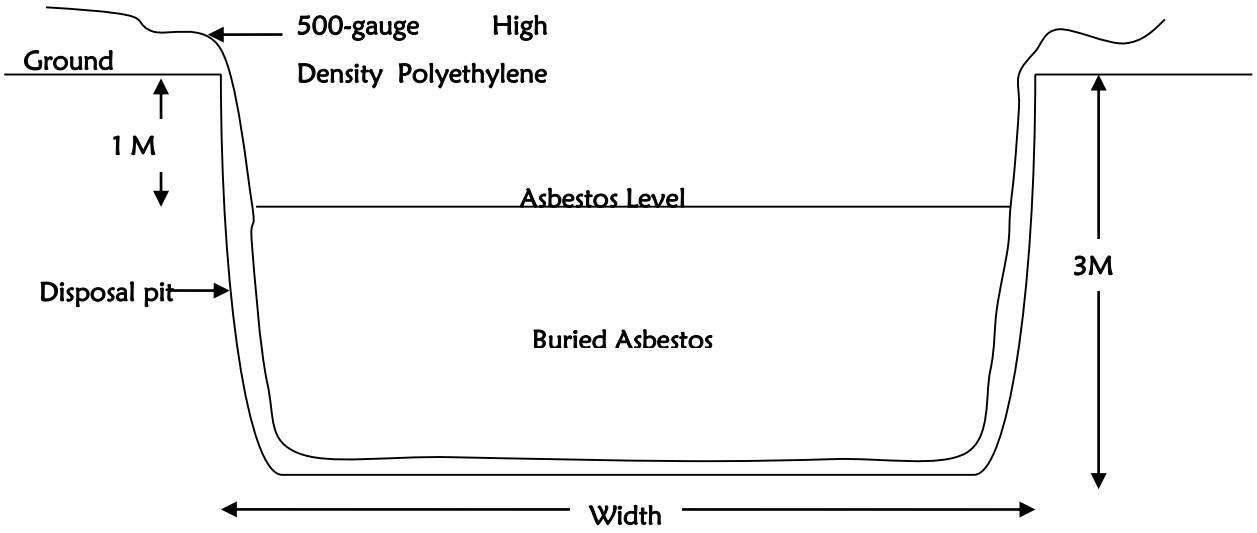


Figure 3: A cross section of a typical asbestos disposal pit (Source: National Guidelines on Safe Management and Disposal of Asbestos, 2011).

1.5 Study approach and methodology

1.5.1 Introduction

The methods adopted for preparing the ESIA study report were guided by the Third Schedule of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. The consultants prepared a scoping report and Terms of Reference (TORs) as required under Regulation 11 of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003 and submitted them to NEMA for consideration for approval. The scoping report and TORs were approved on 15th July 2022 and the consultants began preparation of the ESIA study report.

1.5.2 Data collection

The methods for carrying out the study included site visits and observations, photography, literature review of relevant documents, baseline monitoring of environmental media (air quality, noise levels, water quality and soil tests) and public consultations through administration of questionnaires and public consultative meeting. A site visit was undertaken on 12th July 2022 for purposes of area reconnaissance, assessing the baseline environmental conditions of the proposed project site and screening of environmental risks associated with the proposed project as well as the applicable environmental safeguards and standards. Environmental screening criteria was informed by the Second Schedule of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003. As per this schedule, the issues considered by the experts included ecological impacts, socio-economic issues, landscape changes, land use character and water (Table 1).

Table 1: Summary of the results from the screening exercise.

Criteria	Results
Ecological impacts	– Excavations will occur – No endangered species of trees and plants found at the site – No endemic species reported on site
Social-economic considerations	– Safe disposal of ACMs – Income to proponent – Employment creation – Revenue to the government through taxes &licenses – No cultural or heritage issues at the site – Consultations will materialize harmony among stakeholders
Landscape impacts	– The landscape area will be altered
Land uses	– The current use of land is agricultural (Ranching)

1.5.1 Baseline environmental data

Baseline environmental data was collected on ambient air quality, noise levels, water quality and soil in collaboration Lahvens (K) Limited. The results will be used to provide a benchmark for implementing the Environmental Monitoring Plan proposed in the ESIA report. The approaches and methods used for sampling and analysis of baseline environmental media are discussed below.

1.5.1.1 Ambient air quality monitoring

Mobile, static and active monitoring was done by use of real time gas detector-pump suction equipment LB-MS4X (Figure 4) which integrates the main ambient gases and meteorological parameters. The gas sensitive semiconductor sensor uses proprietary sensing material, built in automatic Correction (ABC) and interference rejection. This combination results in ppb resolution and a highly linear response. The gas sensitive electrochemical sensors generate Nano-amp currents proportional to the gas concentration. Aeroqual uses low noise electronics to capture these signals resulting in low detection levels. The non-dispersive infrared sensor uses infra-red light, a narrow

band-pass filter and photodiode to measure the intensity of light at the gas absorption band. The light intensity is proportional to the gas concentration.

The laser particle counter for Particulate Matter measurements uses optimized signal processing using low noise electronics added algorithms to correct for interferences. An aerosol particle counter works on the principal of either light scattering or light blocking. An aerosol stream is drawn through a chamber with a light source (either Laser Based Light or White Light). When a particle is illuminated by this light beam, it is redirected or absorbed. Light scattered by a single particle in a specific direction in relation to the original direction has a unique signature which relates to the size of the particle. This allows for sizing and counting of individual particles.

1.5.1.2 Baseline noise levels measurements

Noise emission survey (Figure 4) was achieved via initial examination of significant sources of noise. Noise levels were evaluated using a Sound Level Meter Model AWA 5636 IEC 61672 – 1:2013 class 2 with a built-in ⅓octave / octave band filters which does real time 1/1 and 1/3 octave analysis. The sound level meter was mounted on at 2.0m above ground level and at least 3.5m away from any sound reflecting surfaces at a boundary position and measurements taken at timed intervals over 10 minutes and stored in SLM's memory. The sound level meter was placed on the microphone to reduce any wind interference during measurements. The sound level meters, were within its calibration period, at the time of monitoring. In addition, the equivalent noise level (LAeq), the maximum sound pressure level (Lmax) and the minimum sound pressure level (Lmin) during that measurement period were recorded. Factors to consider such as time, duration and predictability of the noise emission, amplitude and frequency of the noise emission, nature of the source, location of noise sensitive receptors, ambient and background noise level, nature and character of the locality, presence of special acoustic characteristics and the incongruity or familiarity of the noise during noise survey and site placement were put into consideration. Furthermore, as each individual measurement was being taken, the nature of the noise climate in the area was assessed and recorded. This comprised an auditory observation by the surveyor, as well as identifying those noise incidents which influenced the sound level meter readings during that measurement period.

Figure 4: Ambient air quality and noise level monitoring at the proposed project site (Lahvens (K) Limited, July 2022).

1.5.1.3 Soil sampling and analysis

Soil samples were obtained at the proposed project site and analyzed for PH and heavy metals including Cadmium, Lead, Cobalt, Chromium, Mercury and Arsenic. The purpose of soil sampling and analysis was to give a general indication of the existing potential contaminants and for future monitoring of the impact of the proposed project.

1.5.1.4 Water quality sampling and analysis

A water sample was obtained from a borehole neighboring the proposed project site in order to obtain an indicative baseline for the borehole water quality of the area. The water sample was analyzed for drinking water in compliance with KS EAS 12:2018 specification for natural potable water. These included analysis of both physicochemical parameters.

1.5.2 Stakeholder mapping

Prior to commencement of the ESIA process, the consultants conducted a stakeholder mapping and analysis to determine the individual, groups and institutions that will be affected by and have an interest in the project in consultation with the proponent, the County Government and the Ministry of Interior and Coordination of National Government. The consultants then prepared a comprehensive list of all the stakeholders in consultation with the proponent and categorized them based on the following:

- Low interest, low influence – those to keep informed
- High interest, low influence – those to involve and consult with
- Low interest, high influence – powerful stakeholders to engage
- High interest, high influence – partners to collaborate with

Nine key stakeholder categories were identified. These are;

1. County and National Government Representation
2. Lead Agencies and community organizations operating directly under them
3. Civil Society
4. Conservation Organizations
5. Local Community and Residents' Associations
6. Opinion leaders including political leaders
7. Faith Based Institutions
8. Special Interest Groups
9. Media

The consultant then identified the key contact persons within the stakeholder categories who will be engaged throughout the ESIA study process. The identification of the key contact persons was done in consultation with the proponent, lead agencies, the County Government of Mombasa, Ministry of Interior and Coordination of National Government, Residents Associations, Community Groups, Non-Governmental Organizations and Conservation groups.

Further, the consultant identified other stakeholders who may not be apparent but needed to be consulted and analyzing the role of each stakeholder in the ESIA study process as well as project implementation. Finally, the consultant determined the tools for engaging with each stakeholder including language of communication to ensure meaningful participation of the stakeholders in the ESIA process.

Following the analysis, a public consultative meeting was held on 21st July 2022 at Kajire Social Hall.

1.6 Project budget

The total estimated cost of the proposed project is KES 3,200,000. The proponent will therefore pay NEMA the minimum of KES 10,000 (Ten Thousand Only) since 0.1% of the total project costs falls below the minimum amount payable.

2 ENVIRONMENTAL SETTING OF THE PROPOSED PROJECT SITE

2.1 Introduction

Baseline conditions of the proposed project site were assessed and documented for the purposes of determining the future impacts of the proposed project on the environment and livelihoods of the local community. The baseline survey was done through literature review, site visits and baseline environmental media monitoring in collaboration with Lahvens (K) Limited. This section details on the findings of the survey which will form a basis for impact monitoring plans and improvement of the environmental and social performance of the proposed project during implementation.

2.2 Topography and soils

Taita hills complex rise above the erosional plains of the lowlands with small inselbergs. Volcanic foothills and lava flows occur in Taveta. Three major blocks constitute the Taita hills- the Sagalla, Taita and Kasigau. Industrial minerals such as graphite, asbestos, iron ore, gemstones and others are found in the hills and in the surrounding lowlands. Taveta may generally be considered as part of the piedmont plain between the Pare Mountains and Mt. Kilimanjaro.

On Taita Hills, the dominant soils are cambisols. They originate from weathered gneiss and are often gravely to sandy–loamy and shallow. They are well drained and moderately fertile. On steep slopes and transitional zones, the dominant soil types are Regosols, which are shallow soils, have high permeability and low water holding capacity. The drier foothills bordering the hills are characterized by Luvisols, Acrisols and Arenosols soils. They are moderate to low in fertility. In valley bottoms, alluvial soils (fluvisols) are apparently noticed. These are young soils with fertility being moderate to high. They receive fresh sediments and nutrients during regular floods and occur in all larger river basins of Bura, Lumi, Mbololo, Mwatate and Voi Rivers. Deeply weathered soils are widespread in Taveta. Saline and sodic soils occur around Lake Jipe while in the western part of the sub-district are soils developed from the basement rock system with some influence of volcanic ashes. The lowlands are characterized by reddish, very deep acid sandy–clayey soil (Ferralsols). They are found in most of the Tsavo National Park and the ranches. They are vulnerable to soil erosion, have a low water holding capacity and low soil fertility.

