ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUNTUNI AREA, NDAGANI SUB LOCATION, KARINGANI LOCATION MERU SOUTH (CHUKA) SUB COUNTY, THARAKA NITHI COUNTY

.

APRIL 2023

Report prepared in Accordance with the Environmental Management and Coordination Act (EMCA) CAP 387, Environmental (Impact Assessment and Audit) Regulations, 2003 and submitted to NEMA Headquarters, South C, Nairobi.

CERTIFICATION

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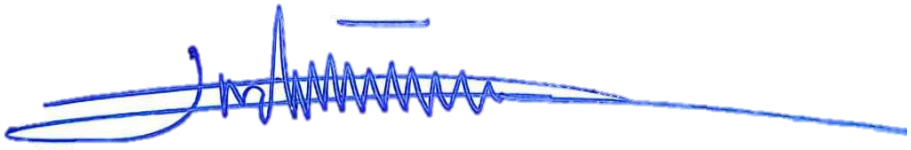
SIGNATURE: 

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ACRONYMS

CPR	Comprehensive Project Report
EA	Environmental Audit
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination
ESMP	Environmental Social and Management Plan
KES	Kenya Shillings
KM	Kilometers
KPLC	Kenya Power and Lighting Company
NEC	National Environmental Council
NEMA	National Environment Management Authority
NLC	National Land Commission
PLUPA	Physical and Land Use Planning Act
SHE	Safety Health and Environment
SWM	Solid Waste Management
UNEP	United Nations Environmental Program
WRA	Water Resources Authority

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EXECUTIVE SUMMARY

Introduction

Solid waste is a global environmental problem in today's world because of the increasing population, rapid economic growth and the rise in community living standards which accelerate generation of solid waste. In urban areas, most of the solid waste is disposed on land close to water bodies, crop fields, settlements etc. This unplanned dumping of solid waste leads to a number of problems to the environment and human health. Solid waste management is currently one of the main challenges facing county governments and other stakeholders who are mandated to ensure a sustainable solid waste management system in their respective counties. The poor management of solid waste has posed severe social, economic and environmental challenges as well as impacts, especially in cities and other urban areas due to rapid urbanization and high population growth rate in such areas (NEMA, 2014).

This Environmental and social Impact Assessment (ESIA) for development of Solid Waste Management site at Ntuntuni area in Tharaka Nithi County, was carried out as per the Terms of Reference (ToR) approved by the National Environment Management Authority (NEMA). The EIA study was conducted in accordance with the requirements of the Environmental (Impact assessment and Audit) Regulations, 2003; as amended in 2015.

The proposed Solid Waste Management site funded by the Government of Tharaka Nithi and implemented through the Department of Roads, Infrastructure and Urban Development, will be located in Ntuntuni area, Karingani Location. The project is aimed at ensuring better, efficient, environmentally friendly, and a safe way of management of solid waste for the urban centers.

This Environmental Impact Assessment Study Report has been prepared on behalf of Tharaka Nithi County. The report presents the findings for the proposed development of the project and makes recommendations on how to mitigate the negative impacts.

The Project

This project involves the development of development of Solid Waste Management site at Ntuntuni area in Tharaka Nithi County, and implementation of recommendations stipulated by this ESIA Study for the development of an Integrated Solid Waste Management System (ISWM).

The Government of Kenya and the County Government of Tharaka Nithi have identified solid waste disposal in the county as a priority problem. Implementation of the project would allow for cessation of solid waste disposal operations at the existing disposal site. The project will have the following components:

- Site Office, with Parking space
- External Washrooms
- Offloading / Sorting Zone
- Recycling plants
- Sewer line within a 8m Wayleave
- Sewage Plant
- 7 Ground Water Monitoring Wells
- Drive Way
- Perimeter Fence with a control gate house and a buffer zone
- Trucks parking

Therefore, before construction of the new Solid Waste Management Site, an environmental and social impact assessment study was a requirement. This was to provide inputs to the final design (as part of an interactive process of design and environmental/public assessment which is required by Environmental Management and Coordination Act (Cap 387) in order to obtain an optimally environmentally acceptable and cost-effective design). The final design was to incorporate mitigation measures to address potential adverse impacts and significant public concerns. Mitigation measures within the final design include construction details and operations and management plans for the new waste management disposal site.

Justification of the project

The project involves implementation of the recommendations of Tharaka Nithi County on solid waste management plan in accordance with the provisions of the constitution of Kenya 2010 for access to a healthy environment to every human being, which has been considered as a basic human right.

The eighth Sustainable development Goal emphasizes the provision of safe clean water and safe environment. Further vision 2030 social pillar targets the implementation of an integrated solid waste Management system which the project seeks to achieve.

County governments are responsible for the implementation of the devolved function of waste management. Consequently, they will be required to ensure county waste management laws conform with the Sustainable Waste Management Act.

Objectives of the Environmental and Social Impact Assessment (ESIA)

The main objective of the ESIA is to ensure that all environmental consequences due to the proposed waste management site are evaluated and analyzed to warrant developing and operating the project for the county government of Ntharaka Nithi. The environmental and socio-economic impacts evaluated and addressed as part of the mitigation measures incorporated into the facilities' final design.

Specific Objectives of the ESIA included the following :-

- To describe the project site and its environmental status.
- To assess the socio-economic status of those directly and indirectly affected by the project.
- To collect baseline information of the project area with regards to climate, geology water, soils, roads, population, social economic factors and biological environment (fauna and flora)
- To review relevant legislations for such projects

- To acquire the views of the affected public and other stakeholders with regards to the presence of the dumping site.
- To determine land use conflicts existing between the dumpsite and its neighborhood land uses,
- To determine the potential significant impacts of the project
- To propose alternatives to the project and/or project location
- To propose mitigation measures for the significant negative impacts
- To develop an ESMP for the project

EIA Methodology

To adequately address the environmental issues emanating from the implementation of the proposed project, a team of experts carried out environmental and social screening for the project. The environmental impact assessment study comprised the following activities: mobilization, consultation with stakeholders, a screening and scoping exercise, desk and field studies, data analysis, impact identification, and analysis of health and safety issues associated with the proposed project. Secondary data was collected from review of books, journals, newspapers, magazines, previous studies on solid waste management thesis, papers and reports, policies, regulations, development plans, laws and by-laws on solid waste management. Primary data was collected through observation of activities at the site and data collection questionnaire with the concerned stakeholders in the ares. A combination of tools was employed to execute the assignment. These included:

- Environmental Screening that identified the project as among those requiring EIA under schedule 2 of EMCA amendment ,2015,
- Environmental scoping to provide the key environmental issues
- Use of checklists and matrix to analyze impacts

- Use of professional expertise
- Documents analysis
- Unstructured Observation.
- Photography
- Use of GPS meters to get elevation and coordinates data
- GIS to analyze baseline data
- Mapping

Public consultation carried out by:

- Key informants' interviews
- Phone interviews
- Barazas and questionnaire administration

In order to determine and Assess the Climate Change Risk and Vulnerability of the proposed project, the consultant carried out a survey to determine how:

i. Climate change may influence the proposed project
ii. How current climate parameters will change due to global climate change,
iii. Assess how this these climate hazards may affect the project design or impact the project assets,
iv. Determine how to adapt the project specifications.

The methodology for the Climate Change Risk and Vulnerability Assessment (CCRVA) involved:

i. Engagement with key stakeholders
ii. Review of the literature on:
– Climate in Tharaka Nithi and climate change projections,

– Previous technical investigations and design reports,

– The impacts of climate change on Waste management facilities

iii. Identify specific adaptation technology needs;

iv. Proposed design, strategic options evaluation, engineering feasibility, and proposed approach to climate resilience;

v. Incorporation of adaptation measures into the design and assessment of residual climate risk

vi. Identify potential networks for the sharing of information on successful adaptation;

vii. Consideration of the total cost of the climate-resilient components of the project design;

viii. Preparation and review of the CCRVA report in consultation with the proponent relevant stakeholders

Environmental and Social Impacts for the Project

The expected impacts from the projects are diverse in nature and will comprise of both long term and short-term impacts. The short-term impacts will occur during the construction and setting up of the project while the long-term impacts will occur after the completion of integrated waste management facility that will contribute to improved health and provide a more pleasant environment for business and trade.

The project will mainly have positive impacts while mitigation measures will be proposed and designed for the anticipated negative impacts.

The positive impacts are both short term and long term and include the following:

Positive Impacts

- This project will provide residents of Chuka, Chogoria, Muthambi and adjacent urban centers in Tharaka Nithi County with a solid waste management site that will ensure better, efficient, environmentally friendly and a safe way of management of solid waste.

- Employment creation to the residents within the project and surrounding urban areas. The jobs include but not limited to waste transportation to the site, waste sorting, segregation, recycling and repurposing.
- Improved sanitation and hygiene. All solid waste collected to a central place will ensure waste is not scattered all over residential areas which may cause sanitation problems or breeding grounds for disease causing pests.
- Economic and social boost in the region due to increased investors and investment opportunities like sale of recycled products, transport services for waste collection, training in waste management service etc.
- Poverty alleviation due to increased employment and economic growth opportunities as a result of project implementation.
- Increased in value and demand of land within the proposed project area
- Infrastructure development within the project area such as, access roads, electricity and water supply
- Industrial development through processing of products from glass, plastics and organic wastes
- Availability of organic manure which would be collected from organic solid wastes. This would boost agricultural productivity and ensure food security.
- Proper solid waste management though varied techniques and systems- waste segregation and sorting, recycling, reusing or repurposing
- Enhanced integrated waste management because the town sewer is next to the proposed site for solid waste management.
- This project intends to directly benefit women, children, vendors, and the disabled as they are the most vulnerable group. This project will see to it that the economic power of the target group increases as: - the daily earning is realized, more children will be able to attend school comfortably, their health will be improved.

Negative Impacts

The report elucidates anticipated negative impacts in all phases of the project which shall include pre-construction phase, implementation/construction phase, operational phase and

decommissioning phase. Appropriate mitigation measures have been recommended depending on the impact and an environmental and social management plan is included to be adhered to in order to ensure environmental sustainability**.**

Table 1: Summary ESMP for Construction and Operation

Impacts	**Mitigation measures**
Environmental Impacts	
Excavations and protection of flora and fauna	• Protect as possible indigenous trees and other surrounding vegetation that need not be removed. • Minimize site clearance to only areas needed for excavations • Plant trees around the perimeter fence, buffer zone and within some section of the site.
Occupational Safety & Health	• Occupational Safety and Health Act, 2007 • Training the workers on the potential health risk caused by exposure to and how to reduce these risks • Establish a Health and Safety Plan (HASP) for civil works areas • Ensuring the working hours are controlled and that employees are not allowed to extend the working hours beyond an acceptable limit. • Provide workers with appropriate PPEs (gloves, ear gears, sturdy rubber boots and overalls). • Provide workers training on safety procedures and emergency response such as fire and sewer pipe bursts • Notify workers about the upcoming disposal activity and the Safety requirements • Post appropriate signpost and warning notices of the site that will inform the workers of key rules to follow. • Put in place an appropriate emergency and incident response plan

Solid waste generation from construction activities	• A site waste management plan should be prepared by the Contractor prior to commencement of construction works. This should include designation of appropriate waste storage areas, collection and removal schedule and identification of approved disposal site; • Ensure that the solid waste collection, segregation, and disposal system is functioning properly at all times during the construction phase; • Recycle and re-use wastes where possible such as scraps metal. • Train cleaning and maintenance workers on the need for proper waste management
Noise and excessive vibration from construction equipment and vehicles	• Contractor will comply with provisions of EMCA 2015 (Noise and Excessive Vibrations Regulations of 2009). • The Contractor will keep noise level within acceptable limits (60 Decibels during the day and 35 Decibels during the night) and construction activities shall, where possible, be confined to normal working hours in the residential areas. • Sensitive receptors shall be notified by the Contractor at least 5 days before construction is due to commence in their vicinity.
Traffic and Pedestrian Safety	• Signposting, warning signs, barriers and traffic diversions: site should be clearly visible and the workers warned of all potential hazards • Provision of safe passages and crossings for pedestrians be made • Train staff at the site on safe and convenient passage at the work place.
	• Ensuring safe and continuous access to office and other facilities within the project area.
Air Quality	• Establish simple air quality monitoring that ensures the outputs of the monitoring process are maintained and utilized in improving.

	• Appoint a dust monitoring agent/lab to monitor and analyze dust and air quality • Air monitoring should be done continuously in areas related to asbestos removal works.
Storm water Management	Ensure all storm water from the site is directed towards the established water drains
Hygiene and sanitary provision	Provide washrooms, bathrooms and changing rooms within the facility Provide enough drinking water and for general use.
Disposal Scheduling and Hours	The disposal and cleaning activities should be limited from 7 am or sunrise (whichever is later) to 5 pm or sunset
Clearance Inspections	Inspections should be done to ensure that project site and work environment is cleaned to a satisfaction standard.
Social Impacts	
Spread of communicable diseases and HIV/AIDS infection	• Develop appropriate training and awareness materials for Information, Education • Develop an intervention strategy compatible with the construction programme to address success of the HIV/AIDS prevention and provide peer educators for sustainability in collaboration with other stakeholders; • Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs
Labour Influx to the Project area.	• Effective community engagement and strong grievance mechanisms on matters related to labour. • Effective contractual obligations for the contractor to adhere to the mitigation of risks against labour influx

	• Proper records of labour force on site while avoiding child and forced labour • Fair treatment, non-discrimination and equal opportunity of workers. • Comply to provisions of Labour Relations Act 2012 and Work Place Injuries and Benefits Act (WIBA 2007) • The Contractor shall require his employees, sub-contractors, sub-consultants, and any personnel thereof engaged in construction works to individually sign and comply with a Code of Conduct.
Violation of Human Rights, and gender requirement	• Mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 gender rule and National Gender and Equality Commission Act 2011 • Protecting human risk areas associated with, disadvantaged groups, interfering with Participation Rights and Labour Rights • The contract will provide provisions that ensures that gender based violence and abuse are not triggered by the Project as provided for by Sexual Offences Act 2006
Violation of children rights	• Develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project. • All staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour • Children under the age of 18 years should be hired on site as provided by Child Rights Act (Amendment Bill) 2014

Conclusion

The result of the ESIA Study report has indicated that there are no significant negative impacts likely to be generated by the activities of the proposed project which have not been addressed. Many environmental impacts identified during the construction period are of short term and can

be mitigated. Most of the expected potential negative impacts have been rated as low. Therefore, supervision of the project implementation should be of high standard to ensure negative impacts are minimized, reduced and avoided. Positive impacts have long term positive impacts on the development of the area and on the welfare of the people as a whole, those were rated as high and beneficial to all the affected stakeholders. The project is expected to promote a clean and healthy environment in the project area, promote the economy, and enhance social economic standards of the population in the area and beyond. It is therefore concluded that the proposed project will not compromise the well-being of the Ntuntuni residents, ecological and environmental conditions and will improve access to solid waste management facilities and enhance the economy. The project therefore is highly recommended and therefore should be approved for implementation.

1. INTRODUCTION

1.1 Introduction

All human activities generate waste which requires to be properly managed to protect human health, environment and maintain and enhance aesthetics. The need for proper and efficient waste management is more pronounced in urban settlements where huge amounts of waste are generated within a very small area. The impacts of solid waste if not properly managed within the urban settlements particularly cities and big towns can be disastrous.

The generation of solid waste is inevitable in all sectors. Ever since, Solid Waste Management has been of great concern to municipal authorities worldwide. Proper collection and disposal of solid waste is necessary in order to avoid environmental pollution problems such as pollution of surface water bodies and of the ambient atmosphere, through burning or decomposition. Policy failures in the past have contributed to poor waste collection and management because most urban authorities would not allow private sector involvement in waste management. There are also inadequate facilities for recycling materials such as paper, aluminum, and glass, and inadequate measures in the re-use of recycled containers that may have contained harmful substances. The Kenya's new political system gives power of self-governance to the local level in order to enhance the participation of the people in making decisions affecting them.

Improper solid waste management leads to substantial negative environmental impacts, including pollution of air, soil and water and generation of greenhouse gases from un managed landfills, and health and safety problems, such as diseases spread by insects and rodents attracted by garbage heaps, and diseases associated with different forms of pollution. Since Waste management is a devolved function, the county governments are charged with responsibility of providing solid and liquid waste management services.

In this light, the County Executive Committee approved for Tharaka Nithi County through, the department of Lands to identify and acquire land for relocation of the Solid Waste Management site located within the center of Chuka Town that is currently the collection Center of all the solid

waste from Chuka, Chogoria, Muthambi and adjacent urban centers. This will ensure better, efficient, environmentally friendly, and a safe way of management of solid waste for the urban centers. The solid waste generated from these urban areas include dry and wet solid waste. Further, the site identified is next to the current site under construction of a Sewer for Chuka Town.

The aim of this ESIA Study report is to examine both positive and negative impacts that the project undertaking is likely to have on both physical and socio-economic environment with emphasis of maximizing the positive impacts and minimizing the negative impacts. Early identification of possible impacts will promote environmental sustainability in that anthropogenic factors will not interfere with natural environment but will blend with it creating harmony. This study is an important planning tool for the project proponent since it will state any significant project impacts and clearly define mitigation measures to avoid or curb adverse environmental and social impacts.