2.3 Climatic conditions

Taita Taveta County is mainly dry, with the exception of Taita Hills which are considerably wet. The south-easterly winds influence climate in the area, whereby hilly areas have ideal conditions for moisture condensation which then results in relief rainfall. Long rains are usually experienced between March and May – where on average, highlands record 265 mm as opposed to the 157 mm in lowlands. Short rains are anticipated between October and December, with annual rainfall being recorded at 1,200 mm (highlands) and 341 mm (lowlands). Rainfall distribution is usually uneven, with higher rainfall amounts being recorded in highland areas as compared to the lowlands. Annually, mean rainfall is 650 mm. Average temperature in Taita Taveta County is 23 °C, with lows of 18 °C in hilly areas (Sagalla, Taita ad Mwambirwa) and rising to about 25 °C. in lower zones (Figure 5).

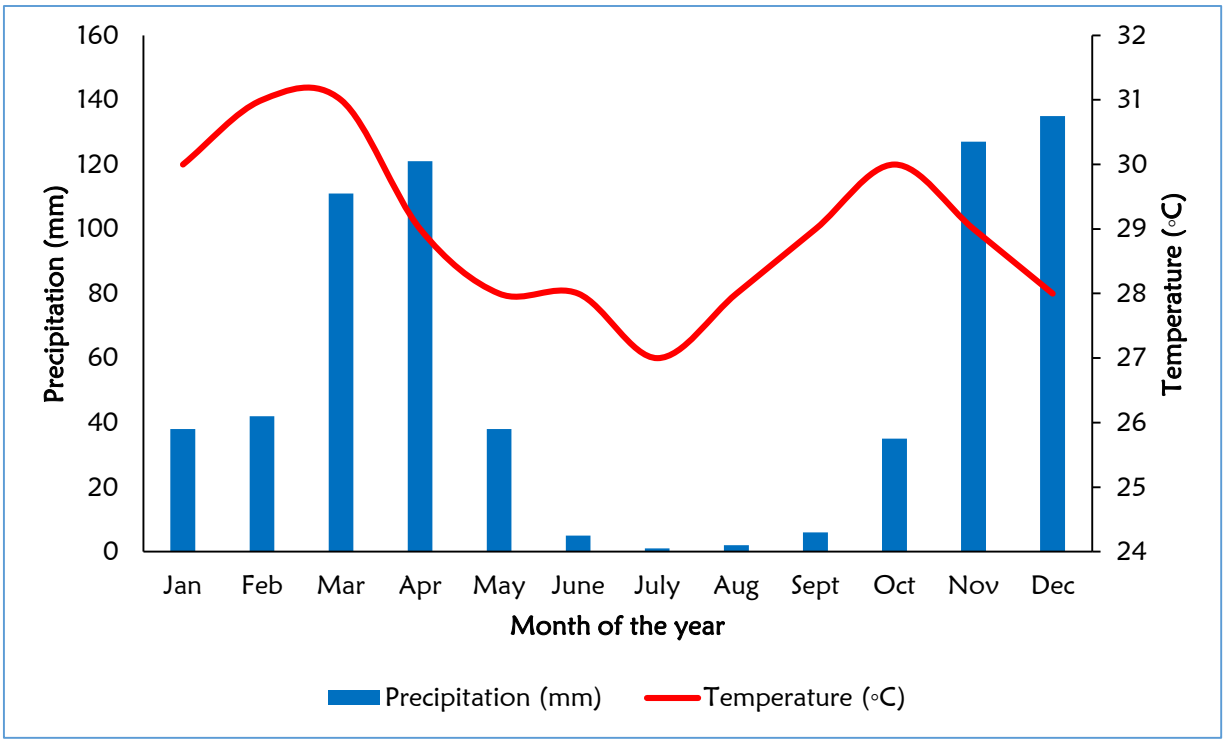


Figure 5: Annual rainfall and temperature distribution for Taita Taveta County in 2022 (Data Source: World Weather Online, 2022.

2.3.1 Biodiversity

The above climate dictates the type and species of trees as well as vegetation cover which occurs within Taita Taveta County. The dominant vegetation types observed is predominantly grass, thickets and acacia trees (Figure 6). The fauna is comprised of baboons, monkeys, elephants, zebras and birds among others.

Figure 6: A section of the proposed project site dominated by acacia tree species (Source: site visit, July 2022).

2.4 Demographics

According to the Kenya National Bureau of Statistics (KNBS,2019), Taita Taveta County has a total population of 340,671 persons. The average household size in the county is 5.0 people per

household with an average population density of 20 persons per square kilometers. The distribution of the population is influenced by the availability of water as settlements are concentrated along water points, near urban and rural trading centres as well as along major roads.

2.5 Land use patterns and socio-economic activities

Agriculture is the dominant land use pattern within the county. The main crops grown are cereals, pulses, root crops, horticultural crops, fruit crops, nuts and oil crops (macadamia, groundnuts, sunflower, coconut, cashew nut) fibre crops (cotton, sisal) and emerging crops (jojoba, moringa, mushroom, aloe vera, jatropa). Sisal for fiber production is grown on large scale farms and this reduces land available for settlement and household farming activities. There are three companies that produce sisal for both domestic and export markets.

The County is a major livestock rearing zone, with the main types of livestock being beef cattle, dairy cattle, goats, sheep, camels, donkeys, poultry, bee keeping, rabbit and pigs. Chicken is the main poultry reared, although guinea fowl quills, turkeys, geese, ducks, peacock, pigeons are emerging poultry.

Ranching is a major avenue through which beef cattle are produced, with the County having a total of 28 ranches, with 10 of these owned by the government under the Directed Agricultural Company (DAC) arrangement. The other major categories of ranches are private and group ranches, with quantities of these being seven and six respectively. Individual group ranches are four while there is only one ranch owned by a cooperative society, located in Wundanyi. The livestock reared in the ranches include goats, sheep, camels and cattle.

The major mining activities in the county are for gemstones and industrial minerals such as iron ore, limestone, marble, magnetite, asbestos, graphite, kaolin clay and mica. Deposits of copper and cobalt are also thought to be present. There are over one hundred licensed mineral prospectors and miners and among them eight major companies involved in gemstone mining.

The county has immense potential for tourism as it prides in being home to Tsavo East and West National parks with magnificent sceneries, wildlife, birdlife, indigenous forests and rolling volcanic landscape.

The proposed disposal site falls within the Izera ranch where controlled livestock rearing is practiced (Figure 7).

Figure 7: Livestock rearing within Izera Ranch (Source: site visit, July 2022).

2.6 Water supply and sanitation in Taita Taveta County

The County has the biggest water supply scheme in the coastal region. This is the Mzima Water Project, which supplies water to Voi town and its environs through a number of major projects including Voi water supply, Mbololo water supply, Irima, Kimwa and Kaloleni water projects, Miasenyi water project, Manyani water supply, and Sagalla-Bughuta water project. This scheme is also among the major suppliers of water in the coastal city of Mombasa. The source of the water is Mzima springs, situated in the Tsavo West National Park. Other major water schemes are found in Taveta and Wundanyi areas. In Taveta, there are four schemes. These are Taveta Lumi water supply, Challa Water Project, Chumvini water project, and Kitobo water project.

The County is home to both surface and underground water sources. The surface water sources include Mzima springs, Lakes Challa and Jipe, and some rivers like Mwatate, Kishenyi, Ziwani, Lumi, Sanga, Wanganga and Voi, Challa, Kighombo and Kishushe. Underground water resources include two springs, Homer 's and Lemonya, and a number of streams including Njukini, Sanite Njoro Kubwa, Kitobo, and Maji ya Waleni. The county lacks a sewerage system and most households depend on ineffective waste water disposal systems such as pit latrines, septic tanks or Urine Diverting Dry Toilets (UDDTs).

The proposed project will source water from an existing borehole within the Izera ranch (Figure 8). Mobile toilets will be delivered onsite for use by workers and visitors to the project site during the establishment phase of the disposal site.

Figure 8: One of the boreholes within Izera ranch next to the proposed project site. (Source: Site visit, July 2022).

2.7 Solid waste management

The County's major urban centres of Voi town, Mwatate, Wundanyi, Taveta with several other have dump sites that only provide basic solid waste collection and management services despite the amount of waste collected per day ranging between 10-20 tones. Currently the County has three waste disposal sites namely: Chakaleri dumpsite serving Mwatate, Voi and Wundanyi, Riata dumpsite in Taveta and Sagalla dumpsite. As a result of shortage of receptacles long illegal dumpsites are coming up the Wundanyi stage in Mwatate and in Taveta. Waste transportation in the County is done by 2 garbage trucks and one tractor which currently do not meet the guidelines stated Waste Management Regulation, 2006.

2.8 Infrastructure

2.8.1 Transport Network

Taita Taveta County has a total road network of 1832.29km which 283.2km are of bitumen standards, 168.09km of murram, and 1381km earth road. Key roads in the county include Mombasa-Nairobi highway, which covers approximately 270km, Voi-Taveta Road(110km) Mwatate – Wundanyi Roads, Voi-Salaita gate Road, Sagalla-Kasigau road. The road network has greatly improved in recent times following upgrading of Mwatate-Taveta road to bitumen standards and rehabilitation of Mwatate –Wundanyi road. The county has also seen regular maintenance of both classified and unclassified roads which has greatly improved increased accessibility and agricultural productivity.

The Standard Gauge Railway (SGR) traverses the through the county which hosts two major SGR Terminus Stations at Miasenyi and Voi, with a total of 170km of railway track running through the county. The SGR has greatly enhanced accessibility to the county for both trade and tourism purposes. Additionally, the county has a total of 17 public airstrips most of which are underutilized or undeveloped. The airstrips are located in Taveta (6), Voi (5) and Mwatate (6). The main airstrips are Ikanga, Taveta and KWS. Plans are underway to have Ikanga airstrip handle chartered airlines which will greatly boost tourism and trade in the county. There are also two private airstrips one in Taveta and one Mwatate and 4 airstrips in Tsavo National Park.

2.8.2 Energy Supply

The main source of energy in the county include electricity, solar and wood fuel. Though a good number of areas have been connected to the national electricity grid some areas in Taveta and Wundanyi sub-counties are yet to be reached. However, firewood and charcoal are the main source of cooking fuel respectively and also lighting fuel is paraffin followed by electricity and solar. Solar energy where there is great potential has however not been exploited.

2.8.3 Telecommunication

The proposed project area is well served with communication network including the main mobile phone services such as Safaricom, Airtel and Telkom.

2.9 Baseline environmental data

2.9.1 Ambient air quality measurements

There were notable gaseous concentrations of Nitrogen dioxide (NO_2), Sulfur dioxide (SO_2), ozone (O_3), Carbon monoxide (CO) and Total Volatile Organic Compound (TVOC) within the project site. Notable levels of particulate matter (PM10 and PM2.5) were also detected. However, the gaseous and particulate parameters measured were all within the stipulated standards under the First Schedule of Environmental Management and Coordination (Air Quality) Regulations, 2014 (Table 2).

Table 2: Baseline air quality measurements for the proposed project site (Source: Lahvens (K) Limited, February 2022).

Survey locations	NO_2 (ppm)	SO_2 (ppm)	O_3 (ppm)	CO (mg/m^3)	TVOC (mg/m^3)	$PM_{2.5}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
Perimeter 1 (Lat: -3.633774 Long: 38.613341)	0.044	0.023	0.07	0.11	1.70	29	45
Perimeter 2 (Lat: -3.637084 Long: 38.615825)	0.037	0.0325	0.04	0.13	1.11	22	40
EMCA (Air Quality) Regulations, 2014	**0.5**	**0.191**	**0.12**	**10**	**600**	**-**	**100**

2.9.2 Ambient noise level measurements

The results of noise level measurements were within the limits stipulated under the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 (Table 3 &4). Baseline results obtained from the monitoring location shows that the areas are noise insignificant area hence there is no threat to the sensitive receptors around these areas. The existing baseline noise levels were influenced by noise emissions from nearby construction and vehicular traffic around the project site.

Table 3: Baseline noise level measurements for the proposed project site (Source: Lahvens (K) Limited, July 2022).

Location	Measured Sound Pressure Level (Noise) (dBA) (1100Hrs-1300Hrs)			EMCA Guidelines (Day time)
	LAeq	Lmin	Lmax	
Perimeter 1 (Lat: -3.633774 Long: 38.613341)	43.2	73.5	37.9	55
Perimeter 2 (Lat: -3.637084 Long: 38.615825)	47.1	77.5	39.8	55

Table 4: Summary of the baseline noise level measurements for the proposed project site (Source: Lahvens (K) Limited, July 2022).

Location	Measured Sound Pressure Level (Noise) (dBA) (1100Hrs-1300Hrs)	EMCA Guidelines (Day time)
	LAeq	
Perimeter 1 (Lat: -3.633774 and Long: 38.613341)	43.2	55
Perimeter 2 (Lat: -3.637084 and Long: 38.615825)	47.1	55

2.9.3 Baseline water quality measurements

The results indicated that the physical and chemical tests of the water sample from the borehole in the project neighborhood conforms to the required KS EAS 12:2018 specification for natural potable water. However, the microbial tests for total plate count were too numerous to count and thus did not conform to the specifications (Table 5).

Table 5: Baseline water quality measurements for an existing borehole in the project neighborhood (Source: Bureau Veritas Kenya Limited, July 2022).

Test	Method	Results	KS EAS 12: 2018 Specification For Natural Portable Water
Physical tests			
Appearance	KS 459:2007	Clear	-
Odor	Organoleptic	Odorless	-
Suspended matter, mg/L	ISO 11923	0.7	Not detectable
Color, TCU	ISO 7887	10	15 Max
PH@25°C	ISO 10523	7.0	5.5-9.5
Conductivity, μS/cm	ISO 7890	1244.0	1500 Max
Chemical tests			
Total dissolved solids, mg/L	ISO 3025-10	626.0	1000 Max
Total hardness as $CaCO_3$, mg/L	ISO 6059	65.0	300 Max
Chlorides as Cl^- mg/L	APHA 4500	34.99	250 Max
Aluminium as Al^{3+}, mg/L	ISO 12020	<0.01	0.2 Max
Manganese as M, mg/L	ISO 6333	<0.01	0.1 Max
Iron as Fe, mg/L	ISO 9332	0.13	0.3 Max

Sodium as Na^+, mg/L	ISO 9964	56.29	200 Max
Magnesium as Mg^{2+}, mg/L	ISO 12846	7.35	100 Max
Calcium as Ca, mg/L	ISO 7980	14.93	150 Max
Lead as Pb, mg/L	ISO 8288	<0.01	0.02 Max
Copper as Cu, mg/L	ISO 7980	<0.01	1.0 Max
Fluoride as F^-, mg/L	ISO 10359	<1.0	1.5 Max
Potassium as K, mg/L	ASTM D4192	0.23	-
Sulphate as SO_4^{2-}, mg/L	ISO 22743	23.03	400 Max
Total alkalinity, mg/L	ISO 2271-2008	382.0	-
Residual Chlorine as Cl_2,mg/L	ISO 7393	0.23	0.2-05
Microbial tests			
Total plate count@ 37˚C, cfu/ml	ISO 6222	TNTC	50 Max
Total plate count@ 22˚C, cfu/ml	ISO 6222	TNTC	100 Max
Escherichia coli, cfu/100ml	ISO 9308^{-1}	Not detected	Not detected
Total coliform count, cfu/100ml	ISO 9308^{-1}	Not detected	Not detected
Pseudomonas aeruginosa, cfu/100ml	ISON16266	Not detected	Not detected

2.9.4 Soil sampling and analysis

Soil sampling results Cadmium, Mercury and Arsenic were below 0.01mg/kg. Kenya has not developed a specific environmental legislation on soil standards but relies on existing legislation on pollution such as the Environmental Management and Coordination (Water Quality) Regulations, 2006 and the Kenya Constitution 2010 to prosecute environmental crimes on soil contamination.

Table 6: Baseline soil test for the proposed project site (Source: Bureau Veritas Kenya Limited, July 2022).

Test	Method	Results (mg/kg)	Soil Remediation Guideline value
pH @ 25 ^{0}C	EPA 3050B	6.86	Min 6-Max 8.5
Cadmium as Cd	EPA 3050B	<0.01	No guideline
Lead Pb	EPA 3050B	0.08	No guideline
Cobalt as Co	EPA 3050B	0.03	No guideline
Chromium as Cr	EPA 3050B	0.04	No guideline
Mercury as Hg	EPA 3050B	<0.01	No guideline
Arsenic as As	EPA 3050B	<0.01	No guideline

3 IDENTIFICATION OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The proposed project will have both socio-economic benefits and attendant negative environmental and social impacts. The purpose of the ESIA process is to therefore systematically assess the value of the benefits against the environmental concerns and provide measures to avoid, prevent or reduce the magnitude of the impacts. The following section provides details on these impacts and proposed mitigation measures to address the identified negative environmental and social impacts. The mitigation measures are based on the underlying principle of EIA that everyone is entitled to a clean and healthy environment and a duty to enhance and safeguard the environment.

3.1 Positive impacts of the proposed project

The proposed project will have the following benefits;

1. **Provision of safe disposal services for asbestos corrugated sheets**
   The proposed project will ensure safe disposal of asbestos corrugated sheets that will minimize the risk of contamination to the environment
2. **Provision of employment opportunities**
   The proposed project has the potential to generate extra livelihood streams for the local community by employing personnel to receive and dispose the asbestos containing materials as well as waste transporters from the source to the disposal site. Already the proponent has employed various consultants to develop the disposal pit plans and preparation of the ESIA study report. This will in turn improve the local economy and livelihoods
3. **Income to the proponent**
   The proponent will commercialize the site and hence earn income from customers who will bring Asbestos Containing Materials for disposal at the site.
4. **Revenue to the government**
   The proposed project will generate revenue to the government through taxes, licences and fees levied on goods/ services. Through the revenues generated, the government will be capable of financing its obligations to the country.

3.2 Anticipated negative environmental and social impacts

The main concern about asbestos materials is the health risk that fibres pose to humans since they are carcinogenic. To address this concern, NEMA has prepared National Guidelines on Safe Management and Disposal of Asbestos (2011) to guide removal, handling and disposal of asbestos in Kenya. These guidelines include standard procedures and precautions which are briefly highlighted in the following sections:

3.2.1 Standard procedure and precautions for asbestos transportation and disposal

3.2.1.1 Preparation for transportation

Material containing asbestos or contaminated with asbestos must be viewed as hazardous and packaged to keep fibres from getting into the air. Containers used for packaging may be hard or flexible and must seal airtight.

The following are some of the precautions that should be observed in the packaging.

i. The waste transporting vessel must be lined with a 500-gauge double wrapped plastic sheet with every seam sealed with a tape and covered.
ii. The transportation vessel should be labeled **"Danger - Contains Asbestos Fibres Cancers and Lung Disease Hazard"** and contain the following information:
   - The identity of the hazardous waste.
   - The name, physical address and telephone contact of the generator of waste
iii. The bags and stacks should be gently loaded into transportation vessel.

iv. The goosenecks should not be used as handles for carrying the bags, because that might unseal the ends or tear the bags. Tossing the bags into a waste transporting vessel must be avoided because of the risk of rupture.
v. The asbestos waste should be transported to a prepared disposal site that is authorized by NEMA.

3.2.1.2 Transportation

i. The vehicle transporting the asbestos waste should be licensed as per the Environmental Management Coordination (Waste Management) Regulations 2006 and must be accompanied by a tracking document
ii. The waste shall be transported to the disposal site in an enclosed vehicle or container, capable of being washed without lodgment of debris and fibres, and secure from escape of fibres to the atmosphere.
iii. The contractor should ensure that all persons involved in handling and disposal of asbestos are trained in emergency operating procedures. These procedures shall include how the waste is to be handled, services to be contacted during such an exposure, and additional personnel protective equipment.

3.2.1.3 Disposal Site

Disposal of asbestos must be at a site;

- Designated by the local authorities and licenced by NEMA;
- Privately owned disposal facility licenced by NEMA;
- Designated by the waste generator (on-site disposal)

Where a designated site by the local authorities or privately owned facility does not exist the waste generator shall identify an appropriate site, undertake an EIA and be duly licensed. The Disposal site should be as per specifications in the EIA report. However, the following minimum conditions must be observed:

i. The optimal distance of the disposal pit shall be as far as practicable from the nearest human settlement and as it shall be determined by the Ministry of Public Health and Sanitation.
ii. A lined pit that does not reach the water table or according to other standards that may be approved by NEMA.
iii. Disposed material to be one metre below ground level
iv. Disposal site should be fenced off appropriately and the gate locked.

3.2.1.4 Disposal operation

The waste generator shall ensure that the following precautions are observed when disposing asbestos wastes:

i. The waste generator shall notify the Authority on commencement of disposal activities.
ii. Asbestos materials **must not** be reused or offered for sale.
iii. All asbestos sheets and the debris should be wrapped before it is hauled to the disposal site or transfer station in a covered vehicle.
iv. Asbestos waste must be disposed of at approved disposal sites only.
v. The depth of the disposal pit shall be as deep as practically possible to accommodate more asbestos waste but at least one (1) meter above water table.
vi. The asbestos should be lowered gently into the disposal site and should not be dropped from any height to avoid breakage.

vii. When all available asbestos has been lowered into the pit, cover with polythene paper followed by 6-inch layer of soil. Continue doing this until the pit is full or the waste is finished.
viii. The pit shall be considered full when the asbestos waste is **one meter** below the ground level or the asbestos waste is exhausted.
ix. After the pit is full, cover with 500 gauges double wrapped polythene sheet and fill the pit with layer of soil up to the ground level.
x. Disposal site should be completely fenced off with at least chain link and a lockable gate which shall be locked at all times. The fence should be at least one (1) meter from the edge of the pit.
xi. Warning notices stating **"Asbestos hazard area, keep out"** shall be placed at the disposal site. These signs, with lettering of minimum 150mm in height, are to be placed so that they are clearly visible.