1.2 Rationale of the EIA

The proponent of this project; County Government of Tharaka Nithi, through the Department of Lands in compliance with the legal requirement contained in the Environmental Management and Coordination Act (EMCA) Cap 387 and Environmental Management and Coordination (EIA & EA) Regulation 2003, engaged Environmental Impact Assessment Experts to carry out an EIA Comprehensive project report for the proposed construction of Solid Waste Management Facility in Ntuntuni area, Chuka Sub- County. The assessment seeks to evaluate the potential and foreseeable impacts of the proposed project on the proposed site, the surrounding community, construction workers, businesspersons and the surrounding environment/ecosystem during its project cycle. It incorporates the potential environmental (physical, ecological and cultural/socio-economic) impacts and addresses them adequately at the inception (design) and operation stages of the project.

Environmental Impact Assessment is a planning tool now generally accepted as an integral component of sound decision-making. The purpose of Environmental Impact Assessment is to give the environment its due place in the decision-making process by clearly evaluating the environmental consequences of the proposed activity before action is taken. Early identification and characterization of critical environmental impacts allows the public and the government to form a view about the environmental acceptability of a proposed developmental project and what

conditions should apply to mitigate or reduce those risks and impacts.

1.3 Project Objective

The main objective of this project is to ensure better, efficient, environmentally friendly, and a safe way of management of solid waste for the urban centers. The relocation of the Solid waste facility from the center of Chuka town will enable environmental cleanliness, health and safety in the town, not to mention improve aesthetics. The project will also create jobs for people of Chuka town and its surroundings thus contributing to poverty alleviation and increased economic growth of the town and County at large.

Objective of the EIA Study Report

The objectives to be achieved by this report include: -

- To determine the compatibility of the Solid Waste Management facility with the neighboring land use.
- To identify and evaluate the significant environmental impacts of the proposed project.
- To assess the environmental costs and benefits of the proposed project to the local and national economy.
- To evaluate and select the best project alternative from the various options.
- To incorporate environmental management plans and monitoring mechanisms during implementation and operation phases of the project.

1.4 The Scope of the Study

The report has undertaken environmental assessment by simulating environmental concerns in all phases of the project. This task involved: -

- Assessment of the potential environmental impacts of the project on the site and the surrounding areas.
- Establishment of the significance of these impacts.
- Proposed the mitigation measures for the anticipated negative impacts to the environment.

- Generation of baseline data for monitoring and evaluation of how well the mitigation measures are being implemented during the project cycle.
- Assessing the feasibility of project alternatives.
- A review of the environmental policy, legal and administrative framework.
- Social repercussions of the development within the locality and region.
- Development of an ESMP with mechanisms for monitoring and evaluating the compliance and environmental performance.

1.5 Scoping Process and Terms of Reference (TOR)

The scoping exercise was conducted to evaluate the project in its entirety, to identify areas of concern, and the sources of potential environmental impacts that could be associated with the proposed Solid Waste Management facility project.

The Terms of Reference (ToR) as required under the Environmental Management and Coordination (Amended) Act, Cap 387 and the Environmental (Impact Assessment and Audit) regulations 2003 (Rev.2015) was prepared. The general ToR for this study was to conduct an EIA for the proposed Solid Waste Management facility in Ntuntuni area, Chuka Sub- County.

Specifically, this ESIA study was commissioned under the following Terms of References:

1. To carry out assessment and description of location/site, objectives, scope, nature of the proposed Ntuntuni Solid Waste Management project;
2. To carry out analysis of the proposed project activities during the proposed project cycle;
3. To review baseline information (Physical, Biological and Social and Economic);
4. To describe and analyze relevant policies, legal and institutional framework and any other relevant information related to the project;
5. To carry out Consultation and Public Participation (CPP);

6. To identify and analyze proposed project alternatives including but not limited to: scale and extent; project site alternatives, no project alternatives, design alternatives, material, processes and technologies alternatives. Giving reasons for the preferred and proposed alternatives;

7. To adequately identify, predict and carry out an in-depth analysis of all actual potential and significant impacts on flora, fauna, soils, air, water, the social, cultural and community settings; the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated to be generated by the proposed project, both positive and negative impacts throughout the project cycle and recommend sufficient mitigation measures for all the potential negative impacts identified and analyzed;

8. To analyze occupational health and safety issues associated with the proposed Solid Waste Management Site.

9. To develop an ESMP proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, time-frame and responsibility to implement the measures;

10. To prepare a comprehensive EIA Project Report under EMCA Cap 387 legislation for submission to NEMA and subsequent approval.

1.6 Methodology of assessment

This Environmental Impact Assessment was undertaken through the following process:

i. **Screening of the project** to determine if it qualifies for an ESIA or not. The screening determined that it qualifies for the Environmental and Social Impact Assessment process and licensing. This was done in reference to requirements of the EMCA, 1999, and specifically the second schedule. Issues considered included the physical location, sensitive issues, and nature of anticipated impacts.

ii. **Environmental scoping -** The scoping process helped narrow down onto the most critical issues requiring attention during the assessment. Environmental issues were categorized into physical, natural/ecological and social, economic and cultural aspects.

iii. **Preliminary assessment of the site**; the experts toured the Proposed Solid waste management site and the neighborhood to get a comprehensive site baseline data. This was collected through observation, photographing, and oral interviews with neighbors, and administration of questionnaires.

iv. **Analyzing the project design and the intended activities**;

ix. **Desktop review-** This included documentary review of the nature of the proposed project activities, project documents, project design, policy and legislative framework governing the implementation of the project as well as the environmental setting of the area among others.

It will involve review of the literature on; Climate in Tharaka Nithi and climate change projections, previous technical investigations and design reports, the impacts of climate change on Waste management facilities and identification of specific adaptation technology needs;

v. **Consultation and Public Participation:** Field visits were meant for physical inspections of the site characteristics and the environmental status of the surrounding areas to determine the anticipated impacts as well as collecting data for baseline information. To ensure adequate public participation in the ESIA process, extensive consultations with the local communities (neighbors to the project site and the general public) through oral interviews, filling in questionnaires and holding meetings in order to get their views, expectations and concerns. The information gathered was subsequently synthesized and incorporated into the ESIA project report.

vi. **Preparation of the Project Report:** This Environmental Impact Assessment Study report was then prepared in accordance with the provisions of the EMCA cap 387 and other relevant regulations and laws of Kenya as indicated in the

vii. **Submission of the Environmental Impact Assessment Study Report**: The report was thereafter compiled in accordance with the guidelines issued by NEMA for such work and presented to the proponent for submission to NEMA for licensing process.

2. PROJECT LOCATION, PROJECT DESIGN AND DESCRIPTION

2.1 Project Location

The proposed project is located at Ntuntuni area, Ndagani sub location, Karingani location Meru South (Chuka) Sub County, Tharaka Nithi County, at coordinates Latitude 0^0 18'55.96", Longitude $37^0$42;39.11" and 1149m above sea level. Total area of land is 7.193Ha.

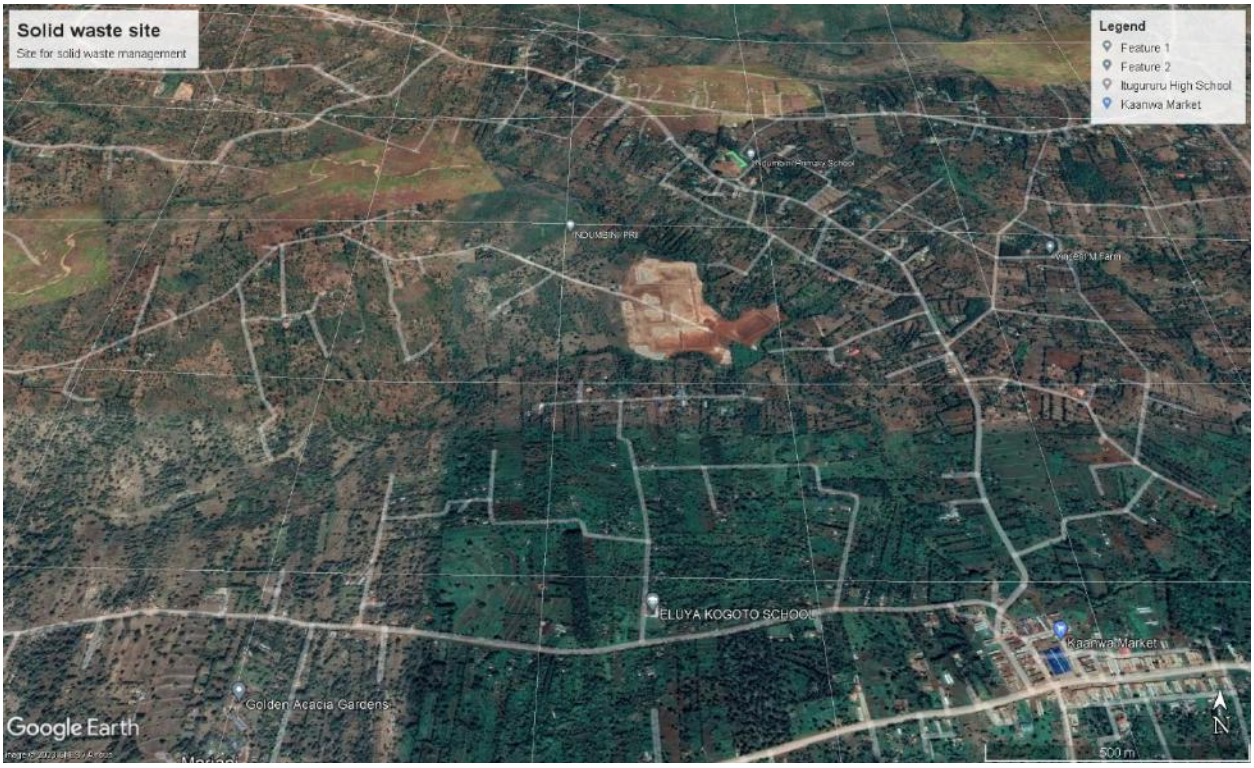

Figure 1:Google earth image of the project location

2.2 Project Description and Activities

This project involves the development of development of Solid Waste Management site at Ntuntuni area in Tharaka Nithi County, and implementation of recommendations stipulated by this ESIA Study for the development of an Integrated Solid Waste Management system (ISWM).

The Government of Kenya and the County Government of Tharaka Nithi have identified solid waste disposal the county as a priority problem. Implementation of the project would allow for

cessation of solid waste disposal operations at the existing disposal site. The project will have the following components:

- Site Office, with Parking space
- External Washrooms
- Offloading / Sorting Zone
- Recycling plants
- Sewer line within a 8m Wayleave
- Sewage Plant
- 7 Ground Water Monitoring Wells
- Drive Way
- Perimeter Fence with a control gate house and a buffer zone
- Trucks parking

a) Project planning

This is a government project proposed to be implemented on land parcels to be acquired. Official searches for the land parcels encompassing the proposed project area have been carried out (see Annex 6**Error! Reference source not found.**). Once all land has been acquired and approval by relevant authorities has been done, the construction tender shall then be awarded to a contractor who will then move to the site to prepare it for the construction works. A perimeter wall will be set up to enclose the site, a site office be put up and constriction signage erected indicating the kind of project, work and professionals involved including all the approvals acquired. As such, the site will be handed over to the contractor until the end of construction work.

This is a big and an important project for the County Government and therefore before the construction works begin, there will be a ground-breaking ceremony led by the County Leadership.

b) Construction phase

Building materials will be transported to the project site from their extraction, manufacture or storage site using transport tracks. Great emphasis will be laid on procurement of material from

within the local area which will make both economic and environmental sense as it will reduce negative impacts of long-distance transportation of material to the project site. In cases where materials are not available locally or nationally, they will be sourced overseas and transported by an appropriate means to the construction site. Building materials will also be stored on site in temporary secure structures.

Excavation will be carried out to prepare the site for construction of depression pits, landfills pavements and drainage system. This will not involve the use of heavy earthmoving machinery. The ground is a gentle slope and therefore excavation will be minimal as the ground is required to have a gently sloping gradient for drainage of storm water.

Once the construction is complete, all waste generated at the site and remaining surplus materials will be sorted at the site for recycling, reuse in other projects or for safe disposal at landfills constructed.

c) Operation phase

This is a solid waste management site therefore upon construction, the project will be used for waste disposal, waste sorting and segregation, recycling, reusing or repurposing, organic waste composting among other management techniques.

d) Decommissioning activities

The County Government of Tharaka Nithi and its community have no intention of decommissioning the solid waste management site in near future. However, a number of factors / reasons may contribute to the need for decommissioning. This may include an order by a court of law, Natural calamities or Proponent; the County Government deeming it necessary to put up a more value adding project / facility both to the government and the people.

In case there will be a need to decommission the project, the proponent will undertake all the decommissioning activities and process that will ensure decommissioning is done in an environmentally friendly manner and the site is returned to its original state as much as practicable. A decommissioning plan will be prepared and submitted to the relevant departments for approval.

In case the site is proposed for another project then a feasibility study and EIA will be undertaken before demolition or dismantling work starts. These will guide on the extent to which demolition can be done and what facilities can be retained to be used in the new project.

2.3 Construction Activities and Time Frame

The proposed project is expected to start soon once all the approvals are obtained. The contractor shall, upon receiving instructions to proceed with the works, draw up a time table and progress schedule to which the works are to be carried out and stating the appropriate dates. This time and progress schedule is to be agreed upon with the proponent and no deviation from the order set out in the schedule will be permitted without the written consent of the engineer in charge.

2.4 Project Inputs and Outputs

Inputs

Solid waste from urban areas

The proposed project being a solid waste management site, all solid wastes shall be collected from different centers and disposed of at the proposed site. These wastes include plastic, paper and glass wastes, electronic wastes, construction wastes from other projects within the urban areas, sanitary and clinical wastes, metal wastes, and organic wastes from households and farms.

Labor

Local community members will be employed to provide services throughout the project cycle such as construction works, collection of wastes from different locations, sorting wastes and processing of products in the recycling plant, maintenance of the site and work vehicles, and security of the site and equipment.

Output/Product

The different types of solid wastes collected would be recycled into other products such as tiles from glass waste, plastic household products from plastic waste, organic manure for agriculture from composted waste, among other products.

2.5 Project budget

The project budget is estimated at **KES 200,500,000.**

3. BASELINE INFORMATION ON THE STUDY AREA

3.1 Information Gathering Procedure

Project information was gathered through discussions with the proponent and the neighboring community. The site was also visited for investigation of the physical environmental status and that of the immediate surroundings on 12/03/2023 and 14/03/2023. A questionnaire (completed copy annexed to this report was used to record information gathered during the discussions with the neighboring community and interested parties.

Physical investigation took into consideration among other issues the hydrology and surface terrain, drainage system, risk involved during operation, water availability and sanitation status in the area as well as typical socio-economic activities around the proposed site. Also investigated were the public services provided in the area including the drainage systems, water supply/abstractions, power supply and access roads etc.

3.2 Infrastructure development

Road and accessibility:

The project is accessible through the Ntuntuni-KK-Sewage Road.

Figure 2:access road to the proposed site

Water supply:

The area within the project site gets water from river Kurugucha which is an all season river and from other local water service providers.

Figure 3:Source of water within the proposed project area

Sewer System

There is a sewer system adjacent to the proposed project area.

Figure 4:sewer adjacent to the proposed solid waste management site

Energy

The main source of energy to the facility is electricity from Kenya Power and Lighting Company (KPLC). The proponent is encouraged to install solar panels for the proposed site to reduce the operational costs related to high cost of electricity.

Communication

The area is well covered by communication facilities by the main telephone service providers including: Safaricom, Airtel and Telkom. All these will facilitate communication during the implementation and on operation phase of the project.

3.3 Climate

The area is characterized as semi-arid with inadequate rainfall. Rainfall is bimodal with long rains falling between the months of March to May and short rains in October to December with annual rainfall average of 740mm. The area is generally hot and dry with average temperatures of 24.7° C.

3.4 Topography and Drainage

The project site is fairly flat. The highest point in the sub location is 1149m above sea level.
The direction of flow for surface water is eastwards.

3.5 Geology and Soils

The area is occupied by sedimentary rocks. The rocks have undergone significant weathering and fracturing making it possible for them to play an important role in the workings of the hydrological system, particularly as a mechanism for groundwater recharge, thereby making them highly aquiferous. On their part, the lowlands' pre-Cambrian metamorphic sub-strata, equally composed of weathered and fractured gneisses and schists, is overlain by a thin profile of sandy clays with low dry-season water retention properties, although the sandy rivers host substantive aquifers.

3.6 Ecological Environment, Flora and Fauna

There is no wildlife, bird sanctuaries or conservation wetlands within the project site. There are no rare, endangered or endemic species recorded. The ecology of the project area is not substantially rich in diversity or high in endemism.

3.7 Socio Economic Environment

The main socio-economic activity in the project area is farming. The main crops grown in the area are maize, beans, coffee, mangoes and occasionally oranges. The main purpose of the socio-economic analysis is to place the proposed project within the context of the local human environment, upon which it is expected to have an important influence. Similarly, the analysis also examined the ways in which the local human environment might impact the project and may be supportive of it. Of corollary concern, was the project's impact on the existing site in relation to any potentially important heritage elements that exists, or likely to exist. No significant negative impacts were detected in this sector.

Indeed, the project will bring significant social-economic benefits including increased access to water, employment opportunities, as well as improving the property values within the neighborhood by optimizing use.

3.8 Population

National/ County		**Sex**	**Total**
	Male	**Female**	

Tharaka-Nithi	**193,764**	**199,406**	**393,177**
Igambang'ombe	26,464	26,745	53,210
Maara.	57,689	57,205	114,894
Meru South/Chuka	28,290	46,155	91,080
Tharaka North	36,190	30,053	58,345
Tharaka South	208	9,058	75,250
Mt. Kenya Forest		190	398

Table 2: Distribution of Population by Sex and Sub-County

Source: KNBS 2019

4. RELEVANT LEGISLATIVE REGULATORY FRAMEWORK

4.1 Introduction

This chapter outlines legislative frameworks that are relevant to implementation of this project during its planning, construction, operation and decommissioning phase. These are legislations that relate to management of health and safety matters, protection and conservation of natural resources as it regards the project, management of wastes, pollution prevention and / control and ecosystem conservation.

4.2 Institutional Arrangements Relevant to the Project

The main institutions relevant to the proposed development are summarized in the table below. The summary includes the name of the institution, envisioned role (s) in the project cycle and the project phase required.

Institution	**Role in the proposed project**	**Project phase required**
County Government of Tharaka Nithi	Funding of the project	Planning and construction phases
National Environmental Management Authority(NEMA)	Issuance of license, Monitoring for compliance with environmental health and safety regulations	Implementation, Operation and decommissioning phases
Directorate of Environment	Monitoring of the Environmental and Social Management Plan	Construction, Operational and decommissioning phases
Department of Lands, Physical Planning and Urban Development	Ensure that the project is within the right zoning and land use Land Acquisition	Project planning and implementation

Directorate of Urban Development	Preparation and approval of plans, Coordinate implementation and operation of the project	Project planning and implementation
National construction Authority (NCA)	Check and ensure construction standards	Construction phase

4.3 Constitution of Kenya

Article 42 of the Bill of Rights of the Kenyan Constitution provides that 'every Kenyan has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures. Under Chapter 5 (land and Environment), Part 1 is devoted to land. It requires that land be used and managed in 'a manner that is equitable, efficient, productive and sustainable.

Article 69 (1) mandates the state to encourage public participation in the management, protection and conservation of the environment.

Relevance to the project

The proponent will cooperate with State organs and other persons to protect and conserve the Environment. Extensive public participation with all stakeholders will also be caried out. Further, the project should ensure the sustainability of livelihoods and biological resources within the project areas are protected

4.4 Relevant Legal Framework

4.4.1 The Environmental Management and Co-ordination Act, Cap 387, amended 2015

EMCA is a framework law containing environmental provisions as well as addressing cross-sectoral issues associated with projects. Amongst other provisions, it gives, through schedule II,

the projects that require to undergo EIA and EA process and it makes it mandatory for development projects to undertake the assessment before commencement and to carry out Annual Audits

Compliance

Environmental Management and Coordination Act Cap 387 provides a legal and institutional framework for the management of all environmental matters. This report has been written pursuant to section 58 (1) of this Act.

4.4.2 EIA/EA Regulations (Legal Notice No. 101 of 2003)

The EIA/EA Regulations are meant to ensure the implementation of Section 58 of EMCA. The EIA and EA regulations require that EIAs and EAs be conducted in accordance with the issues and general guidelines spelt out in the second and third schedules of the regulations. These include coverage of the issues on schedule 2 (ecological, social, landscape, land use and water considerations) and general guidelines on schedule 3 (impacts and their sources, project details, national legislation, mitigation measures, a management plan and environmental auditing schedules and procedures. These regulations provides that "During the process of conducting an environmental impact assessment study under these Regulations, the proponent shall in consultation with the Authority, seek the views of persons who may be affected by the project". It further provides that, once the approval of the project report by the Authority is given, the proponent shall publicize the project and its anticipated effects and benefits by posting posters in strategic public places in the vicinity of the site of the proposed project informing the affected parties and communities of the proposed project; and publishing a notice on the proposed project for two successive weeks in a newspaper that has a nation-wide circulation; and making an announcement of the notice in both official and local languages in a radio with a nation-wide coverage for at least once a week for two consecutive weeks among others.

Relevance to the proposed project

This report has been prepared following the guidelines. The EIA report contains an Environmental Management Plan and a stakeholder engagement plan which the proponent will ensure compliance.

4.4.3 Environmental Management and Coordination (Water Quality) Regulations, 2006 Legal Notice 120

The EMCA (Water Quality) Regulations, 2006 provide guidelines on the use and management of water sources to safeguard quality of water for domestic use and irrigation, among others. The regulation also provides for protection of springs, streams and other water sources from pollution.

Relevance

The Chuka Town sewer is adjacent to the proposed project site. There is also an all season river next to the two sites. The proponent shall contain the solid waste and liquid waste within their respective sites and that they shall not carry out any activities likely to pollute directly or indirectly any water sources around the project area.

4.4.4 Waste Management Regulations (Legal Notice No.121 of 2006)

The regulations require a waste generator to collect, segregate and dispose off each category of waste in such manners and facilities as provided by relevant authorities. Regarding transportation, licensed persons shall operate transportation vehicles approved by NEMA and will collect waste from designated areas and deliver to designated disposal sites. Some of the waste materials expected during the life of this project include soil piles, vegetation and those generated by human activities.

Relevance

The ESMP has provided adequate guidelines to be followed community and relevant authorities during the operation phase.

4.4.5 Noise Regulations (Legal Notice No. 61 of 2009)

Part II section 3(I) of these Regulations states that: no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment and section 3(2) states that in determining whether noise is loud, unreasonable, unnecessary or unusual.

Relevance

The proponent shall ensure the contractor operates construction equipment so as not to emit noise in excess of the permissible levels as set out in the Second Schedule to these Regulation. They will provide suitable personnel protection equipment (ear protective devices). The proponent is also required to acquire a license for activities that are deemed in need of a license as stipulated by the regulations.

4.4.6 Environmental Management and Coordination (Air Quality) Regulations, 2014

Under the general prohibitions (Part II), section 5 states that no person shall act in a way that directly or indirectly causes immediate or subsequent air pollution. The regulations provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources, including mobile sources such as motor vehicles.

Other sources recognized at sections 32 and 33 are those arising from construction equipment and materials as well as particulate matter from demolitions of structures and buildings as well as stockpiled dry materials

Relevance

The Proponent shall observe regulatory requirements and implement the mitigation measures proposed in the ESMP to comply with the provisions of these Regulations on prevention of air pollution.

4.4.7 Biodiversity Regulations 2006

Part II of Regulations, section 4 states that no person shall engage in any activity that may have adverse impacts on ecosystems, lead to introduction of exotic species or lead to unsustainable use of natural resources without an EIA license. The regulation puts in place measures to control and regulate access and utilization of biological diversity that include among others banning and restricting access to threatened species for regeneration purposes.

Relevance

There are no endangered species identified within the project area, however the proponent will preserve any indigenous tree species on the site.

4.4.8 The Public Health Act (Cap. 242)

Part IX section 115 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health.

The proponent shall ensure appropriate measures will be taken in accordance with the Act in order to safeguard the health of project workers and the general public around the project areas by maintaining building standards and ensuring access to safe drinking water and put measures to prevent activities that would be a nuisance to the public.

4.4.9 The Occupational Health and Safety Act (2007)

The Act has the following functions among others:

- Secures safety and health for people legally in all workplaces
- Prevents employment of children in workplaces where their safety and health is at risk.
- Promotes reporting of work-place accidents, dangerous occurrences and ill health with a view to finding out their causes and preventing similar occurrences in future.
- Promotes creation of a safety culture at workplaces through education and training in occupational safety and health.

Section 53 of this Act requires that for workers employed in a process involving exposure to any injurious or offensive substances, suitable protective clothing and appliances (gloves, footwear, goggles, and head coverage) shall be provided.

Relevance

The contractor will provide Personal Protective Equipment (PPE) and ensure all the workers use them throughout the construction and operation phase of the project. The contractor will make available safe drinking water for the workers throughout the construction phase of the project. They will hire qualified competent workers to perform the required work tasks, ensure reporting and documenting of any accidents or incidents and provide first aid kits to be used in case of any accident throughout the project phase.

4.4.10 The Water Act 2016

Section 25 of the Act requires a permit to be obtained for among others any use of water from a water resource, discharge of a pollutant into any water resource. Section 75 and sub-section 1 allows a licensee for water supply to construct and maintain drains, sewers and other works for intercepting, treating or disposing of any foul water arising or flowing upon land for preventing water belonging to the licensee or which he is authorized to take for supply from being polluted. However, if the proposed works will affect or is likely to affect any body of water in the catchment, the licensee shall obtain consent from the Water Resources Authority. Section 76 states that no person shall discharge any trade effluent from any trade premises into sewers of a licensee without the consent of the licensee upon application indicating the nature and composition of the effluent, maximum quantity anticipated, flow rate of the effluent and any other information deemed necessary.

Relevance

This act will be important in ensuring that the proposed project is compliant with the water resource management requirements that are outlined in the Act. Pollution within the proposed project areas should also be avoided. The proponent will acquire relevant licenses as stipulated by the Act.

4.4 11 Land Act, 2012.

The Land Act provides for the sustainable administration and management of land and land-based resources, and for connected purposes. The Act applies to all land declared as : (a) Public land under Article 62 of the Constitution; (b) Private land under Article 64 of the Constitution; and (c) Community land under Article 63 of the Constitution and any other written law relating to community land. The Land Act, guarantees security of tenure for land under (a) freehold; (b) leasehold; (c) such forms of partial interest as may be defined under the Act and other law, including but not limited to easements; and (d) customary land rights, where consistent with the Constitution and guarantees equal recognition and enforcement of land rights arising under all tenure systems and non- discrimination in ownership of, and access to land under all tenure systems.

Relevance

The proponent will also ensure that they comply with all the requirements of the Act during land acquisition.

4.4.12 The County Governments Act 2012

Sections 87 to 92 and 115 of the County Governments Act, 2012 outlines the principles of public participation and the imperative for facilitating public participation in the work of the County Government. Public participation is a structured way of consulting with persons, groups and entities before decisions are made. It is designed to give a voice to the voiceless and cements the concept of agency to the County Government, that is, the County government becomes an agent of the people. Public participation is not meant to convey decisions already made, but to generate and confirm decisions. It is not a political process but a non-partisan process that involves the agent going to ‘take instruction and direction’ from the people.

Relevance

The act will be useful to the proposed project in ensuring that the local people are fully involved in the project development and decision making at all stages. This is done through appointment of the local project management committees which represent the voice of the locals

4.4.13 Physical and land use Planning Act (PLUPA) , 2019

PLUPA provides for the preparation and implementation of physical and land use development plans. The Act allows for the prohibition or control of the use and development of land and buildings in the interest of proper and orderly development of an area. The plan shows the manner in which the land in the area may be used. It allows the county executive committee member in charge of Physical Planning to approve all development applications and grant development permissions as well as to ensure the proper execution and implications of approved physical development plans.

Relevance

The site for establishment of the project has been marked as agricultural and therefore change of use is required to enable the project be implemented.

4.4.14 Sustainable Waste Management Act, 2022

The aim of the Act is to protect human health and the environment. Part II of the bill gives County Government functions, policy, and regulations with regard to Sustainable Waste Management. The Act ensures that the County Governments are responsible for implementing the devolved function of waste management and establishing the financial and operational conditions f or the effective performance of this function; that county waste management legislation is in conformity with this Act within a period of one year of the coming into operation of this Act; that the disposal of waste generated within the county is done within the county's boundaries except where there is an agreed framework for inter-county transportation and disposal of waste; provision of central collection centers for materials that can be recycled; establish waste management infrastructure to promote source segregation, collection, reuse, and set up for materials recovery; maintain data on waste management activities and share the information with the Authority; mainstream waste management into county planning and budgeting; develop, manage and maintain designated

disposal sites and landfills; maintain a register of all waste service providers operating within their boundaries.

Relevance

The Act acknowledges that County governments are a key component in realizing sustainable waste management given that among the devolved functions waste management has been allocated to the counties.

The Act will also enable the County to:

a) Ensure that county legislation on waste management is in compliance with the Act
b) Ensure that waste generated in the county is disposed of within county boundaries unless there is an agreed framework for intercounty transportation

c) Provide central collection centers for recyclable materials

d) Establish waste management infrastructure to promote source segregation, collection, reuse and set up for material recovery

On Public Participation and Access to information

The Act provides for access to information, particularly for waste management records and also encourages public participation in the operationalization of the Act in the procedures set out under the Constitution and other written laws.

County governments are responsible for the implementation of the devolved function of waste management. Consequently, they will be required to ensure county waste management laws conform with the Sustainable Waste Management Act

The County Government will ensure that those working in waste management are observing certain health, safety, and environmental standards. This will affect waste service providers, their employees, and informal waste pickers.

4.4.15 The Employment Act, 2007

The Employment Act, 2007 defines the fundamental rights of employees including the basic conditions of employment of workers. It also prohibits employment of children. The Act provides that no employer shall discriminate directly or indirectly, against an employee or prospective employee or harass an employee or prospective employee on the following grounds; race, color, sex, language, religion, political or other opinion, nationality, ethnic or social origin, disability, pregnancy, mental status or HIV status.

Relevance

The contractor will employ workers from the project area. The basic conditions of employees should be observed such as rest days and payment for equal remuneration for work of equal value.

4.4.16 Child Rights Act (Amendment Bill) 2014

The Child Rights Act (Amended Bill 2014) takes forward the government's commitment to improve services for vulnerable children and support strong families. It reinforces wider reforms to ensure that all children and young people can succeed, no matter what their background. The Child Rights Act (Amended Bill 2014) protects children from all manner of discrimination and exploitation. It delivers to children their various rights including right to Protection from child labor and armed conflict, Protection from sexual exploitation, Protection from drugs, Duties and responsibilities of a child. To name a few. During the project implementation, due consideration was done in the interest of protecting children.

Relevance

The act will be relevant in terms of children protection form child labor, sexual protection and even protection from exposure to drugs.

4.4.17 Work Injury Compensation Benefit Act (WIBA) 2007

The Work Injury Compensation Benefit Act 2007 provides guidelines for compensating employees on work-related injuries and diseases contracted during employment. The Act also requires provision of compulsory insurance for all employees.

Relevance

The proponent will ensure the Contractor of the proposed project provides the workers contracted during the project implementation appropriate insurance covers so that they can be compensated in case they get injured while working.

4.4.18 National Construction Authority Act (NCA) Act No.41of 2011

The Act consolidates and provides a well-regulated construction industry that will promote sustainable socio-economic development. It establishes The National Construction Authority whose mandate is to oversee the Construction Industry and Coordinate its development.

NCA requires that;

- The proponent contracts a qualified contractor who is registered by them
- The proponent to engage a qualified engineer who will supervise construction work.
- Proponent to have a written contract between him and the contractor on the scope of work and terms of agreement.
- A building shall not be constructed without their approval.

Relevance

The proponent and the contractor will ensure compliance to all the requirements of the Authority before commissioning works.

4.4.19 Gender Policy 2011

The overall goal of this Policy Framework is to mainstream gender concerns in the national development process in order to improve the social, legal/civic, economic and cultural conditions of women, men, girls and boys in Kenya.

Relevance

This policy will be referred to during project implementation especially during hiring of staff to be involved in the project, procuring of suppliers and sub consultants and sub-contractors the project. The one third gender rule will be strictly observed with special consideration to women and youth.

4.4.20 Climate Change Act (2016)

This is an Act of parliament to provide a regulatory framework for enhanced response to climate change at both the National and County Government levels, to provide for mechanisms and measures to achieve low carbon climate development, and for connected purposes. The Act was promulgated in line with Kenya's responsibility to mitigate the effects of climate change, and in keeping with the objective of the Paris Agreement. Consequently, climate change is now recognized as a crosscutting thematic area in the Country's planning process.

Relevance

The proponent will ensure compliance to all the requirements of the Act through ensuring low carbon emissions.

4.5 Relevant International Conventions and Treaties

Kenya is signatory to several international conventions and treaties that would need to be adhered to in implementing this project and are geared towards environmental protection and conservation. Some of these include;

1. ILO Conventions ratified by Government of Kenya- Kenya have ratified 43 ILO conventions and those that are relevant to this study includes

a. Safety and Health in Construction Recommendation, 1988

b. Recruiting of Indigenous Workers Convention, 1936 (No.50)

c. Contracts of Employment (Indigenous Workers) Convention, 1939 (No. 64)

d. Minimum Age Convention, 1973 (No. 138) Minimum age specified: 16 years

e. Migrant Workers (Supplementary Provisions) Convention, 1975 (No. 143)

2. Convention on Wetlands or the Ramsar Convention

3. Convention on Biological Diversity (CBD)

4. The Convention on International Trade in Endangered Species (CITES)

5. Convention on the Conservation of Migratory Species

6. United Nations Framework Convention on Climate Change

7. United Nations Convention to Combat Desertification

8. Important Bird Areas

9. The World Heritage Convention

10. UNESCOs Man and Biosphere

11. New Partnership for Africa Development (NEPAD)

12. East African Community.

The Ministry of Foreign Affairs deals with international treaties at the primary stages of negotiation. The ministry offers advisory guide to the government on the need to ratify such a treaty if considered to be of national interest. Implementation portfolio then moves to the line ministry, relevant departments and co-operating agencies.

13. IFC Performance Standards

The IFC Performance Standards (2012) require clients to engage with stakeholders in a manner commensurate with the risks and impacts of a development. In particular, the standards compel developers to engage affected communities through disclosure of relevant and accurate information as well as an informed consultation and participation process. ICP requires an in-depth exchange of views and information with affected communities and stakeholders. In addition, it requires that an organised and iterative consultation process be undertaken on, amongst other things, managing and mitigating negative impacts as well as sharing and capitalising on development benefits and opportunities.

The main requirements for consultation and disclosure are covered under Performance Standard 1, which aims to ensure that stakeholders are appropriately engaged on issues that could potentially

affect them, and to build and maintain constructive relationships with stakeholders in addition to establishing a grievance mechanism.