3.2.1.5 Post-disposal

i. All transportation vessels, re-useable containers or any other similar article which have been in contact with asbestos waste shall be cleaned at the disposal site.
ii. The disposal site should be maintained including the warning signs, the fence, the gate among others to prevent vandalism and interference.
iii. Human activities which might interfere with the buried asbestos waste such as construction and pitting should not be allowed at the disposal site.
iv. The waste generator shall notify the Authority in writing on completion of disposal of asbestos waste.

3.2.2 Negative impacts at establishment of the disposal site

3.2.2.1 Loss of grazing areas and wildlife habitat

The proposed project site falls within the Izera Ranch. Izera ranch is privately owned and a home to wildlife including Zebras, elephants, monkeys, baboons and birds among others. Additionally, controlled livestock rearing is practiced within the ranch. Implementation of the project would lead to loss of the grazing areas and wildlife habitats. However, Izera ranch covers a total area of 439.9 hectares and only 40.47 (10%) hectares will be utilized for the establishment of the disposal site.

Recommended mitigation measures

1. Preserve as possible indigenous trees and other vegetation cover that need not be removed

3.2.2.2 Destruction of the physical environment

The establishment of the disposal site will involve clearing of trees, bushes, grasses and other vegetation cover within the project site. Vegetation cover at the site provides several environmental and socio-economic benefits which include preventing soil erosion, carbon sequestration and provision of wood fuel to the local community. Hence clearance of the vegetation would lead to the loss of these benefits.

Recommended mitigation measures

1. Restore degraded areas through landscaping by sediment binding grasses and trees
2. Retain the excavated soil to be used in backfilling the disposal pits

3.2.2.3 Occupational Safety and health risks

Workers undertaking preparatory activities at the site will be exposed to health and safety risks from the use of machinery, air and noise pollution and accidental falls among others which could cause injuries, permanent disability or even death.

Recommended mitigation measures

1. Register the site as a work place with the Directorate of Occupational Safety and Health Services (DOSHS)
2. Obtain insurance cover for the workers at the site
3. Procure and provide adequate and appropriate Personal Protective Equipment to workers and visitors to the site and enforce their use
4. Provide employees with correct tools and equipment for the jobs assigned and train on their use
5. Ensure moving parts of machines and sharp surfaces are securely protected with guards to avoid unnecessary contacts and injuries
6. Provide a fully equipped first aid box and trained personnel on site at all times during the establishment phase
7. Provide a standby vehicle and trained medical personnel at the site
8. Comply with the provisions of the Occupational Safety and Health Act, 2007

3.2.2.4 Air pollution

Air pollution during the establishment phase will be in form of dust generated during excavations, concrete mixing activities and exhaust fumes from machinery use and HCVs accessing the site. The most relevant pollutant considered is particulate matter because of its potentially significant increase during the establishment phase. Respirable particulate matter may present respiratory diseases, cause eye irritation and visual intrusion to workers and visitors to the project site if it is in excess of 100 $\mu g/Nm^3$ as per the First Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014.

Recommended mitigation measures

1. Sprinkle water at the excavation areas to suppress dust
2. Use of serviceable machinery/equipment and trucks
3. Procure and enforce the use of dust masks to workers and visitors to the project site
4. Monitor fugitive emissions to ensure compliance with the limits set under the First Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014
5. Comply with the provisions of the Environmental Management and Coordination (Air Quality) Regulations, 2014

3.2.2.5 Noise pollution and excessive vibrations

The excavation works, delivery of materials by heavy trucks and the use of machinery may lead to high levels of noise and vibrations within the disposal site and the surrounding area. The noise levels produced may be above the stipulated EMCA limits and may lead to hearing impairments to both the workers and visitors to the site.

Recommended mitigation measures

1. Procure and provide adequate ear muffs to workers and visitors to the site and enforce their use
2. Sensitize truck drivers to avoid unnecessary hooting and running of vehicle engines
3. Comply with the provisions of the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009

3.2.2.6 Solid waste generation

The site preparatory and construction of the burial pits will generate significant quantities of solid waste in form of biomass, overburden, domestic waste such as plastic containers and construction materials such as building blocks and wrappings among others. These will need to be disposed off appropriately.

Recommended mitigation measures

1. Use the generated overburden in backfilling and landscaping
2. Procure and strategically place adequate solid waste collection bins with a capacity for segregation within the site
3. Procure a sizeable central solid waste collection bin with chambers to accommodate separated waste
4. Sensitize construction workers on the process of solid waste collection, segregation and proper disposal
5. Procure the services of a NEMA licensed waste handler to dispose off the solid waste
6. Comply with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006

3.2.2.7 Water demand and effluent generation

At the establishment phase water will be required for concrete mixing, casting and curing works, drinking and sanitation purposes and will be sourced from an existing borehole within the ranch. Based on the projected workforce of 20 people at establishment phase, water demand at the site will be at most $2m^3$ per day. Out of these, 10% ($0.2m^3$) will be used for domestic purposes and will generate $0.14m^3$ of effluent which will need to be disposed off. The rest of the water soaks into ground areas within the project site. Poor disposal of the effluent generated has the potential to pollute underground aquifers.

Recommended mitigation measures

1. Sensitize the workforce at the site on the need to conserve the available water resources
2. Monitor the amount of water being abstracted from the borehole
3. Procure and deliver to the site mobile toilets from a NEMA licensed waste contractor
4. Comply with the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006

3.2.3 Negative impacts at operation of the disposal site

3.2.3.1 Littering during transportation

Asbestos sheets will be brought from various areas in the country by trucks to the disposal site. Non containment of the asbestos being transported will lead to littering which exposes residents within the roads to the harmful asbestos waste.

Recommended mitigation measures

1. The ACMs waste should be transported to the disposal site in an enclosed vehicle or container, capable of being washed without lodgment of debris and fibres, and secure from escape of fibres to the atmosphere
2. Vehicles transporting the asbestos waste should be licensed as per the Environmental Management and Coordination (Waste Management) Regulations, 2006 and must be accompanied by a waste tracking document
3. Ensure all persons involved in handling and disposal of asbestos adhere to the stipulations set under the National Guidelines on Safe Management and Disposal of Asbestos, 2011

3.2.3.2 Safety and health risks

Impacts on safety and health are expected to arise from potential exposure to asbestos and accidents occurrence to workers at the disposal site. Uncontrolled access to the site by the public may also pose similar health hazard.

Recommended mitigation measures

1. Train workers on asbestos handling
2. Fence the disposal site using a chain link with an access gate to control access with clear hazard demarcations
3. Provide adequate and appropriate Personnel Protective Equipment (PPE) including P2 disposable mask or a full-face respirator, disposable overalls with a hood, gloves with wrist taped, and gumboots or non-laced footwear with disposal slippers to all workers, train them on correct use and enforce their use
4. Comply with the provisions of the Occupational Safety and Health Act, 2007 and the National Guidelines on Safe Management and Disposal of Asbestos, 2011

3.2.3.3 Air pollution

Airborne dust is likely to be present in the environment where asbestos is handled due to its fibrous nature. During handling operations, they are bound to be breakages realising asbestos fibres into the air. Fibres that are inhaled can lodge and remain in the lungs, or migrate to other locations in the body. Asbestos fibers have been shown to cause asbestosis, lung cancer and mesothelioma.

Recommended mitigation measures

1. Provide adequate and appropriate Personnel Protective Equipment (PPE) including P2 disposable mask or a full-face respirator, disposable overalls with a hood, gloves with wrist taped, and gumboots or non-laced footwear with disposal slippers to all workers, train them on correct use and enforce their use
2. Lower the ACMs gently into the disposal site to avoid breakages
3. Wet any cracked pieces of ACMs to prevent release of the asbestos fibres
6. Comply with the provisions of the National Guidelines on Safe Management and Disposal of Asbestos, 2011 and the Environmental Management and Coordination (Air Quality) Regulations, 2014

3.2.3.4 Noise pollution

Noise is expected to be generated by the trucks in and out of the site, as well as machinery that may be used at the site to aid in the deep burial undertaking. The impact of noise is however expected to be minimal.

Recommended mitigation measures

1. Provide earmuffs to employees and visitors to the disposal site
2. Comply with the provisions of the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009

3.2.3.5 Contamination of surface and ground water

The buried asbestos has a potential to contaminate both surface and ground water resources. This may occur due to excessive excavation of the pit into the water table, poor pit lining and erosion of the pits by surface runoff thus exposing asbestos material.

Recommended mitigation measures

1. The pits should be shallow and as such do not pose a threat to the water table
2. The design of the site should include appropriate drainage channels so as to divert surface runoff from the disposal area
3. Comply with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006 and the National Guidelines on Safe Management and Disposal of Asbestos, 2011

3.2.3.6 Soil contamination

There is potential to contaminate the soils in the area if the asbestos sheets are not well covered with the HDP liner and the pits not lined with concrete. Additionally, clean-up of the asbestos contaminated PPE and the truck may contaminate the soil.

Recommended mitigation measures

1. The burial pits should be lined with concrete
2. Ensure the burial pits are fully covered with the HDP liner
3. Construct a concrete paved area to be used for clean-up activities
4. Waste water from the clean-up area should be directed towards the established water drains
5. The contaminated soil during clean-up activities should be removed and disposed of at the disposal site

3.2.3.7 Solid waste generation

Asbestos contaminated PPE that will be discarded will become hazardous waste, and if disposed incorrectly on the site or surrounding areas may pose health risk to people who come into contact with the waste.

Recommended mitigation measures

1. Asbestos contaminated PPE should be disposed in the disposal pits
2. Comply with the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006 and the National Guidelines on Safe Management and Disposal of Asbestos, 2011

3.2.3.8 Water and effluent generation

Water at the disposal site will be required for sanitation and clean-up activities to ensure decontamination of the workers, PPE, machinery and trucks that come into contact with asbestos. Water for use will be sourced from an existing borehole within the ranch. Seventy percent (70%) of the domestic water use will be generated as effluent and will need to be disposed appropriately.

Recommended mitigation measures

1. Sensitize the workforce at the site on the need to conserve the available water resources
2. Construct sanitation facilities for use by workforce
3. Install and commission a bio-digester to manage the generated effluent
4. Monitor the quality of the effluent from the bio-digester before discharge into the environment to ensure conformity with the set standards
5. Apply for and obtain an Effluent Discharge License from NEMA
6. Comply with the provisions of the Environmental Management and Coordination (Water Quality) Regulations, 2006

3.2.4 Impacts at possible decommissioning phase

The site will be decommissioned once the land available for asbestos disposal is exhausted or due to other reasons such as lack of asbestos for disposal, court order or change of business strategy by the proponent. At this phase, the proponent will prepare and submit a due diligence decommissioning audit report to NEMA for approval at least three (3) months in advance. The main environmental concerns likely to occur during the decommissioning phase and possible mitigation measures are discussed below.

3.2.4.1 Loss of livelihoods

Job opportunities created during the operational phase of the project will be lost leading to economic decline.