The Performance Standards also outline requirements for engagement with vulnerable people which include identifying vulnerable individuals and groups and tailoring the engagement process to the needs of these groups. This may include applying differentiated measures to allow for the effective participation of vulnerable persons.

5. PROJECT ALTERNATIVES

5.1 Project alternative

This EIA project report has been prepared for submission to NEMA based on sound desktop and field studies made by the EIA team. The findings and recommendations are based on the proposed site acquisition plans and the proposed technologies to be used in implementation of the proposed project. Tharaka Nithi County government has no alternative to this project except not implementing the project.

5.2 Alternative to site

The proposed project site is already an alternative since the current site for solid waste disposal is within the Center of Chuka Town. Selecting a different alternative site for the proposed project would have several implications for both the proponent and the immediate environment. These implications include but not limited to costs of purchasing land and disruption of the new ecosystem should the site suitable.

The relocation to a different site is not an option available to the project. The County Government of Tharaka Nithi has officially commenced the process of compulsory acquisition of this land though correspondence with the National Land Commission for the purpose of establishing a solid waste management site. The area is conducive for the proposed use being a considerable distance from the Town center and environmentally sustainable. Additionally, the proposed project site is also next to the current site under construction of Sewer for Chuka Town and will not affect the surrounding community environment if at all the mitigation measures proposed in this report are ensured.

5.3 No project alternatives

The No project alternative option is least preferred since it will mean Solid waste management will still be carried out in the Town center which presents a health and safety hazard for residents and the entire community in Chuka. The No project alternative will also contribute to lack of job

opportunities that would have been created through the entire project Cycle. This would in turn contribute significantly to stagnated economic growth, increased poverty levels and increased crime activities.

5.4 Alternative to technology

The proponent should consider installing solar panels so that solar energy is used as an alternative.

5.5 EIA With/Without Environmental and Social Management Plan (ESMP)

5.5.1 With ESMP

If the environmental management strategies discussed in this report are fully implemented, the adverse impacts of the project would be greatly minimized, and therefore there will be an overall socio-economic and environmental improvement of the people within the project area. Thus, this remains the most preferred option.

5.5.2 Without ESMP

This scenario is based upon the assumption that the proposed project would go ahead without any environmental management plan. The total project impact for this scenario would be appreciably adverse. This means that it would be difficulty to monitor the operations, performance and impacts of the project without an ESMP, which in the long run can have serious adverse effects on the environmental and socio-economic health of the intended beneficiaries. Thus, this assumption is disqualified and not applicable since the greatest challenge worldwide presently is sustainable development and sustainable use of natural resources and environmental conservation, which can easily be attained where an ESMP is in place.

6. PUBLIC PARTICIPATION AND STAKEHOLDER CONSULTATION

6.1 Introduction

Public participation which is mandatory while undertaking Environmental Impact Assessment study may be defined as the involvement of individuals and groups that are positively or negatively affected by a proposed intervention (e.g, a project, a program, a plan, a policy) subject to a decision-making process or are interested in it. It is enshrined in the Kenya Constitution 2010, Article 10 (2): The national values and principles of governance. The purpose of involving the public in the proposed ESIA study was to inform the stakeholders about the study and its likely effects (positive and negative), canvass for their inputs, views and concerns, and take account of the information and views of the public on the project and decision making. Stakeholder Engagement and Public Participation Process is an integral aspect of successful decision making in the ESIA processes for major developments. Public participation is a key requirement as stipulated in Article 69 Section 1 of the Kenyan Constitution, 2010, Environmental Management and Coordination Act (EMCA), Cap 387, Section 3 of the EIA/EA regulations, 2003 and Section 87 & 113 of the County Governments Act, 2012.

6.2 Stakeholder Engagement Plan

This stakeholder engagement plan was been designed as the main framework for Tharaka Nithi to manage its stakeholder engagement and related activities during all the project phases. It served as an implementation plan for the stakeholders' engagement. The plan was also aligned to the measures included in the environmental and social management plan.

6.2.1 Objectives of the Stakeholders Engagement plan

The stakeholder engagement plans was designed to ensure that that there was a consistent, comprehensive and long-term approach that encourages open and transparent dialogue with all stakeholders. It was designed to meet the following objectives:

1. To ensure understanding by facilitating an open, culturally appropriate and inclusive approach to engagement that provides timely and accurate information in an accessible and transparent way to all stakeholders, regardless of their status;
2. To manage expectations and concerns by providing a mechanism which not only provides stakeholders an opportunity to freely provide comment and feedback but also allows Tharaka Nithi County Government to respond to this feedback, thereby addressing concerns raised.
3. To manage risks through building sustainable relationships. Stakeholder engagement will allow Tharaka Nithi County Government to understand stakeholder interests and issues and work with stakeholders to find mutually acceptable ways to achieve or address these; and
4. To create value where engagement allows for partnerships to be developed for the mutual benefit of both Tharaka Nithi County, Chuka Municipality and the stakeholders. This relates also to seeking mutual benefit through design and operations by considering stakeholders and seeking their benefit in all the Waste Management Project activities.

6.2.2 Stakeholder Identification

In order to develop an effective stakeholder engagement plan, it is necessary to determine exactly who the stakeholders are and understand their priorities and objectives in relation to the proposed project. Stakeholder identification was undertaken through a brainstorming process by asking questions like which people or groups or institutions would be interested in the proposed Project at Ntuntuni? What would be their role in the project? Who are the potential beneficiaries? Who might be adversely impacted? *who* has constraints about the initiative?

Thereafter, a list of stakeholder and organizations was developed and grouped as government, civil society, vulnerable groups and NGOs and private sector etc.

Consequently, a list of all stakeholders was analyzed to better understand their relevance and the perspective they offer, to understand their relationship to the issues and each other and, to prioritize based on the relative usefulness to the project engagement. The following criteria was used to analyse each stakeholder:

- Contribution: does the stakeholder have information counsel or expertise on the issue that could be helpful in the development of the Waste management site?
- Legitimacy: how legitimate is the stakeholders claim for engagement?
- Willingness to engage: how willing is the stakeholder to engage?
- Influence: how much influence does the stakeholder have?

6.2.3 Stakeholder Mapping

Mapping stakeholders was a visual exercise and an analysis tool that was employed to further determine which stakeholders are most useful to engage with. Mapping allowed the proponent to see where stakeholders stand when evaluated by the same key criteria and compared to each other and helped to visualize the often complex interplay of issues and relationships created in the criteria above.

We considered the following questions when developing stakeholder map:

(i) What is the stakeholder's level of influence? Level of influence refers to the stakeholder's breadth of authority and influence (direct or indirect) to the success of the project, including positional authority, financial power, or persuasive power over decision-makers.

(ii) What is the extent of the stakeholder's potential contributions? For example, does the stakeholder have information, expertise, or resources (current or potential) that will facilitate the development and execution of the Proposed waste management plan? What perspectives or experiences does the stakeholder bring to the conversation that is unique to his or her community?

(iii) What is the stakeholder's commitment level?

6.2.4 Stakeholders Identified

The table below presents a framework of how stakeholders were categorised, where each of the identified stakeholder categories and groups is relevant for inclusion in future engagement activities. The main stakeholders targeted in this exercise were: government institutions, local authorities, NGOs and CBOs, affected communities, the proponent and any other interested party within and around the project site.

Level	**Stakeholder Category**
National	• NEMA • Water Resources Authority, • Kenya Power • Ministry of Energy
Regional	• Athi Water Works development Agency; • Nithi Water & Sewerage Company; • Tharaka Nithi City County Government -Environment Committee • Chuka Municipality
Local	• The affected parties (15No households within 2km radius of the site) • Ndagani County leadership -MCA & member of parliament for Meru south Constituency • National Govt representatives- DCC -Chuka; ACC Ndagani; Chief-Ndagani & Subchief -Ntuntuni location • The general public: communities living in close proximity to proposed waste management facility – Area youth Representatives, Women Representatives and persons with disabilities • Tharaka Nithi County Ward administration team- Administrator; Ward environment officer & ward public health officer • Private waste collector's association • Local NGOs and CBOs

In as much as Tharaka Nithi County adopted an inclusive approach to stakeholder engagement, the study has tailored its engagement to meet needs of local stakeholders. Local stakeholders include all stakeholders that are located within or undertake livelihood activities directly adjacent to the proposed project, water and sanitation infrastructure. They include: community members, local government including political and administrative authorities.

Engagement with local and vulnerable groups is undertaken through an on-going process whereby Tharaka Nithi County will actively engage and ensure the participation of these groups in all phases of the Project lifecycle.

Additionally, the consultant in conjunction with the proponent:

i. Organized **several key public meetings** in **key market centres** within the proposed Project area.

   a. The forums for public participation enabled interested and affected parties to present their concerns and opinions regarding the proposed project.
   b. The meetings were held after a one week notice and mobilization was done appropriately as required by existing legislative framework.

ii. The views of the public were solicited and incorporated in this study report. Other methods that were applied to capture the views of the various stakeholders included: questionnaires, Leopold matrix, interviews schedules, public meetings and photography.

iii. The consultants assisted in coordinating the environmental assessment with other government agencies, in obtaining the views of local NGO's and affected groups, and in keeping records of meeting and other activities, communications, and comments and their dispositions. Such activities included interagency scoping session, environmental briefings for project staff and interagency committees support to public forums.

6.3 Public Participation

The County Government of Tharaka Nithi conducted a public consultation meeting on 12th April 2023 at the project site in Ntuntuni village.

Figure 5:public consultation meeting in Ntuntuni area

6.4 Objectives

1. Inform the stakeholders about the project and its likely effects (positive and negative);
2. Capture the stakeholder's inputs, views and concerns;
3. Identify positive and negative impacts with a view to subsequently promoting and mitigating them respectively.
4. Establish the socio-economic profile of the community and to help in identifying any other miscellaneous issues that may bring conflict in the course of study's implementation.
5. Take account of the information and views of the public on the project and decision making;
6. Obtain local and traditional knowledge that may be useful for decision making;
7. Facilitate consideration of alternatives, mitigation measures and trade-offs;
8. Reduce conflict through the early identification of contentious issues;
9. Provide an opportunity for the public to influence project design in a positive manner (thereby creating a sense of ownership of the proposal);
10. Improve transparency and accountability of decision making;
11. Increase public confidence in the project cycle.

6.5 Methodology Used

- Public forum where the community identified the project
- Consultation by the project technical working group
- Open forum discussions
- Administering structured questionnaires.

6.6 Findings

Positive impacts highlighted by the participants include;

- Employment creation
- Improved sanitation and hygiene
- Enhanced electricity and water supply in the areas within the proposed project site
- Economic and social boost in the region due to increased investors and investment opportunities
- Increased in value and demand of land within the proposed project area
- Infrastructure development within the project area for instance, improvement of access roads
- Industrial development through processing of products from glass, plastics and organic wastes
- Availability of organic manure which would be collected from organic solid wastes.
- Proper solid waste management though varied techniques and systems- waste segregation, recycling, reusing or repurposing, composting, landfills
- Enhanced integrated waste management because the town sewer is next to the proposed site for solid waste management.

Issues of concern raised by the community;

- Displacement of residents in the proposed project area due to demolition of existing structures
- Increased air pollution from fume chambers, incinerators during operation phase
- Disturbance from wildlife and birds e.g., hornbills, hawks which would be attracted by the solid waste

- Diseases and pests (flies, mosquitos) from the waste components during operation phase of the project
- Excessive amounts of solid waste that may cause contamination of nearby water sources
- Social disconnects among households due to different living standards and relocations
- Influx of people working and living within the project area may lead to moral decadence and insecurity
- Increased traffic due to vehicles coming from different collection centers to the main site
- Dust emission during construction phase
- Noise pollution from movement of machines during construction phase
- Workplace injuries during construction phase
- Loss of existing trees in the area

6.7 Recommendations made;

- Planting of variety of tree species to replace those lost during construction phase of the project and for environmental sustainability- improvement of air quality, reduction of air pollution
- Waste sorting, segregation, recycling, reducing and repurposing
- Use of incinerators to reduce volumes of solid wastes
- Proper chemical treatment of the solid waste to reduce occurrences of pests and diseases
- Put in place measures to avoid contamination of neighboring water sources
- Construction of a health center near the proposed project area to deal with diseases
- Enhance electricity supply and establishment of a police post to curb insecurity issues
- Fencing off the project area during construction and operational phases of the project
- Residents within the project area to be prioritized during job recruitment at construction and operational phases
- All surrounding land within the proposed project site to be acquired by the government and residents be resettled elsewhere.
- Provision of Personal Protective Equipment and First Aid boxes
- Sourcing of construction materials from local suppliers

- Provision of Condom dispensers at construction site
- Sprinkling of water to dust prone areas
- Control of traffic during project construction
- Installation of precautionary signage during project construction
- Creation of awareness on upholding good moral ethics in the region

The analysis of the questionnaires and the interviews showed that the neighborhood and relevant stakeholders appreciated the project and had no objections on its implementation. However they noted that it is important for the project to be implemented and completed in good time without delay.

7. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

7.1 Introduction

The proposed Ntuntuni Solid Waste Management project will have both positive and negative socio-economic and environmental impacts. Through an intensive and extensive field survey, screening, scoping, key stakeholder consultation and public participation forums conducted on the proposed project area, the impacts were identified**.**

7.2 Description of the existing and anticipated impacts

7.2.1 Existing Impacts

There were no notable negative environmental impacts on site at the time of this assessment.

7.2.2 Anticipated Impacts

The impacts of the proposed project on the environmental elements are both positive and negative. The magnitude of each impact is described in terms of being significant, minor or permanent, short-term or long term, specific (localized) or widespread, reversible or irreversible. Most of the impacts have been addressed in the proactive design of the project and other mitigations can only be guaranteed through active and responsible management committed to the propositions of the environmental management plan.

The assessment criteria of the significant impacts are as shown in the table below:

Key	**Type of impact**	**Key**	**Type of impact**
++	Major positive impact	+	Minor positive impact
--	Major negative impact	-	Minor negative impact
O	Negligible/zero impact	NC	No change
SP	Specific/localized	W	Widespread
R	Reversible	IR	Irreversible
SH	Short term	L	Long term

T	Temporary	P	Permanent

Table 3: Assessment criteria of impacts

On the basis of information gathered during both the desktop, field study and consultation fora, the potential environmental impacts of the proposed project are as tabulated below

Anticipated impacts

Impacts on or due to	**Construction**	**Operational**	**Remarks**
Changes in land use extent	-	-/O	The proposed project will not have a significant change in the land use of the area since the area has been approved for such purposes
Pollution Air/dust Noise Oil waste	-,T,IR -,T,IR -, SH O	-,SP -,T O O	During construction, dust and exhaust emission from the construction activities, noise from heavy machinery may have negative effect to the neighborhood. During operational phase of the project, emissions from fume chambers, waste incinerators may have a negative impact to the surrounding areas. Petroleum oils and grease used in vehicles and construction machinery may spill or leak onto the ground but these will be very negligible. Up to date pollution control measures will be put in place.
Water resources	-, SH	O	Water shall be used during the construction phase thus straining the supply. There will also be some

			increase in water use during operational phase of the project.
Site of traditional, historical or cultural significance	O	O	There are no sites of cultural, historical or religious significance within the project boundary
Disturbance of public	-,SH	O	Disturbance would mainly occur during construction due to noise and dust. Afterwards during operational phase, change in noise and dust levels will be negligible.
Construction materials	-	O	Undesirable, hazardous or unauthorized materials should not be used
Health and Safety	-,T,IR	NC	During construction, increased dust, noise and air pollution levels could impact on health and safety, particularly in the direct impact zone. During the operation of the project health and safety concerns will be linked to diseases caused by pests from the collected solid waste, fumes from incineration chambers. These impacts will be effectively mitigated through provision of appropriate PPEs in all phases of the project and effective treatment techniques for different types of solid wastes collected.
Vegetation/Flora	--, L,SP,IR	++	Vegetation will be lost during site clearing for construction. Tree planting will be done during operational phases to replace trees/vegetation lost

Construction waste	-,SH,SP	O	Construction waste will be minimal. Proper disposal of the construction waste by the approved and licensed parties is necessary.
Positive impacts	++, T	++,L	Construction and operation phases will create jobs for skilled and non-skilled workers. Improvement of hygiene and health due to proper solid waste management. Improving in income generation activities and economic growth of the area. The project will directly benefit all residents within the project area and attract investors. The project will boost industrialization as sorted plastic and glass waste can e processed into new products for sale e.g. tiles, plastic basin, cups, storage containers etc. The project will lead to improved infrastructure in the area such as roads, water supply and electricity.

Table 4: Anticipated impacts

7.3 Positive Impacts

7.3.1 Potential Positive Impacts during Planning and Design Phase

a) Employment opportunities

With the planning and design phase of the proposed project, there will be employment opportunities especially for professionals. Those involved in planning and design include engineers, surveyors, environmentalists and sociologists among others. Those employed will improve their living standards from the fees they will be paid for their services.

b) Creation of Awareness

During the planning and design phase of the proposed project, a lot of awareness has been done through consultations on different aspects of the project. Awareness improves civility in project planning, implementation and operations. This is a sure formula for ensuring there is sustainability of the project.

7.3.2 Potential Positive Impacts during Construction Phase

a) Creation of Market for Construction materials

The Project will require a variety of construction materials, including cement, ballast, hardcore and steel bars/rods etc., most of which will be sourced locally. This will provide a ready market for suppliers in and outside the project area.

b) Creation of Employment Opportunities

The waste management has many benefits in the cyclical economy ranging from waste collection, sorting, transportation, recycling to composting. All these will offer employment opportunities to the local including women and youth. Additionally, construction works will require several human resources from machine operators to other skilled and unskilled laborers. Several workers including casual laborers, plumbers and engineers are expected to work on the site for a period of time. With labor intensive construction technologies, the project will provide employment for youths.

c) Increased Business opportunities

The large number of project staff required will provide ready market for various goods and services, leading to several business opportunities for small-scale traders such as food vendors around the construction site.

7.3.3 Potential Positive Impacts during Operational Phase

- This project will provide residents of Chuka, Chogoria, Muthambi and adjacent urban centers in Tharaka Nithi County with a solid waste management site that will ensure better, efficient, environmentally friendly and a safe way of management of solid waste.
- Employment creation to the residents within the project and surrounding urban areas. The jobs include but not limited to waste transportation to the site, waste sorting, segregation, recycling and repurposing.
- Improved sanitation and hygiene. All solid waste collected to a central place will ensure waste is not scattered all over residential areas which may cause sanitation problems or breeding grounds for disease causing pests.
- Economic and social boost in the region due to increased investors and investment opportunities like sale of recycled products, transport services for waste collection, training in waste management service etc.
- Poverty alleviation due to increased employment and economic growth opportunities as a result of project implementation.
- Increased in value and demand of land within the proposed project area
- Infrastructure development within the project area such as, access roads, electricity and water supply
- Industrial development through processing of products from glass, plastics and organic wastes
- Availability of organic manure which would be collected from organic solid wastes. This would boost agricultural productivity and ensure food security.
- Proper solid waste management though varied techniques and systems- waste segregation and sorting, recycling, reusing or repurposing
- Enhanced integrated waste management because the town sewer is next to the proposed site for solid waste management.
- This project intends to directly benefit women, children, vendors, and the disabled as they are the most vulnerable group. This project will see to it that the economic power of the target group increases as: - the daily earning is realized, more children will be able to attend school comfortably, their health will be improved.

7.4 Negative Impacts

There are some negative impacts anticipated from the project, which however can be adequately mitigated through implementation of the recommended ESMP. Compared to the anticipated positive impacts the negative ones pales into insignificance. Significant impacts are defined as being those which are:

- Of public concern and importance.
- Subject to legislative control.
- Determined as such by technically qualified professionals.
- Related to protected areas or to culturally and historically important areas including shrines and heritage sites.
- Elevate the risk to life threatening circumstances.
- Affect fragile environmental factors and parameters

7.4 1 Potential Negative Impacts during Project Construction Phase

The project construction phase shall involve various activities including delivery of construction materials to the site, site clearance and excavation activities, construction of perimeter wall and waste management facilities. These activities will be associated with less significant negative impacts to both human and natural environment. The impacts have been categorized into three;

a) Impacts on biophysical environment
b) Socio-economic impact
c) Occupational health and safety impacts

7.4.1.1 Negative Impacts to the Biophysical Environment and Mitigation Measures

a) Destruction of vegetation on the proposed project area

Assessment of the project area identified that vegetation on site is moderate, therefore significant impact of the project to the vegetation is anticipated.

Mitigation measures

- Site Clearance and Construction activities will be limited to the area set out for construction.
- Some part of the project area should be set aside for green spaces and trees grown during or after construction phase.
- Design and implement an appropriate landscape program to help in re-vegetation.

b) Contamination of surrounding water sources

The assessment identified a water source, river Tungu and river Kurugucha (all season rivers) located in close proximity to the proposed project area, therefore chances of pollution of the water by construction effluents(oil, grease, hydro-carbonates) is significant. Point pollution can occur during equipment use, cleaning and repair. These effluents can further contaminate the surface water channels within the project area and eventually pollute adjacent water sources.

Mitigation measures

- The machineries are hired and therefore any repair must be done at a garage and not on the site.
- The contractor and the operator of the machineries must ensure that the machineries are properly maintained to prevent any spilt.
- Refueling of the machineries must not be done on site if a must then care must be taken to ensure that there is no spill.
- Any contaminated soil shall be scooped and disposed appropriately

c) Soil erosion resulting to loss of top soil

Site clearance, excavation and ground levelling activities during construction can cause the top soil to be loose and susceptible to agents of erosion which include wind and water. This impact applies to land under this assessment.

Mitigation Measures

- Excavated earth shall be held on locations of the site not susceptible to storm water runoff awaiting reuse or collection for disposal which need to be done as soon as possible.
- Minimize the areas to be cleared and leave as much vegetation as possible to filter runoff water from the site
- Avoid stock piling topsoil, sand and other building materials on foot path, roads and drainage channels.
- Fill and compact trenches immediately after services have been laid down.
- Drivers of construction vehicles and delivery trucks should be cautioned to drive slowly near the site of the earthen road to avoid creating dusty conditions;
- Vehicle transporting materials such as sand, ballast and cement to the site and waste from the site must be covered.

d) Solid waste generation from construction activities

Construction activities at the sites and Contractor's Camps will generate some solid wastes such as plastic containers, used tires, metal parts, plastics and cables, etc. Such wastes can lead to pollution of nearby water courses and blockage of drainage and sewerage systems if not properly handled and disposed of. Since the project itself entails a solid waste management facility, all the different types of construction waste will need to be sorted and placed in specific piles in the facility. This impact applies to land under this assessment.

Mitigation Measures

- Construction wastes (residual earth, debris and scrap materials) to be collected and sorted into designated points for recycling, repurposing, landfills and composting.
- There shall be no disposal of waste on the neighboring plots

- Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste
- Use of construction materials containing recycled content when possible and in accordance with accepted standards.
- Construction materials requirements are carefully budgeted to ensure that the amount of construction materials left on site after construction is kept minimal.
- Environmental Management, Health and Safety Training Programs to be conducted for Contractor's Staff to create awareness on proper solid wastes management

e) Air pollution and dust generation

Air Pollution can be caused by emissions from Construction Plant/Equipment and Vehicles. These machineries will run on fossil fuel hence combustion that will contribute to increase in emission of CO2, NO2, and the particulates along the way as a result of fuel combustion. Such emissions can lead to several environmental impacts including global warming and health impacts. The effect rated to be low. Dust can be generated by vehicles travelling on unpaved roads and tracks, and dust from exposed, non-vegetated surfaces. This impact applies to land under this assessment.

Mitigation Measures

- Workers shall be trained on management of air pollution from vehicles and machinery.
- All construction machinery shall be maintained and serviced in accordance with the contractor's specifications.
- Planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road.
- Truck drivers will be sensitized to avoid unnecessary racing of vehicle engines at loading/offloading areas, and to switch off or keep vehicle engines at these points. Prompt maintenance of vehicle.
- Use low sulphur diesel and petrol in all machinery and trucks
- Drivers of construction vehicles and delivery trucks must be supervised so that they do not leave vehicles idling and limit their speeds so that dust levels are lowered.

- All machinery and equipment should be maintained in good working order to ensure minimum emissions including carbon monoxide, oxides of Nitrogen and Sulphur, as well as suspended particulate matter;
- The removal of vegetation shall be avoided until such time as clearance is required and exposed surfaces shall be re-vegetated or stabilized as soon as practically possible.
- The contractor shall not carry out dust generating activities (excavation, handling and transport of soils) during times of strong winds
- Vehicles delivering construction materials and vehicles hauling excavated materials shall be covered to reduce spills and windblown dust
- Water sprays shall be used on all earthworks areas.
- Paving of access roads

f) Extraction and use of building materials

Construction materials such as hardcore, bricks, ballast, cement, rough stones, and sand required for construction of the waste management facility and perimeter wall will be obtained from quarries, hardware, shops, and sand harvesters who extract such materials from natural sources such as river banks and lake shores. Since substantial quantities of these materials will be required for construction, the availability and sustainability of such resources at the extraction site will be negatively affected as they are not renewable in the short term. In addition, the site from which the materials will be extracted may be significantly affected in several ways including landscape change, displacement of organisms and vegetation's, poor visual quality and opening of depressions on the surface leading to several Human and Fauna health impacts. Excessive use of timber will lead to deforestation and or reduction of vegetation cover at their source.

Mitigation Measures

- The contractor will source materials such as sand, ballast and hard core from registered quarry and sand mining firms, whose projects have undergone satisfactory environmental impact assessment audit and received NEMA approval. Since such firms are expected to apply acceptable environmental performance standards, the negative impacts of their activities at the extraction sites are considerably well mitigated

- The contractor will only order for what will be required through accurate budgeting and estimation of actual construction requirements. This will ensure that materials are not extracted or purchased in excessive quantities.
- The proponent will ensure that wastage, damage or loss (through run-off, wind, etc) of materials at the construction site is kept minimal, as these would lead to additional demand for and extraction or purchase materials.
- The contractor shall consider reuse of materials and use of recycled building materials. This will lead to reduction in the amount of raw materials extracted from natural resources as well as reducing impacts at the extraction sites.
- The contractor will use environmentally friendly inputs.

g) Increased water use

Construction activities will require substantial quantities of water for the construction works. This water will be sourced from river Kurugucha and other water service providers within the project area.

Mitigation measures

The contractor shall ensure that water is used efficiently and reused where necessary at the site by sensitizing construction staff to avoid irresponsible water usage.

h) Aesthetic environment

Long term negative effects on aesthetics is not expected. However, short term changes that will occur during construction on the landscape for example via vegetation clearance, excavations, enclosing the site using iron sheets etc. may create unpleasant scenery. Noise pollution generated during construction may interfere with the quiet environment of the countryside, thereby affecting recreation.

Mitigation measures

Spoiled materials, including solid waste generated during construction works at the site and cleared vegetation should be properly disposed and within appropriate time.

i) Increased energy consumption

It is also expected that there will be high consumption of fossil fuels by machineries and trucks that will be deployed in the project.

Mitigation measures

- Ensure construction machinery and trucks are well maintained to ensure optimal fossil fuel consumption
- Use energy-efficient construction machinery and trucks during construction phase of the project
- Ensure compliance with Energy Management Regulations of 2012.
- Maximize use of bolts in joineries instead of use of welding that requires use of electricity

7.4.1.2 Negative Impacts to the Socio-economic Environment and Mitigation Measures

a) Increased influx of workers

The Project will attract new people to the project area seeking employment during the construction period. Labor influx to the Project area could result to various social vices which include, discrimination, sexual abuse, drug and alcoholism, child labor among others.

Mitigation Measures

The contractor and the supervising engineer should ensure that the personnel on site are protected as provided for under the Worker Injures and Benefits Act (WIBA 2007). The standard aims to;

- Promote the fair treatment, non-discrimination, and equal opportunity of workers.
- Establish, maintain, and improve the worker-management relationship.

- promote compliance with national employment and labor laws and,
- protect workers, including vulnerable categories of workers such as children

b) Increased transmission of HIV/AIDS

The Project will attract new people to the Project area seeking employment during the construction period and this can lead to increased transmission of HIV/AIDS and other sexually transmitted diseases (STDs). This impact applies to the settlements under this assessment.

Mitigation Measures

- HIV/AIDS Awareness Program to be instituted and implemented as part of the Contractor's Health and Safety Management Plan. This will involve periodic HIV/AIDS Awareness Workshops for Contractor's Staff
- Contractor to provide standard quality condoms to personnel on site

7.4.1.3 Negative Impacts on Occupational health and safety and Mitigation Measures

a) Noise and excessive vibrations

Noise and Excessive Vibrations are caused by operation of construction plant and equipment and activities such as excavation and rock breaking. This impact poses a health and safety risk to both the communities living in the project area and construction workers.

Mitigation Measures

- Construction works should be carried out only during the specified time of 0800hrs to 1700hrs.
- Machinery should be maintained regularly to reduce noise resulting from friction
- There should not be unnecessary horning of the involved machinery
- Provision of billboards at the construction site notifying of the construction activity and timings

- The contractor shall comply with the Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations of 2009 where he will ensure that only noise permitted level of 75dB (A) is emitted.
- Any complaints received by the Contractor regarding noise will be recorded and communicated to the Supervising Engineer for appropriate action.

b) Risk of accidents at Work Site

Accidents during construction activities may occur due to failure to use Personal Protective Equipment (PPE) by workers on site and members of the public illegally accessing the work sites. Accidents may result in injuries or even death of workers or members of the public. This impact applies to all settlements under this assessment.

Mitigation Measures

- All workers should be provided with protective gear. These include working safety boots, overalls, helmets, goggles, earmuffs, respirators/masks and gloves
- Construction crew at the site will be sensitized on social issues such as drugs, alcohol, diseases
- Fencing or construction of perimeter wall on site to restrict access by the local communities during the construction for their safety and health
- Contractor to provide a Healthy and Safety Plan prior to the commencement of works to be approved by the Supervising Engineer.
- A first aid kit should be provided within the site.
- Food handlers preparing food for the workers at the site should be controlled and monitored to ensure that food is hygienically prepared
- Regular maintenance of machinery on site
- Conducting risk assessments before the work commences to ensure that hazards are identified and eliminated before the work commences.
- Before the work begins every day, the contractor/foreman shall instruct all the workers on safety and health issues at work place so that they can avoid occurrence of any accident to the workers and the neighborhood.

- The contractor must be committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Safety and Health Act, 2007

7.4.2 Potential Negative Impacts during Project Operation Phase

a) Odor production

Increased air pollution form incinerators, recycling plants, high volumes of decomposing organic waste could affect surrounding neighborhoods.

Mitigation measures:

- Advanced Techniques of controlling fumes and odor from decomposing waste to be instituted such as sanitary landfills.
- Avoid burning of solid wastes.
- Include a buffer zone around the facility
- Provide closed containers for waste storage

b) Pests and diseases

The project being a solid waste management site may attract disease causing and transmitting pests that can transmit diseases to workers and local residents.

Mitigation

- Ensuring all solid waste management techniques are adhered to and waste is properly sorted and segregated at specified points
- Ensuring workers have protective gear including helmets and face masks while handling any waste that is prone to pests breeding like decomposing organic waste
- Proper treatment of waste before/after recycling or repurposing to ensure disease causing variants are not transferred to end users.
- Providing a closed depression pit for unloading waste

c) Increased energy consumption

Sufficient amounts of energy will be used during various processes of solid waste management like recycling, incineration and transport of waste from various points in the urban areas to the main site for disposal.

Mitigation measures

- Truck drivers will be sensitized to avoid unnecessary racing of vehicle engines at loading/offloading areas, and to switch off or keep vehicle engines at these points. Prompt maintenance of vehicle.
- Establish other sources of energy like solar energy to run incinerators and recycling plants. This would reduce overreliance of electricity and wood/fossil fuels.

d) Increased crime and insecurity

Influx of persons to the project area may lead to increased insecurity and incidences of crime.

Mitigation Measures

- Contractor and Supervision Team to liaise regularly with the Local Administration and Police Service to address any security and crime arising during project implementation.
- Security lights installation around the project site
- Security guard(s) be stationed on site to monitor movement of people in and out of the site area.

e) Occupational hazards, health and Safety Risks

Accidents during operation phase of the project may occur due to failure of using Personal Protective Equipment (PPE) by workers on site. Accidents can occur during waste sorting, segregation, recycling, and use of incinerators and transportation of waste to different points in the site. Attention must be focused on health of employees, traders and the neighboring community

in order to attain a level of health condition that permits them to lead a healthy, socially and economically productive life.

Mitigation Measures

- All workers should be provided with protective gear. These include working safety boots, overalls, helmets, goggles, earmuffs, respirators/masks and gloves
- A first aid kit should be provided within the site.
- Food handlers preparing food for the workers at the site should be controlled and monitored to ensure that food is hygienically prepared.
- Measures shall be put in place to ensure that there is good fresh air circulation in all structures.
- Appropriate firefighting equipment and response measure shall be put in place
- Noise generating activities will be avoided as much as practicable and as per the noise control regulation
- Proper waste management systems will be put in place as earlier discussed
- Provide condom dispenser at the washrooms
- Water supplied for consumption will be that fit for consumption;
- Health and environment committee to be formed to address matters health and environment;
- It is also important that good hygiene practices be ensured to reduce exposure of the traders, customers, the public and the neighboring community to unexpected infections.
- Control waste collection and transportation timing, do not exceed working hours

f) Contamination of water sources

From the site assessment, there is an all-season water source, river Kurugucha in close proximity to the proposed project area. Increasing and uncontainable amounts of solid waste during operational phase would put the river at risk of being contamination.

Mitigation

- Construction of perimeter wall to ensure no waste flows from the designated area and onto the river
- Establishment of landfills to composting techniques as opposed to high heaps of wastes that can easily be blown by wind and end up in the river channel.

g) Vegetation cover

If trees and vegetation lost during construction phase is not replanted/replenished, the aesthetic value of the area will diminish.

Mitigation

- Ensure proper nurturing and maintenance of the vegetation
- Plant trees at strategic points within the project site

h) Increased traffic

The proposed project will lead to increased traffic of vehicles, motorbike and pedestrians heading to and from the project site hence accidents may result. High speed of vehicles, bicycles and motor cycles to and from the market to deliver waste from collection centers or to pick end products or workers may cause accidents.

Mitigation Measures

- Appropriate road signs be put in place to control and guide road use by motorists and the pedestrians.
- Put road bumps at intervals where necessary.

g) Climate Change Impacts

Solid waste management processes and climate change operate at similar timescales, as such; there is a need to understand what the potential climate change impacts may be on waste management. The major impediment in many areas is the lack of capital, which jeopardizes improvements in waste and wastewater management. These areas may also lack access to advanced technologies.

However, technologies must be sustainable in the long term, and there are many examples of advanced, but unsustainable, technologies for waste management that have been implemented. Therefore, the selection of truly sustainable waste and wastewater strategies is very important for both the mitigation of GHG emissions and for improved urban infrastructure. Waste management sites are also vulnerable to flooding from an increase in extreme precipitation events.