Mitigation measures

1. Train employees on alternative livelihoods prior to decommissioning
2. Prepare and issue recommendation letters to employees to seek alternative employment opportunities
3. Review potential job opportunities in other ongoing contracts by the proponent and recommend the employees who qualify
4. Comply with labor laws by paying the employees their terminal dues

3.2.4.2 Creation of ecologically vulnerable land

The abandoned site will comprise of derelict land that will be susceptible to erosion.

Recommended mitigation measures

1. Maintain the warning signs, fence and gate to prevent vandalism and interference of the disposal site
2. Rehabilitate the site through planting grass and appropriate tree species in consultation with the Kenya Forest Service (KFS)

3.3 Impact analysis

Potential project impacts are predicted and quantified to the extent possible. The magnitude of impacts on resources such as water and air or receptors such as people, communities, wildlife species and habitats is defined. Magnitude is a function of the following impact characteristics;

1. Type of impact (direct, indirect, induced)
2. Size, scale or intensity of impact
3. Nature of the change compared to baseline conditions (what is affected and how)
4. Geographical extent and distribution (e.g. local, regional, international)
5. Duration and/or frequency (e.g. temporary, short-term, long term, permanent)

Magnitude describes the actual change that is predicted to occur in the resource or receptor. It takes into account all the various impact characteristics in order to determine whether an impact is negligible or significant. Some impacts can result in changes to the environment that may be immeasurable, undetectable or within the range of normal natural variation. Such changes can be regarded as essentially having no impact and are characterized as having a negligible magnitude (Table 7).

1. **Negligible impact (very low) -** Where a resource or receptor would not be affected by a particular activity or the predicted effect is deemed to be imperceptible or is indistinguishable from natural background variations.
2. **Less than significant impact (Low**) - Is a minor impact where a resource or receptor would experience a noticeable effect but the impact magnitude is sufficiently low (with or without mitigation) and /or the resource or receptor is of low sensitivity. In either case, a less than significant impact must be sufficiently below applicable standard threshold limits.
3. **Potentially significant impact (moderate) -** A moderate impact that meets applicable standards but comes near the threshold limit. The emphasis for such moderate impacts is to demonstrate that the impact has been reduced to a level that is as minor as reasonably practicable so that the impact does not exceed standard threshold limits.
4. **Significant impact (high) -** One where an applicable standard threshold limit would or could be exceeded or if a highly valued or very scarce resource would be substantially affected.

Table 7: Risk and impact significant matrix for the proposed asbestos corrugated sheets disposal site.

Environmental impact	Magnitude of impact at establishment phase	Magnitude of impact at operational phase	Magnitude of impact at possible decommissioning phase
Loss of grazing areas and wildlife habitat	2	0	0
Destruction of the physical environment	3	0	0
Occupational safety and health risks	3	3	1
Air pollution	2	2	1
Noise pollution	2	2	1
Solid waste generation	2	2	1
Water demand	2	2	1
Effluent generation	2	2	1
Littering during transportation	0	2	0
Contamination of surface groundwater	0	3	0
Soil contamination	0	3	0
Loss of livelihoods	0	0	3
Creation of ecologically vulnerable land	0	0	2

Magnitude	Impact score
Negligible	0
Low	1
Moderate	2
High	3

3.4 Public consultations and findings

Pursuant to the requirements for stakeholder engagement in the ESIA process envisioned under EMCA and the Kenya Constitution 2010, the firm of experts organized a community consultative meeting in collaboration with Tai Lifestyle Limited and the local administration targeting the potentially affected persons.

3.4.1 Community consultative meeting

The meeting was held on 21st July 2022 at the Kajire Social Hall, starting at 10 am and was attended by 122 community members (Figure 9).

The agenda of the meeting was to;

1. Sensitize the local community on the proposed establishment of the asbestos corrugated sheets disposal site
2. Document comments and concerns of the community with respect to the construction of the silt traps
3. AOB

3.4.1.1 Concerns/issues raised by the local community

The community concerns/issues with respect to the disposal site were discussed under the plenary session. They included;

1. Health hazards of asbestos to human and livestock
2. Contamination of underground water and soil
3. The distance from the proposed disposal site to the community settlements
4. Site visit to the proposed project site
5. Pending court case between Sagalla and Izera ranches

The five issues were exhaustively discussed and responded to by the ESIA consultant and staff from Tai Lifestyle Limited. In addition, the ESIA study report has proposed Environmental Management and Monitoring Plans to mitigate the concerns of the local community throughout the project cycle. The meeting proceedings are annexed to this report.

Figure 9: A section of the locals who attended the community engagement meeting at Kajire Social Hall (Source: Public consultative meeting, July 2022).

3.4.1.2 Site visit to the proposed project site

During the community consultative meeting held on 21st July 2022 at Kajire Social Hall, the community requested for a visit to the proposed disposal site so that they can appreciate its exact location. Consequently, Tai Lifestyle Limited, the ESIA consultant and the local administration organized a site visit for the community to the disposal site on 27th July 2022 (Figure 10). During the site visit, the community members were shown the exact location of the proposed disposal site and given a brief overview of the disposal facility establishment and operation phase. After the site visit, they reaffirmed their support for the proposed project subject to the implementation of the mitigation measures proposed in the ESIA study report.

Figure 10: Site visit with local community to the proposed disposal site location (Source: Community site visits, July 2022).

3.4.2 Concerns by other stakeholders

3.4.2.1 Sagalla Ranchers Limited

Sagalla Ranchers Limited stated that there is a pending court case between Izera Ranch Enterprises Limited and themselves. They added that asbestos corrugated sheets are hazardous and may pose risk to both the environment and neighbors within the proximity of the property. In response, the proponent requested them to provide the court case number and pleadings. Their letter is annexed to this report.

3.4.2.2 Wildlife works

Wildlife works wanted to know the following details about the proposed asbestos disposal site;

a) The geographic coordinates
b) The dimensions (area)
c) The expected volume of asbestos corrugated sheets

In addition, they stated that the proposed disposal site has a pending court case.

To address these issues, the consultant responded as follows;
The proposed asbestos corrugated sheets disposal site will be located on Plot L.R. No. 12177/68 in Sagalla, Taita Taveta County. It is geo-referenced at Latitude 3°38'22.69" South and Longitude 38°37'6.83"East.

The strategy for disposal will be pit burial at a depth of 3meters which will be excavated and lined with concrete and High Density Polyethylene (HDP) to prevent soil and underground water contamination. Pilling of the asbestos sheets will be up to 2meters from the excavated ground, closing up the HDP and backfilling the remaining one meter as per National Guidelines for Safe Management and Disposal of Asbestos, 2011.

The number of pits to be constructed will be on asbestos disposal need basis. The dimensions for each pit are as follows; Length 36m, breadth 14m and height 3m. The expected volume of the asbestos corrugated sheets is approximately 300,000 tones.

In addition, the consultant requested Wildlife works to provide the court case number and pleadings which they are yet to provide.

3.4.3 Grievances Redress Mechanism

3.4.3.1 Introduction

The affected persons by the proposed project may raise their grievances and dissatisfactions about actual or perceived impacts in order to find a satisfactory solution. These grievances, influenced by their physical, situational and/or social losses, can emerge at the different stages of the project cycle. Not only should the affected persons be able to raise their grievances and be given an adequate hearing, but also satisfactory solutions should be found that mutually benefit both the affected persons and the project. It is equally important that the affected persons have access to legitimate, reliable, transparent and efficient institutional mechanisms that are responsive to their complaints.

3.4.3.2 Grievances prevention

Grievances cannot be avoided entirely, but much can be done to reduce them to manageable numbers and reduce their impacts. This will be achieved by;

1. Providing sufficient and timely information to communities. Many grievances arise because of misunderstandings; lack of information; or delayed, inconsistent or insufficient information. Accurate and adequate information about a project and its activities, plus an approximate implementation schedule, should be communicated to the communities, especially affected parties, regularly.
2. Conduct meaningful community consultations. The project proponent should continue the process of consultation and dialogue throughout the implementation of the project. Sharing information, reporting on project progress, providing community members with an opportunity to express their concerns, clarifying and responding to their issues, eliciting communities' views, and receiving feedback on interventions will benefit the communities and the project management.
3. Overall good management of the facility will ensure a reduction in potential conflicts with the local community and other stakeholders.

3.4.3.3 Grievances Redress Mechanism Tool

The facility will have a prompt and efficient resolution on individual and collective complaint and provision of feedback on any grievances and dissatisfaction from stakeholders during operations. The flow chart below (Figure 11) shows a complaint and proposal consideration mechanism for the facility that provides an accessible channel for submission of complaints and feedback to stakeholders.

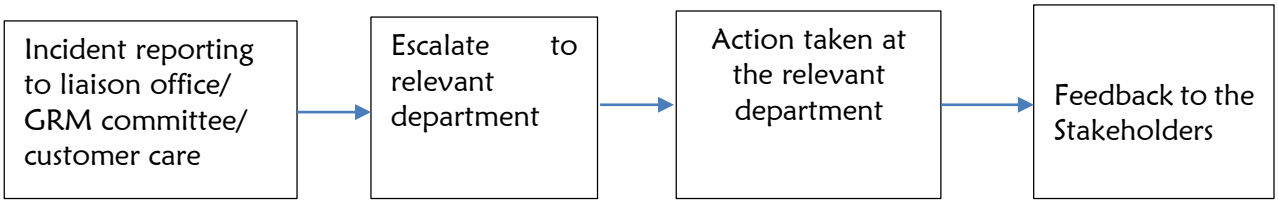


Figure 11: Grievances Redress Mechanism Tool flow chart (Source: Consultant's gallery, 2021).

3.5 Analysis of project alternatives

Analyzing project alternatives is important as it allows the proponent to evaluate possible project options that could mitigate the environmental risks identified during the ESIA process through prevention, elimination of the risks all together or reduction of the severity of an impact. The analysis will also assist NEMA and lead agencies in decision making by either approving the project as proposed or advising the proponent on the need for a particular alternative such as an alternative

site or technological and design changes. In the current proposal, the alternatives identified are discussed in detail below.

3.5.1 The 'No project' alternative

The 'No Project' alternative has the advantage of retaining the status quo, meaning that the predicted environmental impacts will not occur and is ideally the best case scenario for mitigation. This alternative is however not viable owing to the lack of appropriate and licensed disposal sites in the county and the increased demand for the safe disposal of asbestos.

3.5.2 The "Yes Project" alternative

This option envisages that the proposal will be implemented thus was considered as the most viable because of the following reasons;

1. Provision of safe disposal services for asbestos corrugated sheets
2. Optimal use of land that is currently undeveloped
3. Creation of employment opportunities
4. Source of income from the proponent and revenue to the government

3.5.3 Alternative project site

An alternative site could be considered for disposal site if the proposed project would present serious environmental challenges that cannot be effectively managed. However, the proposed mitigation measures are considered adequate to minimize the impacts to levels that do not warrant significant environmental damage. In addition, there is availability of adequate piece of land for the proposal. This alternative is therefore not viable.

4 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR THE PROPOSED PROJECT

The preceding section has analyzed and identified the potential environmental and social impacts of the proposed project as well as the mitigation measures to address the impacts. Under this section, three Environmental and Social Management Plans (ESMPs) are proposed to guide the proponent in implementing the mitigation measures. These are ESMPs for the construction, operational and possible decommissioning phases. Each of the ESMP is organized into five sections comprising of the environmental concerns, recommended mitigation measures, implementing party, timeframe and a budget.