Green House Gas emissions from waste can be effectively mitigated by current technologies. Many existing technologies are also cost effective; for example, landfill gas recovery for energy use can be profitable. Regarding the future of up-front recycling and separation technologies, it is expected that wider implementation of incrementally-improving technologies will provide more rigorous process control for recycled waste streams transported to secondary markets or secondary processes, including paper and aluminum recycling, composting and incineration. Waste can be considered a resource, and these improvements should result in more advantageous material and energy balances for both individual components and urban waste streams as a whole.

Table 5: Summary of adaptation, mitigation and sustainable development issues for waste management.

Technologies and practices	**Vulnerability to climate change**	**Adaptation implications & strategies to minimize emissions**	**Sustainable development dimensions**			**Comments**
			Social	**Economic**	**Environmental**	
Recycling, reuse & waste minimization	Indirect low vulnerability or no vulnerability	Minimal implications	Usually positive Negative for waste scavenging without public health or safety controls	Positive Job creation	Positive Negative for waste scavenging from open dumpsites with air and water pollution	Indirect benefits for reducing GHG emissions from waste Reduces use of energy and raw materials. Requires implementation of health and safety provisions for workers
Controlled landfilling with landfill gas recovery and utilization	Indirect low vulnerability or positive effects:	Minimal implications May be regulatory mandates or	Positive Odour reduction (non-CH_4 gases)	Positive Job creation	Positive Negative for improperly managed sites	Primary control on landfill CH_4 emissions with >1200

	Higher temperatures increase rates of microbial methane oxidation rates in cover materials	economic incentives Replaces fossil fuels for process heat or electrical generation		Energy recovery potential	with air and water pollution	commercial projects Important local source of renewable energy: replaces fossil fuels Landfill gas projects comprise 12% of annual registered CERs under CDM[a] Oxidation of CH_4 and NMVOCs in cover soils is a smaller secondary control on emissions
Controlled landfilling without landfill gas recovery	Indirect low vulnerability or positive effects: Higher temperatures increase rates of microbial methane oxidation rates in cover materials	Minimal implications Gas monitoring and control still required	Positive Odour reduction (non-CH_4 gases)	Positive Job creation	Positive Negative for improperly managed sites with air and water pollution	Use of cover soils and oxidation in cover soils reduce rate of CH_4 and NMVOC emissions
Optimizing microbial methane oxidation in landfill cover soils (‘biocovers’)	Indirect low vulnerability or positive effects: Increased rates at higher temperatures	Minimal implications or positive effects	Positive Odour reduction (non-CH_4 gases)	Positive Job creation	Positive Negative for improperly designed or managed biocovers with GHG emissions and NMVOC emissions	Important secondary control on landfill CH_4 emissions and emissions of NMVOCs Utilizes other secondary materials (compost,

						composted sludges) Low-cost low-technology strategy for developing countries
Uncontrolled disposal (open dumping & burning)	Highly vulnerable Detrimental effects: warmer temp. promote pathogen growth and disease vectors	Exacerbates adaptation problems Recommend implementation of more controlled disposal and recycling practices	Negative	Negative	Negative	Consider alternative lower-cost medium technology solutions (e.g., landfill with controlled waste placement, compaction, and daily cover materials)
Thermal processes including incineration, industrial co-combustion, and more advanced processes for waste-to-energy (e.g., fluidized bed technology with advanced flue gas cleaning)	Low vulnerability	Minimal implications Requires source control and emission controls to prevent emissions of heavy metals, acid gases, dioxins and other air toxics	Positive Odour reduction (non-CH_4 gases)	Positive Job creation Energy recovery potential	Positive Negative for improperly designed or managed facilities without air pollution controls	Reduces GHG emissions relative to landfilling Costly, but can provide significant mitigation potential for the waste sector, especially in the short term Replaces fossil fuels
Aerobic biological treatment (composting) Also a component of mechanical biological treatment (MBT)	Indirect low vulnerability or positive effects: Higher temperatures increase rates of biological	Minimal implications or positive effects Produces CO_2 (biomass) and compost Reduces volume, stabilizes organic C, and	Positive Odour reduction (non-CH_4 gases)	Positive Job creation Use of compost products	Positive Negative for improperly designed or managed facilities with odours, air and water pollution	Reduces GHG emissions Can produce useful secondary materials (compost) provided there is quality control on

	processes (Q_{10})	destroys pathogens				material inputs and operations Can emit N_2O and CH_4 under reduced aeration or anaerobic conditions
Anaerobic biological treatment (anaerobic digestion) Also a component of mechanical-biological treatment (MBT)	Indirect low vulnerability or positive effects: Higher temperatures increase rates of biological processes	Minimal implications Produces CH_4, CO_2, and biosolids under highly controlled conditions Biosolids require management	Positive Odour reduction (non-CH_4 gases)	Positive Job creation Energy recovery potential Use of residual biosolids	Positive Negative for improperly designed or managed facilities with, odours, air and water pollution	Reduces GHG emissions CH_4 in biogas can replace fossil fuels for process heat or electrical generation Can emit minor quantities of CH_4 during start-ups, shutdowns and malfunctions
Wastewater control and treatment (aerobic or anaerobic)	Highly vulnerable Detrimental effects in absence of wastewater control and treatment: Warmer temperatures promote pathogen growth and poor public health	Large adaptation implications High potential for reducing uncontrolled GHG emissions Residuals (biosolids) from aerobic treatment may be anaerobically digested	Positive Odour reduction (non-CH_4 gases)	Positive Job creation Energy recovery potential from anaerobic processes Use of sludges and other residual biosolids	Positive Negative for improperly designed or managed facilities with odours, air and water pollution and GHG emissions	Wide range of available technologies to collect, treat, recycle and re-use wastewater Wide range of costs CH_4 from anaerobic processes replaces fossil fuels for process heat or electrical generation Need to design and operate to minimize N_2O and CH_4 emissions during transport and treatment

7.4.3 Potential Negative Impacts during Project Decommissioning Phase

a) Solid waste generation

Demolition of the project structures and related infrastructure will result in large quantities of solid waste, in addition to the high volumes solid wastes collected from different urban areas. The waste will contain construction materials such as concrete, stones and metals, electronic wastes from households and other facilities, sanitary and clinical wastes, paper, plastic and glass wastes, and organic wastes.

Mitigation Measures

- All foundations must be removed and recycled, reused or disposed in accordance to NEMA regulations.
- Donate reusable demolition waste to charitable organizations, community, individuals and institutions

b) Noise Pollution

The decommissioning related activities such as demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas. This will be as a result of the noise and vibration that will be experienced as a result of demolishing the proposed project concrete structure and related components. This impact will however be minimal since the effects will be short term.

Mitigation Measure

- Demolition works should be carried out only during the specified time of 0800hrs to 1700hrs.
- Workers be provided with ear muffs

c) Occupational hazard

Demolition works will inevitably expose workers and the public to occupational health and public safety risks. In particular, working with heavy equipment, handling and use of tools exposes certain risks. The construction workers are also likely to be exposed to risk of accidents and injuries resulting from accidental falls, falling objects, injuries from hand tools and other equipment.

Mitigation Measures

- All workers should be provided with protective gear. These include working safety boots, overalls, helmets, goggles, earmuffs, respirators/masks and gloves
- A first aid kit should be provided within the site.

7.5 Other recommendations

- **Observing good house-keeping:** these require basic issues like hygiene and welfare facilities being provided for the workers on site during construction and entire population to use the site after project completion. Some of these may involve provision for sanitation, cleaning, washrooms, among other things.
- **Regular review of site planning:** this will be required so as to cope with the changing environmental, economic and technological realities.
- **Monitoring and environmental auditing**: this will be necessary every year as per the EMCA (1999) act requirement.
- The most essential tool in environmental management is the human resource. The operators, supervisors and the support staff need to understand environmental requirements related to their operations. In this regard, therefore, the following steps may be considered:
  - ✓ Provide basic training on specific skills (e.g. HIV / AIDS, health and safety, fire preparedness, life skills, etc.) and technical understanding on environmental performance to selected key operators and their supervisors;
  - ✓ Initiate a general awareness program for all the employees and encourage contribution of improvement ideas e.g. through periodic questionnaires and suggestion boxes.

8. ENVIROMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Introduction

This chapter presents the Environmental and Social Management Plan (ESMP) that will need to be implemented by project proponent to prevent or reduce significant negative impacts to acceptable levels. The entire project components including construction, operational and decommissioning phases were considered when this ESMP was developed.

The table details all necessary mitigation measures as well as the person responsible for implementing such measures hence the ESMP will be used as checklist in future environmental audits.

Due to the magnitude of the project, compliance with the ESMP must be monitored periodically and reports prepared and provided at monthly site meetings during the construction phase and quarterly during the operations and maintenance period as required in EMCA, Cap 387. Annual audits will be conducted during the construction, operation and maintenance phases.

8.2 ESMP Implementation

For effective implementation of the ESMPs, the project must establish an Environment, Health and Safety (EHS) unit that will be responsible for Project Environmental Monitoring and Evaluation to ensure compliance to NEMA Policies and Procedures. The project proponent will be responsible for all costs of implementing the project's EIA license conditions, including the ESMPs and the actual costs of public involvement in the ESIA process. Hence all costs proposed in the ESMPs below will be incurred by the project proponent who may transfer all to the contractor except those of land acquisition and resettlement. The costs for actual activities should be included in the main bill of quantities of the project.

The tables have ESMP for the following phases:

- Planning phase
- Construction phase
- Operational Phase
- Decommissioning phase

Table 6: Environmental and Social Management Plan for Planning Phase

Anticipated Impacts	Mitigation Measures	Responsibility	Timeline	Cost(KES)
Project design and approval	• The project needs to be approved by all relevant Departments both at the County and National level and project engineers	Proponent	Before commencement of works	Per statutory fee
Relocation of Residents in the project area	• Create intensive awareness and offer compensation or resettlement options to the displaced residents in the project site.	Proponent	Before commencement of works	Proponent cost Valuation report by NLC

Table 7 : Environmental and Social Management Plan for Construction Phase

Anticipated Impacts	Mitigation Measures	Responsibility	Timeline	Cost(KES)
Extraction and use of building materials	• The contractor will source materials such as sand, ballast and hard core from registered and approved quarry and sand mining firms • The contractor will only order for what will be required through accurate budgeting and estimation of actual construction requirements. • The proponent will ensure that wastage, damage or loss (through run-off, wind, etc) of materials at the construction site is kept minimal. • The contractor shall consider reuse of materials and use of recycled building materials. • The contractor will use environmentally friendly inputs.	Proponent/ contractor	Throughout construction phase	As per BoQ
Destruction of vegetation	• Site Clearance and Construction activities will be limited to the area set out for construction. • Some part of the project area should be set aside for green spaces and trees grown during or after construction phase. • Design and implement an appropriate landscape program to help in re-vegetation.	Proponent/ contractor	Beginning and end of construction phase	Landscaping and tree planting budget be included in the project cost
Contamination of surrounding water sources	• The machineries are hired and therefore any repair must be done at a garage and not on the site.	Contractor	Throughout project cycle	350,000.00

	• The contractor and the operator of the machineries must ensure that the machineries are properly maintained to prevent any spilt. • Refueling of the machineries must not be done on site if a must then care must be taken to ensure that there is no spill. • Any contaminated soil shall be scooped and disposed appropriately			
Soil erosion	• Excavated earth shall be held on locations of the site not susceptible to storm water runoff awaiting reuse or collection for disposal which need to be done as soon as possible. • Minimize the areas to be cleared and leave as much vegetation as possible to filter runoff water from the site • Avoid stock piling topsoil, sand and other building materials on foot path, roads and drainage channels. • Fill and compact trenches immediately after services have been laid down. • Drivers of construction vehicles and delivery trucks should be cautioned to drive slowly near the site of the earthen road to avoid creating dusty conditions; • Vehicle transporting materials such as sand, ballast and cement to the site and waste from the site must be covered.	Contractor	Throughout construction phase	200,000.00

Solid waste	• Construction wastes (residual earth, debris and scrap materials) to be collected and sorted into designated points for recycling, repurposing, landfills, composting. • There shall be no disposal of waste on the neighboring plots • Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste • Use of construction materials containing recycled content when possible and in accordance with accepted standards. • Construction materials requirements are carefully budgeted to ensure that the amount of construction materials left on site after construction is kept minimal. • Environmental Management, Health and Safety Training Programs to be conducted for Contractor's Staff to create awareness on proper solid wastes management	Contractor and construction workers	Throughout construction phase	250,000.00
Air pollution and dust generation	• Workers shall be trained on management of air pollution from vehicles and machinery. • Provision of PPEs for workers • All construction machinery shall be maintained and serviced in accordance with the contractor's specifications.	Contractor and construction workers	Throughout project cycle	700,000.00

	• Planning of transportation of materials to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road. • Truck drivers will be sensitized to avoid unnecessary racing of vehicle engines at loading/offloading areas, and to switch off or keep vehicle engines at these points. Prompt maintenance of vehicle. • Use low sulphur diesel and petrol in all machinery and trucks • Drivers of construction vehicles and delivery trucks must be supervised so that they do not leave vehicles idling and limit their speeds so that dust levels are lowered. • All machinery and equipment should be maintained in good working order to ensure minimum emissions including carbon monoxide, oxides of Nitrogen and Sulphur, as well as suspended particulate matter; • The removal of vegetation shall be avoided until such time as clearance is required and exposed surfaces shall be re-vegetated or stabilized as soon as practically possible. • The contractor shall not carry out dust generating activities (excavation, handling and transport of soils) during times of strong winds • Vehicles delivering construction materials and vehicles hauling excavated materials shall be covered to reduce spills and windblown dust • Water sprays shall be used on all earthworks areas.			

Increased Water use	• The contractor shall ensure that water is used efficiently and reused where necessary at the site by sensitizing construction staff to avoid irresponsible water usage.	Contractor and construction workers	Throughout construction phase	Nil
Reduced aesthetic beauty	• Spoiled materials, including solid waste generated during construction works at the site and cleared vegetation should be properly disposed and within appropriate time.	Contractor	Throughout construction phase	100,000.00
Increased energy consumption	• Ensure construction machinery and trucks are well maintained to ensure optimal fossil fuel consumption • Use energy-efficient construction machinery and trucks during construction phase of the project • Ensure compliance with Energy Management Regulations of 2012.	Contractor and workers	Throughout construction phase	Nil
Increased influx of workers	• The contractor and the supervising engineer should ensure that the personnel on site are protected as provided for under the Worker Injures and Benefits Act (WIBA 2007).	Contractor and supervisors	Throughout project cycle	As per project budget

Noise and excessive vibrations	• Construction works should be carried out only during the specified time of 0800hrs to 1700hrs. • Machinery should be maintained regularly to reduce noise resulting from friction • There should not be unnecessary horning of the involved machinery • Provision of billboards at the construction site notifying of the construction activity and timings • The contractor shall comply with the Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations of 2009 where he will ensure that only noise permitted level of 75dB (A) is emitted. • Any complaints received by the Contractor regarding noise will be recorded and communicated to the Supervising Engineer for appropriate action.	Contractor & workers	Throughout construction phase	150,000.00
Risk of accidents at Work Site	• All workers should be provided with protective gear. These include working safety boots, overalls, helmets, goggles, earmuffs, respirators/masks and gloves • Construction crew at the site will be sensitized on social issues such as drugs, alcohol, diseases	Contractor & workers	Throughout construction phase	400,000.00

	• Fencing or construction of perimeter wall on site to restrict access by the local communities during the construction for their safety and health • Contractor to provide a Healthy and Safety Plan prior to the commencement of works to be approved by the Supervising Engineer. • A first aid kit should be provided within the site. • Food handlers preparing food for the workers at the site should be controlled and monitored to ensure that food is hygienically prepared • Regular maintenance of machinery on site • Conducting risk assessments before the work commences to ensure that hazards are identified and eliminated before the work commences. • Before the work begins every day, the contractor/foreman shall instruct all the workers on safety and health issues at work place so that they can avoid occurrence of any accident to the workers and the neighborhood. • The contractor must be committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Safety and Health Act, 2007			

Social Impacts				
Increased transmission of HIV/AIDS	• HIV/AIDS Awareness Program to be instituted and implemented as part of the Contractor's Health and Safety Management Plan. This will involve periodic HIV/AIDS Awareness Workshops for Contractor's Staff • Contractor to provide standard quality condoms to personnel on site	Proponent/ Contractor	Throughout construction phase	200,000.00
Insecurity / public safety	• Having guards dedicated to the project sites and fencing off the project sites	Contractor, Proponent	Continuous	As per project budget
Exclusion (ethnicity, gender, age, location and disability	• Public awareness of the project requirements, • Stakeholder engagement and collective reasoning, • Implementation of the requirements of the LMP, and the GBV Action Plan.	Contractor, Proponent PHO, Gender Expert	Continuous	Varied
Gender based Violence/Sexual Exploitation and Abuse	• The contractor should develop a code of conduct which should encompass clear warning to workers on any kind of sexual exploitation and abuse. • The contractor should provide a mechanism where workers are free to report any sexual advances and abuse to the senior management without fear of intimidation.	Contractor, Proponent PHO, Gender Expert	Continuous	Varied

	• The contractor should communicate to the workers that there should be no or minimal interaction with the patients.			
Lack of access to grievance redress mechanism	• A verbal or written complaint from a complainant will be received by the site supervising engineer/site agent and recorded in a complaints log that is kept on site. The log will indicate grievances, date lodged, action taken to address complaint or reasons the grievance was not acted on; information provided to complainant and date the grievance was closed.	Contractor, Proponent	Continuous	Varied
Labour influx	• effective community engagement and strong grievance mechanisms on matters related to labour, including sexual exploitation and abuse	Contractor, Proponent	Continuous	Varied
Child labour	• Ensure no child of below 18 years is seen on site • Ensure contractor sign a CoC for child protection	Contractor, Proponent	Continuous	00
Public health and safety hazards which may be potential risk to contract communicable diseases and infectious diseases	• Treat affected local and migrant workers to control the spread of disease vectors (through contaminated water and between people); • Provision of adequate and accessible sanitation facilities in good condition with adequate water supply; • Create awareness to workers on proper sanitation and personal hygiene to promote proper health; and	Contractor, Proponent, PHO	Continuous	Varied

like COVID-19 at the site	• To mitigate risk from food related contamination amongst construction workers, food supplies will be from the vendors with public health certificate. • Put in place all infectious diseases including COVID19 prevention and containment measures. • Publish health and safety information including site rules at the site • Ensure observance of public and community health and safety.			