The approach for mitigation follows the precautionary principle which aims at first avoiding the impact, minimizing the impact by limiting the degree or magnitude of the action, rectifying the impact by repairing, rehabilitating, or restoring the affected environment, reducing or eliminating the impact over time and lastly compensating for the impact by replacing or providing substitute resources or environments.

4.1 Environmental and Social Management Plan for the establishment phase

For the establishment phase ESMP (Table 8), the main environmental issues include loss of grazing areas and wildlife habitat, destruction of the physical environment, occupational safety and health risks, air and noise pollution, solid waste and effluent generation, and water demand.

4.2 Environmental and Social Management Plan for the operational phase

The main environmental concerns at this phase include littering during transportation, safety and health risks, air and noise pollution, contamination of surface and ground water, soil contamination and solid waste generation (Table 8).

4.3 Environmental and Social Management Plan for the decommissioning phase

The decommissioning ESMP is important in the event of absence of land for further disposal, end of project life and closure by government agencies due to non-compliance with environmental and health regulations among others. The key issues of concern at this stage will be loss of livelihoods and creation of ecologically vulnerable land (Table 8).

Table 8: Environmental Management plan for the establishment, subsequent operation and possible decommissioning phase of the proposed project.

Environmental concerns	Recommended mitigation Measures	Implementing party	Timeframe	Cost (KES)
Establishment phase				
Loss of grazing areas and wildlife habitat	Preserve as possible indigenous trees and other vegetation cover that need not be removed	Proponent/contractor	During establishment	Nil
Destruction of physical environment	Restore degraded areas through landscaping by sediment binding grasses and trees	Proponent/contractor	During establishment	Nil
	Retain the excavated soil to be used in backfilling the disposal pits	Proponent/contractor	During establishment	Nil
Occupational safety and health risks	Register the site as a workplace with the DOSHS	Proponent/contractor	Prior to commencement	5,000
	Obtain insurance cover for the workers at the site	Proponent/contractor	Prior to commencement	1,000,000
	Provide adequate and appropriate PPE to workers and visitors to the site and enforce on their use	Proponent/contractor	Throughout establishment	200,000
	Provide employees with correct tools and equipment for the jobs assigned and train on their use	Proponent/contractor	During construction	Nil
	Ensure moving parts of machines and sharp surfaces are securely protected with guards	Proponent/contractor	Throughout establishment	Nil
	Provide first aid services and emergency vehicle at the site	Proponent/contractor	Throughout establishment	500,000
	Comply with the Occupational Safety and Health Act, 2007	Proponent/contractor	Continuous	Nil
Air pollution	Sprinkle water at the excavation areas to suppress dust	Proponent/contractor	Daily	10,000
	Use of serviceable machinery/equipment and trucks	Proponent/contractor	During establishment	Nil
	Procure and enforce the use of dust masks to workers and visitors to the project site	Proponent/contractor	During establishment	50,000
	Monitor fugitive emissions	Proponent/contractor	Quarterly	50,000
	Comply with the Air Quality Regulations, 2014	Proponent/contractor	Continuous	Nil
Noise Pollution	Procure and provide adequate ear muffs to workers and visitors to the site and enforce their use	Proponent/contractor	Throughout establishment	50,000
	Sensitize truck drivers to avoid unnecessary hooting and running of vehicle engines	Proponent/contractor	Throughout establishment	Nil

Environmental concerns	Recommended mitigation Measures	Implementing party	Timeframe	Cost (KES)
	Comply the Noise and Excessive Vibration Pollution (Control) Regulations, 2009	Proponent/contractor	Continuous	Nil
Solid waste generation	Use the generated overburden in backfilling and landscaping	Proponent/contractor	During establishment	Nil
	Procure and strategically place adequate solid waste collection bins with a capacity for segregation	Proponent/contractor	Prior to commencement	80,000
	Procure a sizeable central solid waste collection bin with chambers to accommodate separated waste	Proponent/contractor	Prior to commencement	100,000
	Sensitize construction workers on proper waste management	Proponent/contractor	Continuous	Nil
	Procure the services of a NEMA licensed waste handler to dispose off the solid waste	Proponent/contractor	Prior to commencement	Tender
	Comply with the Waste Management Regulations, 2006	Proponent/contractor	Continuous	Nil
Water demand and effluent generation	Sensitize the workforce on the need to conserve the available water resources	Proponent/contractor	Throughout establishment	Nil
	Monitor the amount of water being abstracted from the borehole	Proponent/contractor		
	Procure and deliver to the site mobile toilets from a NEMA licensed waste contractor	Proponent/contractor	During construction	30,000
	Comply with Water Quality Regulations, 2006	Proponent/contractor	Continuous	Nil
Operational phase				
Littering during transportation	The ACMs waste should be transported to the disposal site in an enclosed vehicle or container	Proponent	Throughout operations	Nil
	Vehicles transporting the asbestos waste should be licensed as per the Waste Management Regulations, 2006	Proponent	Throughout operations	8,000 per application
	Ensure all persons involved in handling and disposal of asbestos adhere to the stipulations set under the National Guidelines on Safe Management and Disposal of Asbestos, 2011	Proponent	Throughout operations	Nil
Safety and health risks	Train workers on asbestos handling	Proponent	Biannual	20,000
	Fence the disposal site using a chain link with an access gate to control access with clear hazard demarcations	Proponent	Prior to operations	In project cost
	Provide adequate and appropriate PPE to all workers, train them on correct use and enforce their use	Proponent	Throughout operations	100,000

Environmental concerns	Recommended mitigation Measures	Implementing party	Timeframe	Cost (KES)
	Comply with the provisions of the Occupational Safety and Health Act, 2007 and the National Guidelines on Safe Management and Disposal of Asbestos, 2011	Proponent	Continuous	Nil
Air pollution	Provide adequate and appropriate PPE to all workers, train them on correct use and enforce their use	Proponent	Throughout operations	100,000
	Lower the ACMs gently into the disposal site to avoid breakages	Proponent	During operations	Nil
	Wet any cracked pieces of ACMs to prevent release of the asbestos fibres	Proponent	During operations	Nil
	Comply with the provisions of the National Guidelines on Safe Management and Disposal of Asbestos, 2011 and the Air Quality Regulations, 2014	Proponent	Continuous	Nil
Noise pollution	Provide earmuffs to employees and visitors to the disposal site	Proponent	Throughout operations	20,000
	Comply with the Noise and Excessive Vibration Pollution (Control) Regulations, 2009	Proponent	Continuous	Nil
Contamination of surface and ground water	The pits should be shallow and as such do not pose a threat to the water table	Proponent	Prior to operations	In project cost
	The design of the site should include appropriate drainage channels so as to divert surface runoff from the disposal area	Proponent	Prior to operations	In project cost
	Comply with the provisions of the Waste Management Regulations, 2006 and the National Guidelines on Safe Management and Disposal of Asbestos, 2011	Proponent	Continuous	Nil
Soil contamination	The burial pits should be lined with concrete	Proponent	Prior to operations	In project cost
	Ensure the burial pits are fully covered with the HDP liner	Proponent	Prior to operations	In project cost
	Construct a concrete paved area to be used for clean-up activities	Proponent	Prior to operations	In project cost
	Waste water from the clean-up area should be directed towards the established water drains	Proponent	During operations	Nil
	The contaminated soil during clean-up activities should be removed and disposed of at the disposal site	Proponent	During operations	Nil

Environmental concerns	Recommended mitigation Measures	Implementing party	Timeframe	Cost (KES)
Solid waste generation	Asbestos contaminated PPE should be disposed in the disposal pits	Proponent	During operations	Nil
	Comply with the provisions of the Waste Management Regulations, 2006 and the National Guidelines on Safe Management and Disposal of Asbestos, 2011	Proponent	Throughout operations	Nil
Water and effluent generation	Sensitize the workforce at the site on the need to conserve the available water resources	Proponent	Throughout operations	Nil
	Construct sanitation facilities for use by workforce	Proponent	Prior to operations	In project cost
	Install and commission a bio-digester to manage the generated effluent	Proponent	Prior to operations	100,000
	Monitor the quality of the effluent from the bio-digester	Proponent/Licensed NEMA laboratory	Quarterly	30,000
	Apply for and obtain an Effluent Discharge License from NEMA	Proponent	Annual	30,000
	Comply with the of the Water Quality Regulations, 2006	Proponent	Continuous	Nil
Decommissioning phase				
Economic decline	Train employees on alternative livelihoods prior to decommissioning	Proponent	3 months prior to decommissioning	Nil
	Prepare and issue recommendation letters to the workers to seek alternative employment opportunities	Proponent	Prior to decommissioning	Nil
	Review potential job opportunities in other ongoing contracts by the proponent and recommend the employees who qualify	Proponent	Prior to decommissioning	Nil
	Comply with labor laws by paying the employees their terminal dues	Proponent	Prior to decommissioning	TBD
Creation of ecologically vulnerable land	Maintain the warning signs, fence and gate to prevent vandalism and interference of the disposal site	Proponent	Throughout decommissioning	Nil
	Rehabilitate the site through planting grass and appropriate tree species in consultation with the KFS	Proponent	During decommissioning	TBD

5 ENVIRONMENTAL MONITORING PLANS

5.1 Introduction

A suite of Environmental Monitoring Plans is required to ensure full and systematic implementation of the Environmental Management Plan. It entails assessment of environmental performance of the proposed project by documenting, tracking and reporting any changes in environmental parameters in space and time. The objective of the monitoring plans is to enhance the environmental performance of the project by providing data and information on compliance with legislative standards and determining the levels of deviation from the values obtained during the baseline monitoring. This in turn informs the corrective measures if any that need to be implemented to comply with the legislative standards. For the proposed project, five monitoring plans are proposed. These are;

1. Soil quality monitoring plan
2. Water quality monitoring plan
3. Occupational safety and health monitoring plan
4. Air quality monitoring plan
5. Noise level monitoring plan

5.2 Soil monitoring plan

5.2.1 Introduction

There is potential to contaminate the soils in the area if the asbestos sheets are not well covered with the HDP liner and the pits not lined with concrete. Additionally, clean-up of the asbestos contaminated PPE and the truck may contaminate the soil. The purpose of soil monitoring is to assess potential soil contamination and ensure compliance with the National Guidelines on Safe Management and Disposal of Asbestos, 2011

5.2.2 Monitoring strategy

Soil samples will be collected and analyzed at an accredited laboratory for potential contamination during annual audits.

5.3 Water quality monitoring plan

5.3.1 Introduction

The proponent should put in place consistent water quality monitoring plan for the borehole and water pan water within the ranch and the effluent generated from the disposal site. The purpose of the monitoring plan is to ensure the quality of water from the borehole is fit for portable water as per the KS EAS 12:2018 specification for natural potable water and effluent generated complies with the standards prescribed under the Third Schedule of the Environmental Management and Coordination (Water Quality) Regulations, 2006.