Table 8: Environmental and Social Management Plan for Operation phase

Anticipated Impacts	Mitigation Measures	Responsibility	Timeline	Cost(KES)
Odor production	• Advanced Techniques of controlling fumes and odor from decomposing waste to be instituted such as sanitary landfills. • Avoid burning of solid wastes.	Proponent/ contractor	Throughout occupational phase	Project budget
Waste generated from the various departments	• Provide necessary waste collection facilities • Ensure appropriate and adequate segregation of waste at source • Ensure appropriate on-site transportation of all waste-to-Waste treatment area, • Ensure proper records of waste received from the collection centers.	Proponent, PHO	Continuous	200,000
Emission of Green House Gases	• Ensure controlled landfilling with landfill gas recovery and utilization • Avoid open and haphazard waste dumping • To develop programs to sensitize and sustain the waste management concepts among communities through media and established models through: o Practice segregation at source through source separation involving communities; o Reduce waste production through unnecessary packaging, o Adopting practices that reduce waste toxicity o Encourage small-scale wastewater management such as septic tanks and recycling of grey water,	Proponent Community	Continuous	Varied

	○ Construction of medium-technology landfills with controlled waste placement and use of daily cover (perhaps including a final bio cover to optimize CH_4 oxidation), ○ Controlled composting of organic waste. • Ensure the sections within the dumpsite are fully operational			
Pests and diseases	• Ensuring all solid waste management techniques are adhered to and waste is properly sorted and segregated at specified points • Ensuring workers have protective gear including helmets and face masks while handling any waste that is prone to pests breeding like decomposing organic waste • Proper treatment of waste before/after recycling or repurposing to ensure disease causing variants are not transferred to end users.	Proponent/ project workers	Throughout occupational phase	project budget
Surface run-off and waste water management	• Embankment, re-vegetation, proper drainage systems • Efficient use of water resources • Spill prevention procedures and response plan	Proponent, PHO	Continuous	Varied
Pollution of surface and ground water	• All liquid waste from the site should be directed to the hospital septic system • Installation of pre-treatment chambers before discharge to hospital septic system	Proponent, PHO	Through out	Varied

Emissions from site and vehicles	• Use of air pollution control devices through installation of scrubbers/filters to the incinerator to remove particulate matter and other gases • Train the site operators on best operational practices • Periodic operation and maintenance of the site • Conduct periodic air quality monitoring of the site area	Proponent, PHO	Continuous	50,000
Increased energy consumption	• Truck drivers will be sensitized to avoid unnecessary racing of vehicle engines at loading/offloading areas, and to switch off or keep vehicle engines at these points. Prompt maintenance of vehicle. • Establish other sources of energy like solar energy to run incinerators and recycling plants. This would reduce overreliance of electricity and wood/fossil fuels.	Proponent/ Contractor/ workers	Throughout occupational phase	1,000,000.00
Increased crime and insecurity	• Contractor and Supervision Team to liaise regularly with the Local Administration and Police Service to address any security and crime arising during project implementation. • Security lights installation around the project site • Security guard(s) be stationed on site to monitor movement of people in and out of the site area.	Contractor/ Proponent/ Local administration police	Throughout occupational phase	Project budget

Occupational hazards, health and Safety Risks	• All workers should be provided with protective gear. These include working safety boots, overalls, helmets, goggles, earmuffs, respirators/masks and gloves • A first aid kit should be provided within the site. • Food handlers preparing food for the workers at the site should be controlled and monitored to ensure that food is hygienically prepared. • Measures shall be put in place to ensure that there is good fresh air circulation in all structures. • Appropriate firefighting equipment and response measure shall be put in place • Noise generating activities will be avoided as much as practicable and as per the noise control regulation • Proper waste management systems will be put in place as earlier discussed • Provide condom dispenser at the washrooms • Water supplied for consumption will be that fit for consumption;	Proponent, workers	Occupational phase	500,000.00

	• Health and environment committee to be formed to address matters health and environment; • It is also important that good hygiene practices be ensured to reduce exposure of the traders, customers, the public and the neighboring community to unexpected infections. • Regular medical check-up for healthcare waste handlers and vaccination such as against Hepatitis A, B and tetanus and COVID-19, • Undertake awareness creation on OHS to the healthcare workers and the site operators in relation to COVID-19 and first aid training • OHS policy strategically displayed • Ensure observance of public and community health and safety • Train site waste operators on operation and maintenance			
Contamination of water sources	• Construction of perimeter wall to ensure no waste flows from the designated area and onto the river • Establishment of landfills to composting techniques as opposed to high heaps of wastes that can easily be blown by wind and end up in the river channel.	Proponent/ Contractor	Occupational phase	300,000.00
Vegetation cover	• Ensure proper nurturing and maintenance of the vegetation • Plant trees at strategic points within the project site	Proponent	Occupational phase	250,000.00

Surface run-off and waste water management	• Embankment, re-vegetation, proper drainage systems • Efficient use of water resources • Spill prevention procedures and response plan	Proponent, PHO	Continuous	150,000.00
Increased traffic	• Appropriate road signs be put in place to control and guide road use by motorists and the pedestrians. • Put road bumps at intervals where necessary.	Contractor/ proponent	Occupational phase	300,000.00

Table 9 : Environmental and Social Management Plan for Decommissioning phase

Anticipated Impacts	Mitigation Measures	Responsibility	Timeline	Cost(KES)
Solid waste generation	• All foundations must be removed and recycled, reused or disposed in accordance to NEMA regulations. • Donate reusable demolition waste to charitable organizations, community, individuals and institutions	Proponent	Decommissioning phase	To be determined during decommissioning phase
Noise Pollution	• Demolition works should be carried out only during the specified time of 0800hrs to 1700hrs. • Workers be provided with ear muffs	Proponent	Decommissioning phase	To be determined during decommissioning phase

Occupational hazard	• All workers should be provided with protective gear. These include working safety boots, overalls, helmets, goggles, earmuffs, respirators/masks and gloves • A first aid kit should be provided within the site.	Proponent	Decommissioning phase	To be determined during decommissioning phase

Table 10: Decommisioning Phase

8.2 Monitoring Plan

The contractor will be responsible for the environmental monitoring activities during the operation of the facility for the first year. After training the personnel throughout the year, the responsibility will pass on to the Proponent. Environmental monitoring will be undertaken during both the construction and operation phases to ensure appropriate operation of the facility, the implementation, and effectiveness of the recommended mitigation measures, the production of good quality and safe compost, and the response to unanticipated environmental impacts.
Environmental parameters to be monitored with their frequency, duration, and responsible body are summarized below;

Recommended monitoring activities

Table 11: Monitoring activities

Parameter	**Samples**	**Frequency**	**Location**	**Responsibility**	**Estimated cost**
Construction phase					
Noise	Inspection	Monthly	Construction site and surroundings	Contractor/ Proponent	No extra cost
landscape	Visual inspection	Weekly	Construction site and surroundings	Contractor/ Proponent	No extra cost
Health and Safety	Visual inspection	Continuous	Construction site	Contractor/ Proponent	No extra cost
Operation phase					

Noise	Inspection	Quarterly	Facility and neighborhood	Proponent/ facility operatives	No extra cost
odor	Inspection	Monthly	Facility and neighborhood	Proponent/ facility operatives	No extra cost
Health and safety	Visual inspection	Continuous	Construction site and surroundings	Proponent/ facility operatives	No extra cost
Landscape	Visual inspection	Continuous	Construction site and surroundings	Proponent/ facility operatives	No extra cost

9. CONCLUSION & RECOMMENDATIONS

9.1 Conclusions

As a requirement of the EMCA-Cap 387 and its subsidiary Environmental Impact Assessment and Environmental Audit Regulations, 2003, on such projects, the consultants have prepared an Environmental and Social Impact Assessment Compressive Project Report for the proposed Solid waste management site in Ntuntuni. The report has identified positive and negative impacts associated with the life cycle of this project both to the public, the physical and biological environment of the project area. The report has gone further and proposed an adequate Environmental Social Management and Monitoring Plan to be implemented by various stakeholders during the projects Life cycle, which is not static as allowances are given for changes. Having considered the data collected, analyzed and collated information that is available, it is the experts' considered opinion that:

1. The project DOES NOT pose any serious environmental concerns, other than those of a minor scale that accompany most development activities.
2. The positive impacts of the project far outweigh the negative ones.
3. As such, the project should be allowed to commence, and activities be managed within the provided ESMP and sound environmental management practices that are internationally recognized.

The proponent is committed to putting in place measures to mitigate the negative environmental, safety, health and social impacts associated with the life cycle of the project as outlined in the report in addition to adhering to all relevant National, County and International Environmental, Health and Safety Standards, Policies and Regulations that Govern establishment and operation of such facility.

9.2 Recommendations

The proponent will ensure that any unforeseen secondary effects to the neighboring plots and the site, are addressed immediately before any social conflict issues arise from the community residents. Integration of the project to the social framework of the surrounding society will contribute towards the project being considered as part of the entire society.

It therefore recommended that the negative environmental impacts that will result from establishment of the project be mitigated while the positive ones maximized as much as possible hence ensuring that the facility operations are environmentally friendly.

It is from these findings, conclusions and recommendations that the project team is for the opinion that the project be licensed by NEMA for implementation as it will be beneficial to the community of Ntuntuni and Tharaka Nithi County at large.

10. REFERENCES

1. Government of Kenya, (GOK), 2019, Legal Notice 31 &32 of 2019, Government Printer, Nairobi, Kenya
2. Government of Kenya, (GOK), 2015, Environmental Management & Coordination Act 1999 Amended 2015, Government Printer, Nairobi, Kenya
3. Government of Kenya, (GOK), 2019, The Environmental (Impact Assessment & Audit) Regulations, 2003 Rev 2019, Government Printer, Nairobi, Kenya
4. Government of Kenya, (GOK), Physical Planning Act 1996 (Cap 286), Government Printer, Nairobi, Kenya
5. Government of Kenya, (GOK), Urban areas and Cities Act, 2011, Government Printer, Nairobi, Kenya
6. Government of Kenya, (GOK), Public health Act (CAP, 242).
7. Way leave Act Cap 292
8. Government of Kenya, (GOK), 2016, Water Act 2016, Government Printer, Nairobi, Kenya.
9. Factories and other places of work Act.
10. Policy guidelines on environment and development.

11. ANNEXES

Annex 1: Minutes of Public Participation and/ Stakeholders Meeting

MINUTES OF THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PUBLIC PARTICIPATION FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUNTUNI AREA, MERU SOUTH (CHUKA) SUB COUNTY HELD ON 22ND MARCH 2023 AT THE PROJECT SITE AT NTUNTUNI

Members present

See attached attendance list

AGENDA

1. Introduction & welcome remarks
2. Project introduction & Progress review
3. ESIA Public consultation
4. A.O.B

MIN 01-22/03/2023: Introduction & welcome remarks

The meeting was called to order at 10:00am by the area Chief and started with a word of prayer from one of the residents present. Further, the Chief proceeded to lead a self-introduction session and thanked all members for their attendance and urged them to participate fully throughout the meeting. He therefore called upon the Director, Urban Development to take over.

MIN 02-22/03/2023: Project introduction & Progress review

The Director, Urban Development invited the County Physical Planner to give members an overview of the proposed project scope. He further explained to members how the County Government of Tharaka Nithi through the Department of Lands had planned to acquire the land for the proposed project. The Physical Planner elaborated that there were approval documents needed before project commencement among them being an Environmental and Social Impact Assessment Report, which would culminate to a license issued by NEMA. He introduced the Lead Expert and his team and welcomed them to take over.

MIN 03-22/03/2023: ESIA Public consultation

The Lead expert started by creating awareness on environmental laws among them the EIA/EA Regulations 2003, Environmental Management and Coordination Act 1999 amended 2015,Legal notice 31 & 32 of 2019, which guides on the EIA process and categorizes projects into low, medium and high risk respectively. He went ahead to ask members to give their opinion concerning the proposed Solid Waste Management site which was their constitutional mandate.

Proposed positive impacts

- Employment creation
- Improved sanitation and hygiene
- Enhanced electricity and water supply in the areas within the proposed project site
- Economic and social boost in the region due to increased investors and investment opportunities
- Increased in value and demand of land within the proposed project area
- Infrastructure development within the project area for instance, improvement of access roads
- Industrial development through processing of products from glass, plastics and organic wastes
- Availability of organic manure which would be collected from organic solid wastes.
- Proper solid waste management though varied techniques and systems- waste segregation, recycling, reusing or repurposing, composting, landfills.
- Enhanced integrated waste management because the town sewer is next to the proposed site for solid waste management.

Proposed negative impacts

- Displacement of residents in the proposed project area due to demolition of existing structures
- Increased air pollution from fume chambers, incinerators during operation phase
- Disturbance from wildlife and birds e.g., hornbills, hawks which would be attracted by the solid waste
- Diseases and pests (flies, mosquitos) from the waste components during operation phase of the project

- Excessive amounts of solid waste that may cause contamination of nearby water sources
- Social disconnects among households due to different living standards and relocations
- Influx of people working and living within the project area may lead to moral decadence and insecurity
- Increased traffic due to vehicles coming from different collection centers to the main site
- Dust emission during construction phase
- Noise pollution from movement of machines during construction phase
- Workplace injuries during construction phase
- Loss of existing trees in the area during construction phase

Proposed mitigation measures

- Planting of variety of tree species to replace those lost during construction phase of the project and for environmental sustainability- improvement of air quality, reduction of air pollution
- Waste sorting, segregation, recycling, reducing and repurposing
- Use of incinerators to reduce volumes of solid wastes
- Proper chemical treatment of the solid waste to reduce occurrences of pests and diseases
- Put in place measures to avoid contamination of neighboring water sources
- Construction of a health center near the proposed project area to deal with diseases
- Enhance electricity supply and establishment of a police post to curb insecurity issues
- Fencing off the project area during construction and operational phases of the project
- Residents within the project area to be prioritized during job recruitment at construction and operational phases
- All surrounding land within the proposed project site to be acquired by the government and residents be resettled elsewhere.
- Provision of Personal Protective Equipment and First Aid boxes
- Sourcing of construction materials from local suppliers
- Provision of Condom dispensers at construction site
- Sprinkling of water to dust prone areas

- Control of traffic during project construction
- Installation of precautionary signage during project construction
- Creation of awareness on upholding good moral ethics in the region

MIN 04-22/03/2023: A.O.B

The Director, Urban Development thanked members for their time and for giving out their views and opinions, which were all geared to ensure a better and sustainable project. He thanked the Chief for extensively mobilizing residents within the proposed project area. He went ahead to assure the public that all their recommendations would be taken under consideration and that they would also be invited for project commissioning once all approvals are put in place.

There being no other business, the meeting ended at 12:00pm with a word of prayer from one of the residents present.

Pictorials:

Figure 6: Public consultation at the project site in Ntuntuni

Prepared by:

Kiilu Diana

Associate Expert

Signature: 

Date: 12th April 2023

Confirmed by:

Njagi Charles

Chief- Karingani Location

Signature: 

Date: 12th April 2023

Annex 2: Duly filled Questionnaires

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT COMPREHENSIVE PROJECT REPORT (CPR) FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUTUINI AREA,NDAGANI SUB LOCATION, KARINGANI LOCATION MERU SOUTH(CHUKA) SUB COUNTY, THARAKA NITHI COUNTY.

QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS/NEIGHBOURS/INTERESTED PARTIES

The National Environmental Management Authority (NEMA) requires that public participation/consultation be carried out during environmental impact assessment for proposed projects as stipulated in the EMCA 1999 Section 58, EIA/EA. As a member of the local community/neighbor/interested party, we request for your comments on the expected socio-economic and environmental impacts of the proposed project. Your valuable information will remain confidential and shall be used in ensuring sound environmental management in the entire project cycle. Your contribution will be highly appreciated.

1) Are you a resident in the above – mentioned neighborhood? (YES) (NO)

2) If YES, for how long (in years) have you resided/worked in this area? ...More than 40 yrs

3) Which category do you fall (Tick appropriately)
   a) Local resident ☑ b) Business owner ☐
   c) Employee ☐ d) Visitor ☐
   d) Others (Please specify) .....

4) What environmental issues (either positive/negative) are you facing in the current solid waste management site/collection center?
a) - H. Great employment.
b) - Improve Roads and electricity
c) - Brings Piped water
d) - H. Bitings) diseases
e) - Bad Odour.