5.3.2 Monitoring parameters

Borehole and water pan water will be monitored pursuant to the KS EAS 12:2018 specification for natural potable water (Table 9) whereas effluent from the proposed bio-digester will be monitored pursuant to the Third Schedule of Environmental Management and Coordination (Water Quality) Regulations, 2006 (Table 10).

5.3.3 Monitoring location

Water quality sampling should be carried out at the borehole and water pan within Izera ranch, and the discharge point of the bio-digester.

5.3.4 Monitoring frequency

Borehole and water pan water sampling and analysis should be undertaken monthly whereas that for effluent should be undertaken quarterly in collaboration with a NEMA designated laboratory.

Table 9: Water quality monitoring parameters as per KS EAS 12:2018 specification for natural potable water.

Parameter	KS EAS 12: 2018 Specification for natural portable water
PHYSICAL TESTS	
Appearance	Unobjectionable
Odour	Unobjectionable
Suspended matter	Not detectable
Colour hazen units, TCU	50 MAX
PH@25°C	5.5-9.5
Conductivity, μS/cm	2500 MAX
CHEMICAL TESTS	
Total dissolved solids, mg/L	1500 MAX
Total hardness as $CaCO_3$,mg/L	600 MAX
Chlorides as Cl, mg/L	250 MAX
Aluminium as Al, mg/L	0.2 MAX
Manganese as M, mg/L	0.1 MAX
Iron as Fe, mg/L	0.3 MAX
Sodium as Na, mg/L	200 MAX
Magnesium as Mg, mg/L	100 MAX
Calcium as Ca, mg/L	150 MAX
Lead as Pb, mg/L	0.01 MAX
Copper as Cu, mg/L	1.0 MAX
Flouride as F, mg/L	1.5 MAX
Potassium as K, mg/L	50 MAX
Sulphates as SO_4, mg/L	400 MAX
Total alkalinity as $CaCO_3$, mg/L	-
Residual Chlorine as Cl_2, mg/L	Absent
MICROBIOLOGICAL TESTS	
Total plate count@ 37°C, cfu/ml	50 MAX
Total plate count@ 22°C, cfu/ml	100 MAX
Total coliform count, cfu/ml	Absent
Escherichia coli, cfu/ml	Absent
Pseudomonas aeruginosa, /100ml	Absent

Table 10: Water Quality Monitoring Parameters and the standards prescribed under the Third Schedule of the Environmental Management and Coordination (Water Quality) Regulations, 2006.

Parameter	EMC (Water Quality) Regulations, 2006 Standards
PH Value	6.5-8.5
BOD; mg/L	30max
COD; mg/L	50 max
Total Suspended Solids; mg/L	30 max
Ammonia-NH+; mg/L	100 Max
Total Dissolved Solids; mg/L	1200 Max
E. *Coli* Colonies; count/100ml	Nil
Total coliform; count/100ml	1000/100ml

5.4 Occupational safety and health monitoring plan

5.4.1 Introduction

Potential safety and health risks during construction and subsequent operational phases will emanate from the use of machinery, noise and air pollution and exposure to asbestos. All these have a potential to cause injures, permanent disability or even death to workers and visitors to the site. The purpose of safety and health monitoring plan is to assess existing controls alongside potential safety and health risks in order to develop an effective action plan and to ensure compliance with Occupational Safety and Health Act (OSHA), 2007.

5.4.2 Monitoring strategy

The proponent should be committed to ensuring, as far as is reasonably practicable, the safety and health of the workers and visitors to the site is not put at risk during the construction phase and from the operations of the disposal site. This will be achieved by;

- Hazard identification by analyzing activities that can be an immediate threat or cause harm over a period of time.
- Ensuring that all accidents and incidents occurring at the site are promptly reported and investigated.
- Keeping statistics of accidents, incidents and dangerous occurrences and ensuring that reportable cases are filed with the health, safety and environment officer.
- Routine inspections of the disposal site.
- Visual inspection as well as interviewing key personnel to identify areas of improvement.
- Evaluation of the effectiveness of health and safety training to the workforce.
- Assessment of risks involving asbestos handling and disposal

The responsibility for implementing this monitoring plan will be vested in the Department of Occupational Safety and Health Services and overall the management.

5.5 Air quality monitoring plan

5.5.1 Introduction

Air pollution during the construction phase will be in form of dust and exhaust fumes whereas during operations will be as a result of breakage of asbestos releasing fibres into the air. Air pollution above acceptable limits is toxic to ecological systems and to human health. The purpose of the air quality monitoring plan is to ensure that the concentrations of air pollutants are within the standards prescribed under the Environmental Management and Coordination (Air Quality) Regulations, 2014. In addition, the results will be used to evaluate if the adopted air pollution controls and management are effective.

5.5.2 Monitoring parameters

The monitoring parameters and the specified target values are stipulated under the First Schedule of the Environmental Management and coordination (Air Quality) Regulations, 2014 (Table 11).

5.5.3 Monitoring location

Air quality monitoring should be carried out within the project site during the establishment and operational phases.

5.5.4 Monitoring frequency

Air quality monitoring should be done on a quarterly basis in collaboration with a NEMA designated laboratory.

Table 11: Ambient air quality tolerance limits as per the First Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014.

Pollutant	Time weighted average	Industrial area
Sulphur oxides (SO_x)	Annual Average*	80 $\mu g/m^3$
	24 hours**	125 $\mu g/m^3$
Oxides of Nitrogen (NO_x)	Annual Average*	80 $\mu g/m^3$
	24 hours	150 $\mu g/m^3$
Nitrogen Dioxide	Annual Average	150 $\mu g/m^3$
	24 hours	100 $\mu g/m^3$
Suspended Particulate Matter (SPM)	Annual Average	360 $\mu g/m^3$
	24 hours	500 $\mu g/m^3$
Respirable particulate matter (< 10μm) (RPM)	Annual Average*	70 $\mu g/m^3$
	24 Hours**	150 $\mu g/Nm^3$
$PM_{2.5}$	Annual Average	35 $\mu g/m^3$
	24 Hours	75 $\mu g/m^3$
Lead (Pb)	Annual Average*	1.0 $\mu g/Nm^3$
	24 hours**	1.5 $\mu g/m^3$
Carbon monoxide/ Carbon dioxide	8 hours	5.0 mg/m^3
	One hour	10 mg/m^3
Hydrogen Sulphide	24 hours**	150 $\mu g/m^3$
Non methane hydrocarbons	Instant Peak	700ppb
Total VOC	24 Hours**	600 $\mu g/m^3$
Ozone	One hour	200 $\mu g/m^3$
	8 hour (Instant Peak)	120 $\mu g/m^3$

5.6 Noise monitoring plan

5.6.1 Introduction

Potential sources of noise pollution will emanate from excavation works, delivery of asbestos and use of machinery. Noise levels above the stipulated EMCA limits may lead to hearing impairments to both the workers and visitors to the site. The purpose of noise monitoring plan is to therefore ascertain the extent of the impact due to the establishment and subsequent operation of the disposal site in compliance with the First and Second Schedule of the Environmental Management and Coordination (Noise and Excessive Vibrations pollution) (control) Regulations, 2009.

5.6.2 Monitoring parameters

Noise level measurements will be monitored pursuant to the First Schedule of the Environmental Management and Coordination (Noise and Excessive Vibrations pollution) (control) Regulations, 2009 (Table 12).

5.6.3 Monitoring location

Noise monitoring should be carried out within the project site.

5.6.4 Monitoring frequency

Noise monitoring should be done on a quarterly basis in collaboration with a NEMA designated laboratory. Noise levels will be measured in dB (A).

Table 12: The Maximum permissible intrusive noise levels as stipulated under the First Schedule of Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

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

Day: 6.01 a.m. – 8.00 p.m. (Leq, 14 h) Night: 8.01 p.m. – 6.00 a.m. (Leq, 10h)

6 GOVERNANCE FRAMEWORK

6.1 Introduction

The Third Schedule of EIA/EA Regulations requires that environmental guidelines and standards which include Kenya government policies and strategies, national legislation and the institutional arrangements to render them should be incorporated in an ESIA report. The legal and institutional frameworks provide important safeguards for protection and conservation of fragile environments and vulnerable communities and enhance the implementation of the Environmental and Social Management Plans. Under this section, the ESIA will therefore review the applicable sets of laws, and institutions which environmental compliance requirements for the proposed asbestos corrugated sheets disposal site.

6.2 Policy Framework

6.2.1 National Environment Policy, 2013

The National Policy aims to provide a framework for an integrated approach to sustainable management of Kenya's environment and natural resources. In particular, it proposes to strengthen:

- Legal and institutional framework for good governance
- Integrate environmental management with economic growth, poverty reduction and improving livelihoods
- Research and capacity development
- Promote new environment management tools
- Promote collaboration and cooperation and partnerships in environment management
- Promote domestication, co-ordination and maximization of benefit from Strategic Multilateral Environment Agreements

Chapter 6 of the policy elaborates on environmental quality and health and the need to ensure a clean and health environment for all.

6.2.2 The National Health Policy 2014 - 2030

The goal of the Policy is to attain the highest possible standard of health in a responsive manner. The health sector aims to achieve this goal by supporting equitable, affordable, and high-quality health and related services at the highest attainable standards for all Kenyans. This Policy has six objectives which include; to eliminate communicable conditions, to halt and reverse the rising burden of non-communicable conditions and mental disorders, to reduce the burden of violence and injuries, to provide essential healthcare, to minimize exposure to health risk factors and to strengthen collaboration with private and other sectors that have an impact on health. This policy takes into account the functional responsibilities between the two levels of government (county and national) with their respective accountability, reporting and management lines. It proposes a comprehensive and innovative approach to harness and synergize health services delivery at all levels.

6.2.3 The National Land Policy, 2009

The National Land Policy guides the country towards efficient, sustainable and equitable use of land for prosperity and posterity. The Mission of the Policy aims at: promoting positive land reforms for the improvement of the livelihoods of Kenyans through the establishment of accountable and transparent laws, institutions and systems dealing with land. The overall objective of the Policy is to secure rights over land and provide for sustainable growth, investment and the reduction of poverty in line with the Government's overall development objectives. Specifically the policy offers a framework of policies and laws designed to ensure the maintenance of a system of land administration and management that will provide: a) All citizens with the opportunity to access and beneficially occupy and use land; b) Economically viable, socially equitable and environmentally sustainable allocation and use of land; c) Efficient, effective and economical operation of land markets; d) Efficient and effective utilization of land and land-based resources; and e) Efficient and

transparent land dispute resolution mechanisms. Sustainable land use practices are key to the provision of food security and attainment of food self-sufficiency.

6.3 Legislative Framework

6.3.1 The Constitution of Kenya, 2010

The Constitution of Kenya 2010 is the supreme law of the land. Under Chapter IV, article 42 provides for the right to a clean and healthy environment for all. Further, Chapter V of the Constitution deals with Land and Environment. Specifically, Part 2 elaborates on the obligations of the proponent in respect to protection of the environment and enforcement of environmental rights.

Relevance to the proposed project

- The proponent is entitled to a fair administrative decision-making process from NEMA and other State organs.
- The proponent must ensure that the development is carried out in an ecologically, economically and socially sustainable manner.
- The proponent should ensure that construction and operations of the facility do not infringe on the right to a clean and healthy environment for all.

6.3.2 The Environmental Management and Co-ordination Act (EMCA) Cap. 387 of the Laws of Kenya

The Act is the framework environmental law and aims to improve the legal and administrative co-ordination of the diverse sectoral initiatives in the field of environment so as to enhance the national capacity for its effective management. The Act harmonizes the sector specific legislations touching on the environment in a manner designed to ensure greater protection of the environment in line with the National Environment Policy, 2013.

Relevance to the proposed project

Section 58 of the Act requires proponents of a development likely to have deleterious effects on the environment to prepare and submit an EIA report to NEMA for consideration for decision making. This ESIA report is prepared to comply with the provisions of this section.

6.3.3 Regulations under the EMCA Cap. 387 of the Laws of Kenya

To operationalize EMCA, several Regulations have been gazetted since its enactment in 1999 and its amendment in 2015. These relevant ones are;

1. **Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003**

   These Regulations guide the preparation of EIA including how experts should conduct the EIA process and guidelines and standards to be met by the reports. The Regulations were reviewed in 2016 to align them to the Kenya Constitution 2010. They were also recently amended (2019) to address challenges that have been reported since they were gazetted. This report complies with the provisions of these Regulations.

2. **Environmental Management and Coordination (Water Quality) Regulations, 2006**

   These Regulations address the challenges of pollution of water resources and conservation. It consists of VI parts and eleven schedules dealing with protection of sources of water for domestic use to miscellaneous provisions. For the proposed disposal site, the proponent should implement measures to prevent water pollution from construction of the asbestos burial pits and the disposal activities.

3. **Environmental Management and Coordination (Waste Management) Regulations, 2006**

The Regulations focus on the management of solid waste, industrial waste, hazardous waste, pesticides, toxic substances and radioactive substances. In compliance with these Regulations, the proponent should ensure proper solid waste disposal throughout the project cycle.

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

   These Regulations were gazetted to manage noise levels to levels that do not cause a disturbance to the public. Noise is expected to be generated by the trucks in and out of the site, as well as machinery that may be used at the site to aid in the deep burial undertaking. Appropriate PPE should be provided to employees.

5. Environmental Management and Coordination (Air Quality) Regulations, 2014

   These regulations were aimed at controlling, preventing and abating air pollution to ensure clean and healthy ambient air. Airborne dust is likely to be present in the environment where asbestos is handled due to its fibrous nature. During handling operations, they are bound to be breakages that will generate dust which is harmful. The proponent should provide workers with adequate and appropriate PPE, train them on correct use and enforce their use.

6.3.4 National Guidelines on Safe Management and Disposal of Asbestos, 2013

The main objective of these guidelines is to protect the environment and minimize risk to workers and public from asbestos fibres. These guidelines apply to all persons or firms operating in facilities and premises in which asbestos materials may be handled during installation, demolition, renovation, repair or removal for disposal.

Relevance to the proposed project

The proponent should ensure strict adherence to the stipulated guidelines on safe management and disposal of asbestos.

6.3.5 The Occupational Safety and Health Act, 2007

The OSHA, 2007 commenced on 26th October 2007. It is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces. Although the OSHA, 2007 repealed the Factories and Other Places of Work Act Cap. 514 of the Laws of Kenya, it inherited all the subsidiary legislation issued under Cap. 514. Examples of subsidiary legislation inherited include:

- Docks Rules L.N. 306 of 1962
- Eyes Protection Rules L.N. 44 of 1978
- Building Operations and Works of Engineering Construction Rules L.N. 40 of 1984
- Electric Power Special Rules L.N. 340 of 1979
- First Aid Rules L.N. 87 0f 1964
- Cellulose Solutions Rule L.N. 87 of 1964
- Health and Safety Committee Rules L.N. 31 of 2004
- Medical Examination Rules L.N. 24 of 2005
- Noise Prevention and Control Rules L.N. 25 0f 2005
- Fire Risk Reduction Rules L.N. 59 0f 2007
- Hazardous Substances Rules L.N. 60 of 2007

Relevance to the proposed project

Under OSHA, the proponent should register the site as a workplace with the DOSHS and ensure timely renewal of the same. In addition, the proponent should provide the workers with adequate and appropriate PPE and enforce their use.

6.3.6 Public Health Act, 2012

It is an Act of Parliament that makes provision for securing and maintaining health. It outlines the responsibilities for the County Government to maintain a safe and clean environment by taking practicable measures for preventing the occurrence of any outbreak, or prevalence of any infections, communicable or preventable diseases or conditions to safeguard and promote the public health and to exercise the powers and perform the duties in respect of the public health conferred or imposed on it by this Act or by any other law. Section 3 gives provisions for use of poisonous substances. It refers to regulations for protection of persons against risk of poisoning, imposing restrictions or conditions on the importation, sale, disposal, storage, transportation or use of poisonous substances.

Relevance to the proposed project

The proponent will ensure the safety of the public during the disposal of asbestos by ensuring the burial pits are lined with the HDP and concrete, and securing the site using appropriate hazard demarcations.

6.3.7 The Physical and Land Use Planning Act, 2019

The Act provides for the planning, use, regulation and development of land and for connected purposes. It was enacted to ensure that every person engaged in physical and land use planning shall promote sustainable use of land and livable communities which integrates human needs in any locality. The Act allows the County Government to prepare a local physical and land use development plan in respect of a city, municipality, town or unclassified urban area.

Relevance to the proposed project

The proponent should obtain approvals of the plans for the disposal site and operational licenses from the County Government of Taita Taveta.

6.3.8 The Water Act, 2016

The Constitution acknowledges access to clean and safe water as a basic human right and assigns the responsibility for water supply and sanitation service provision to the 47 established counties. The purpose of the 2016 Water Act is to align the water sector with the Constitution's primary objective of devolution. The Act establishes several organs to ensure development and sustainable use of water resources. These include the Water Resources Authority (WRA), the Water Sector Trust Fund (WSTF), Water Resources Users Associations (WRUAs), Water Services Providers (WSPs) and Water Works Development Agencies among others.

Relevance to the proposed project

The Water Act provides for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water, to provide for the regulation and management of water supply and sewerage services. The proposed project will source its water from an existing borehole within Izera ranch.

6.3.9 The County Government Act, 2012

The new constitution grants County Governments the powers to grant or to renew business licenses or to refuse the same. To ensure implementation of the provisions of the new constitution, the County Governments are empowered to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of health, safety and well-being of the general public.

Relevance to the proposed project

The Act gives right to access private property at all times by the County Government officers and servants for inspection purposes.

6.4 Institutional arrangements

To implement the above legal framework, the government has established a number of institutions with varying mandates of implementation. These include;

1. The National Environment Management Authority to implement the Environmental Management and Coordination Act and associated Regulations.
2. The Directorate of Occupational Safety and Health Services to implement the Occupational Safety and Health Act alongside the subsidiary legislation.
3. The Water Resources Authority to implement the Water Act.
4. The County Government of Taita Taveta to implement the County Government Act, its by-laws, the Public Health Act, the Physical and Land Use Planning Act and the Occupiers Liability Act.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

The proposed project is considered important and beneficial to the economy as it will ensure safe disposal of asbestos corrugated sheets, promote socio-economic growth of the area through employment creation and revenue generation to the government. The key concerns that will result from the implementation of the proposed project include occupational safety and health risks, air and noise pollution, waste generation, contamination of surface and ground water, soil contamination and water demand. The ESIA study proposes a suite of comprehensive Environmental and Social Management and Monitoring Plans to address the anticipated negative impacts during the entire project cycle and improve the environmental performance of the proposed project.

7.2 Recommendations

The main recommendation of the ESIA is the need for concerted implementation of the Environmental Management and Monitoring Plans by the proponent. The specific key ones include;

1. Preserve as possible indigenous trees and other surrounding vegetation that need not be removed
2. Register the site as a workplace with DOSHS
3. Provide adequate and appropriate PPE, train them on correct use and enforce their use
4. The ACMs waste should be transported to the disposal site in an enclosed vehicle or container, capable of being washed without lodgment of debris and fibres, and secure from escape of fibres to the atmosphere
5. Vehicles transporting the asbestos waste should be licensed as per the Environmental Management and Coordination (Waste Management) Regulations, 2006 and must be accompanied by a waste tracking document
6. Fence the disposal site using a chain link with an access gate to control access with clear hazard demarcations
7. Lower the ACMs gently into the disposal site to avoid breakages
8. Wet any cracked pieces of ACMs to prevent release of the asbestos fibres
9. The pits should be shallow and as such do not pose a threat to the water table
10. The design of the site should include appropriate drainage channels so as to divert surface runoff from the disposal area
11. The burial pits should be lined with concrete
12. Ensure the burial pits are fully covered with the HDP liner
13. Waste water from the clean-up area should be directed towards the established water drains
14. The contaminated soil during clean-up activities should be removed and disposed of at the disposal site
15. Prior to decommissioning, the proponent should prepare and submit a due diligence decommissioning audit report to NEMA for approval at least three (3) months in advance.
16. Comply with all pieces of regulations as documented in this study report.

On the basis of a commitment by the proponent to implement the proposed mitigation measures and the Environmental Management Plan, we recommend the issuance of an EIA License as per the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya and Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003.

8 REFERENCES

1. Government of Kenya (2019). 2019 Kenya Population and Housing Census, Kenya National Bureau of statistics.
2. Government of Kenya Policies
   - National Environment Policy, 2013
   - National Health Policy, 2014 – 2030
   - National Land Policy, 2009
3. Republic of Kenya Statutes:
   - The Constitution of Kenya, 2010
   - Environmental Management and Coordination Act Cap 387 of the Laws of Kenya
   - Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003
   - Environmental Management and Coordination (Water Quality) Regulations, 2006
   - Environmental Management and Coordination (Waste Management) Regulations, 2006
   - Environmental Management and Coordination (Air Quality) Regulations, 2014
   - Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulation, 2009
   - National Guidelines on Safe Management and Disposal of Asbestos, 2013
   - The Occupational Safety and Health Act, 2007
   - The Public Health Act, 2012
   - The Physical and Land Use Planning Act, 2019
   - The Water Act, 2016
   - The County Government Act, 2012

9 LIST OF ANNEXTURES

1. Copy of title deed plan for the proposed project site
2. Copy of Certificate of Incorporation for Tai Lifestyle Limited
3. Copy of Pin Certificate for Tai Lifestyle Limited
4. Copy of Single Business Permit for Tai Lifestyle Limited
5. Copy of approval of the scoping report and Terms of Reference for the ESIA study
6. Copies of the baseline monitoring reports for air quality, noise level measurements, water quality and soil tests
7. Copy of the stakeholders' consultative meeting programme
8. Proceedings of the stakeholders' meeting to obtain comments and concerns regarding the proposed project held at the Kajire Social Hall on 21st July 2022
9. Copy of Sagalla Ranchers Limited letter to Envasses Environmental Consultants Limited
10. Copy of the NEMA practicing license for the Firm, Envasses Environmental Consultants Limited
11. Copy of the NEMA practicing license for Lead Expert, Mr. Simon Nzuki