5) What good/positive things do you think will arise as a result of the project?
a) - Good Roads
b) - Employment
c) - Clean piped water
d) - Investors will come
e) - Industrial development

6) What negative social-economic and environmental impacts do you think the project will bring to this area?
a) - Displacement of villagers
b) - Diseases due to migration into area eg malaria
c) - Break of families due to new social life
d) - Environmental pollution
e) - Insecurity may also arise

7) Make suggestions on the measures the proponent needs to put in place to control the negative impacts you mentioned above:
1- Recycling to reduce pollution & tree planting
2- The surrounding land should be acquired by the government and left with no residence like 1 km all round.

8) In your opinion, should the project continue at the proposed site? (YES) (NO) If NO indicate your reason. To enhance development such roads, create employment especially to the residents, Economic growth

Name. James Mwambia Occupation. Farmer

Contact. 0725526387 ID No. 25160141

Signature.

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT COMPREHENSIVE PROJECT REPORT (CPR) FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUTUINI AREA,NDAGANI SUB LOCATION, KARINGANI LOCATION MERU SOUTH(CHUKA) SUB COUNTY, THARAKA NITHI COUNTY.

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1) Are you a resident in the above – mentioned neighborhood? (YES) (NO)

2) If YES, for how long (in years) have you resided/worked in this area? Lto Years

3) Which category do you fall (Tick appropriately)
   a) Local resident ☑ b) Business owner ☐
   c) Employee ☐ d) Visitor ☐
   d) Others (Please specify) .....

4) What environmental issues (either positive/negative) are you facing in the current solid waste management site/collection center?
a) Lack of space to plant trees.
b) Pollution.
c) Lack recycling technique.
d) .....
e) .....

5) What good/positive things do you think will arise as a result of the project?
a) Enough space to plant trees around the project to control Pollution
b) Create employment.
c) It will enhance development such as roads.
d) It is neighboring liquid waste management so will be managed together.
e) .....

6) What negative social-economic and environmental impacts do you think the project will bring to this area?
a) Pollution such odours and fumes from incinerators.
b) Open air burning experiment fire.
c) Neighbors of the project will be affected
d) .....
e) .....

7) Make suggestions on the measures the proponent needs to put in place to control the negative impacts you mentioned above;

1. recycling of waste.
2. planting of trees for conservery.
3. security enhancement.
4. hospital set up for disaster.

8) In your opinion, should the project continue at the proposed site? (YES) (NO) If NO indicate your reason.....

Name. HARRISON MUNENE Occupation. BUSINESS MAN

Contact. 0714409669 ID No. 27313634

Signature. H.Munene

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT COMPREHENSIVE PROJECT REPORT (CPR) FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUTUINI AREA,NDAGANI SUB LOCATION, KARINGANI LOCATION MERU SOUTH(CHUKA) SUB COUNTY, THARAKA NITHI COUNTY.

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1) Are you a resident in the above – mentioned neighborhood? (YES) ✓ (NO)

2) If YES, for how long (in years) have you resided/worked in this area? ..... 30 Years Minimum

3) Which category do you fall (Tick appropriately)
   a) Local resident ☑ b) Business owner ☐
   c) Employee ☐ d) Visitor ☐
   d) Others (Please specify) .....

4) What environmental issues (either positive/negative) are you facing in the current solid waste management site/collection center?
a) ....Air pullution.....
b) ....Pest diseases.....
c) ....Theft.....
d) ....Killings.....
e) .....

5) What good/positive things do you think will arise as a result of the project?
a) ....Employment.....
b) ....Accessibility of roads.....
c) ....Business opportunities.....
d) ....Electricity Connectivity.....
e) ....Value of land increases.....

6) What negative social-economic and environmental impacts do you think the project will bring to this area?
a) ....Pullution.....
b) ....displacement of people.....
c) ....Theft.....
d) ....School drapouts.....
e) .....

7) Make suggestions on the measures the proponent needs to put in place to control the negative impacts you mentioned above;

.....

.....

.....

.....

.....

.....

8) In your opinion, should the project continue at the proposed site? (YES) (NO) If NO indicate your reason.....

.....

Name..... Occupation.....

Contact..... ID No.....

Signature..... 22/3/2023

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT COMPREHENSIVE PROJECT REPORT (CPR) FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUTUINI AREA,NDAGANI SUB LOCATION, KARINGANI LOCATION MERU SOUTH(CHUKA) SUB COUNTY, THARAKA NITHI COUNTY.

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1) Are you a resident in the above – mentioned neighborhood? (YES) (NO)

2) If YES, for how long (in years) have you resided/worked in this area? ..Permanent

3) Which category do you fall (Tick appropriately)
   a) Local resident ☑ b) Business owner ☐
   c) Employee ☐ d) Visitor ☐
   d) Others (Please specify) .....

4) What environmental issues (either positive/negative) are you facing in the current solid waste management site/collection center?
a) .....
b) .....
c) .....
d) .....
e) .....

5) What good/positive things do you think will arise as a result of the project?
a) .....
b) .....
c) .....
d) .....
e) .....

6) What negative social-economic and environmental impacts do you think the project will bring to this area?
a) .....
b) .....
c) .....
d) .....
e) .....

7) Make suggestions on the measures the proponent needs to put in place to control the negative impacts you mentioned above;

- Creation of alternative access road & footbridge to Ndumbuini & Marioni
- Priority to residents to Job Opportunities in the site
- Tree planting for buffer zone
- Improvement of infrastructure, water, road, electricity

8) In your opinion, should the project continue at the proposed site? (YES) (NO) If NO indicate your reason

- Provision of amenities ie road, water, electricity
- Creation of employment.

Name Charles M. Mutegi Occupation Farmer

Contact 0790774830 ID No. 21006708

Signature

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT COMPREHENSIVE PROJECT REPORT (CPR) FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUTUINI AREA,NDAGANI SUB LOCATION, KARINGANI LOCATION MERU SOUTH(CHUKA) SUB COUNTY, THARAKA NITHI COUNTY.

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1) Are you a resident in the above – mentioned neighborhood? (YES) (NO)

2) If YES, for how long (in years) have you resided/worked in this area? ..... 72 Years -

3) Which category do you fall (Tick appropriately)
   a) Local resident ☑ b) Business owner ☐
   c) Employee ☐ d) Visitor ☐
   d) Others (Please specify) .....

4) What environmental issues (either positive/negative) are you facing in the current solid waste management site/collection center?
a) ..... Noise & Tar of Solid Waste Management Site.
b) ..... No collection of Solid Waste.
c) ..... The designated solid waste management site
d) ..... in the area.
e) .....

5) What good/positive things do you think will arise as a result of the project?
a) ..... Job creation / employment.
b) ..... Development ie grading of roads piped water
c) ..... Installation of electricity connection
d) ..... Increase in value of land.
e) .....

6) What negative social-economic and environmental impacts do you think the project will bring to this area?
a) ..... Odour / Smell from Waste Management site.
b) ..... Mosquito & flies infestation.
c) ..... The liquid waste site has blocked road access & footbridge to
d) ..... access areas Ndambuni & Mariani
e) ..... family separation due to relocation

7) Make suggestions on the measures the proponent needs to put in place to control the negative impacts you mentioned above;
planting of trees
Solid wastes littering.
proper solid waste management

8) In your opinion, should the project continue at the proposed site? (YES) (NO) If NO indicate your reason..... YES

Name..... JOSEPH MUTUA Occupation..... FARMER

Contact..... 0717591256 ID No..... 27281272

Signature.....

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT COMPREHENSIVE PROJECT REPORT (CPR) FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUTUINI AREA,NDAGANI SUB LOCATION, KARINGANI LOCATION MERU SOUTH(CHUKA) SUB COUNTY, THARAKA NITHI COUNTY.

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1) Are you a resident in the above – mentioned neighborhood? (YES) (NO)

2) If YES, for how long (in years) have you resided/worked in this area? ..More than 30
3) Which category do you fall (Tick appropriately)
   a) Local resident ☑ b) Business owner ☐
   c) Employee ☐ d) Visitor ☐
   d) Others (Please specify) .....

4) What environmental issues (either positive/negative) are you facing in the current solid waste management site/collection center?
a) .....Jal opportunity to Youths.....
b) .....Infrastructures improvement eg.....roads, water.....
c) .....Electricity.....
d) .....
e) .....

5) What good/positive things do you think will arise as a result of the project?
a) .....Jal.....opportunity.....
b) .....Infrastructures.....
c) .....Electricity, water.....
d) .....
e) .....

6) What negative social-economic and environmental impacts do you think the project will bring to this area?
a) .....Pollution.....
b) .....Land.....
c) .....dust.....
d) .....Water.....pollution.....
e) .....diseases.....eg.....cholera.....

7) Make suggestions on the measures the proponent needs to put in place to control the negative impacts you mentioned above;

1. Construction of health facility
2. Security should be provided
3. Develop a committee to control employment system
4. Planting of trees in plenty

8) In your opinion, should the project continue at the proposed site? (YES) (NO) If NO indicate your reason... It will provide employment thus raising the standard of people.

Name: Fredrick Njiru Occupation: farmer

Contact: 0703216992 ID No: 12613323

Signature: [signature]

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1) Are you a resident in the above – mentioned neighborhood? (YES) (NO)

2) If YES, for how long (in years) have you resided/worked in this area? .....
3) Which category do you fall (Tick appropriately)
   a) Local resident ☑ b) Business owner ☐
   c) Employee ☐ d) Visitor ☐
   d) Others (Please specify) .....

4) What environmental issues (either positive/negative) are you facing in the current solid waste management site/collection center?
a) Unemployment
b) Development of infrastructure
c) Improvement in order cleanliness
d) .....
e) .....

5) What good/positive things do you think will arise as a result of the project?
a) Employment
b) Improved standard of living
c) Increase in sales volume of business
d) .....
e) .....

6) What negative social-economic and environmental impacts do you think the project will bring to this area?
a) Contamination of areas
b) Growth of families
c) Destruction of cleanliness
d) Theft
e) .....

7) Make suggestions on the measures the proponent needs to put in place to control the negative impacts you mentioned above:
- Fencing by building perimeter wall.
- Planting of variety of trees + fruit trees.

8) In your opinion, should the project continue at the proposed site? (YES) (NO) If NO indicate your reason... Agriculture use the land is not productive so can be used for this project hence members compensated to buy land which productive area.

Name: [illegible] Occupation: FARMER

Contact: 0725225212 ID No: [illegible]

Signature: [illegible]

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT COMPREHENSIVE PROJECT REPORT (CPR) FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUTUINI AREA,NDAGANI SUB LOCATION, KARINGANI LOCATION MERU SOUTH(CHUKA) SUB COUNTY, THARAKA NITHI COUNTY.

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1) Are you a resident in the above – mentioned neighborhood? (YES) (NO)

2) If YES, for how long (in years) have you resided/worked in this area? ...20+.....

3) Which category do you fall (Tick appropriately)
   a) Local resident ☑ b) Business owner ☐
   c) Employee ☐ d) Visitor ☐
   d) Others (Please specify) .....

4) What environmental issues (either positive/negative) are you facing in the current solid waste management site/collection center?
a) Creating employment
b) Development and infrastructure
c) Weather change as a planting trees.
d) If not well managed can cause healthy issues.
e) .....

5) What good/positive things do you think will arise as a result of the project?
a) .....
b) As NEMA
c) .....
d) .....
e) .....

6) What negative social-economic and environmental impacts do you think the project will bring to this area?
a) .....
b) .....
c) N/A
d) .....
e) .....

7) Make suggestions on the measures the proponent needs to put in place to control the negative impacts you mentioned above:

- On air pollution — Plant Many trees
- Displacement of people — people to be compensated
- Disturbance by bandits/thorn bush — area to be fenced
- Contamination of water — to reduce splage and treat water sources
- Sites — spraying and use of incinerator to reduce waste

8) In your opinion, should the project continue at the proposed site? (YES) (NO) If NO indicate your reason..... N/A .....

Name LINUS MURITHI M'KANGA Occupation FARMER

Contact 0742546179 ID No 33779786

Signature

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT COMPREHENSIVE PROJECT REPORT (CPR) FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUTUINI AREA,NDAGANI SUB LOCATION, KARINGANI LOCATION MERU SOUTH(CHUKA) SUB COUNTY, THARAKA NITHI COUNTY.

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1) Are you a resident in the above – mentioned neighborhood? (YES) (NO)

2) If YES, for how long (in years) have you resided/worked in this area? ..... 35 years

3) Which category do you fall (Tick appropriately)
   a) Local resident ☑ b) Business owner ☐
   c) Employee ☐ d) Visitor ☐
   d) Others (Please specify) .....

4) What environmental issues (either positive/negative) are you facing in the current solid waste management site/collection center?
a) Inadequate land enough space
b) Odour / smell
c) Flies
d) Shortage of employees
e) Disturbance by banks and hamlets

5) What good/positive things do you think will arise as a result of the project?
a) Job opportunities
b) Opening and maintenance of roads
c) Beautification of the area
d) Improve security
e) Infrastructure development

6) What negative social-economic and environmental impacts do you think the project will bring to this area?
a) Odour air pollution
b) Displacement of people
c) Disturbance by banks & hamlets
d) Contamination of water sources (wells & streams
e) Presence of many flies

7) Make suggestions on the measures the proponent needs to put in place to control the negative impacts you mentioned above;

- Treat the sewage properly.
- Drill the mosquitoes & other harmful insects.
- Proper waste management - plastic & other wastes.
- Proper water treatment.

8) In your opinion, should the project continue at the proposed site? (YES) (NO) If NO indicate your reason.....

Name. EUSTUCE. M. KAMENJU Occupation..... farmer.

Contact... 0740 592778 ID No... 1725448

Signature.....

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT COMPREHENSIVE PROJECT REPORT (CPR) FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUTUINI AREA,NDAGANI SUB LOCATION, KARINGANI LOCATION MERU SOUTH(CHUKA) SUB COUNTY, THARAKA NITHI COUNTY.

QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS/NEIGHBOURS/INTERESTED PARTIES

The National Environmental Management Authority (NEMA) requires that public participation/consultation be carried out during environmental impact assessment for proposed projects as stipulated in the EMCA 1999 Section 58, EIA/EA. As a member of the local community/neighbor/interested party, we request for your comments on the expected socio-economic and environmental impacts of the proposed project. Your valuable information will remain confidential and shall be used in ensuring sound environmental management in the entire project cycle. Your contribution will be highly appreciated.

1) Are you a resident in the above – mentioned neighborhood? (YES) (NO)

2) If YES, for how long (in years) have you resided/worked in this area? ...local resident(20yrs)

3) Which category do you fall (Tick appropriately)
   a) Local resident ☑ b) Business owner ☐
   c) Employee ☐ d) Visitor ☐
   d) Others (Please specify) .....

4) What environmental issues (either positive/negative) are you facing in the current solid waste management site/collection center?
a) - Injuries from waste (metal, broken bottles etc)
b) - Foul smells
c) - More animals, Rats, lice, stray dogs
d) - Which can bring diseases
e) .....

5) What good/positive things do you think will arise as a result of the project?
a) - Create employment
b) - Tree planting will positively change the
c) environment.
d) - Better roads
e) - Electricity & water -

6) What negative social-economic and environmental impacts do you think the project will bring to this area?
a) - More mosquitoes -
b) - Foul smell
c) - Lots of plastic waste
d) - We fear more diseases
e) .....

7) Make suggestions on the measures the proponent needs to put in place to control the negative impacts you mentioned above;

- Contruct health center nearby
- put electricity for security purpose
- Have nearby police post
- Plant tree for Environmental Conducivity

8) In your opinion, should the project continue at the proposed site? (YES) (NO) If NO indicate your reason..... YES

Name LAWRENCE GITARI KABURIA Occupation RETIRED TEACHER

Contact 0711492256 ID No. 4447361

Signature

Annex 3: Attendance List – public participation

COUNTY GOVERNMENT OF THARAKANITHI

DEPARTMENT OF ROADS, INFRASTRUCTURE AND URBAN DEVELOPMENT

TELEPHONE P.O BOX 10-60406

Email: lands@tharakanithi.go.ke KATHWANA

Website: www.tharakanithicounty.go.ke

PUBLIC PARTICIPATION ON THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED SOLID WASTE MANAGEMENT SITE IN NTUTUINI AREA, CHUKA SUB- COUNTY, THARAKA NITHI COUNTY

AT NTUNTUNI ON 12TH APRIL 2023

S/No	Name	Designation	Phone number	Signature
1	DANIEL M. KITHUKA	DIRECTOR-URBAN	0725632761	
2	Mwenda K. Duncan	Ass. Dir. - Physical Planning	0706713526	
3	Betty Mwende R.	Ward Adm	0725409018	
4	[illegible] NJAGI KWIGI	SNR PAM OFFICER (CA)	0711985294	
5	Jane Kawira	Resident	0706853409	
6	Alfason Mutembei	Resident	0710924830	
7	Nancy Gitari	Resident	0705667997	
8	N'Twiga Njwima	"	-	
9	Lawrence G Kabuthia	Resident	0711492256	

10	Ephantus IV	Resident	0722299404	
11	[illegible] MWENDA	Resident	0712466186	
12	Juliana Kathambi	Resident	0796133282	
13	Lydia [illegible] Njeru	Resident	0725225212	
14	Hon. Godfrey Muchiri	MCA Karingani	0712557044	
15	Peter Muriuki Nlagi	Resident	0792876944	
16	James Munene	Resident	0710706989	
17	Gitonga Julius	Resident	0777415820	
18	John Njeru	Resident	0722808235	
19	Patrick Muithi	"	0759562029	
20	Santanina Mukwaiti	"	0745016115	
21	Lucy Kanini Stanley	"	0704958372	
22	Jeberio Mungaki	"		
23	Daina Kanini	"	0711992285	
24	Elisphia Kanini Njeru	"	0713114158	
25	James Mwambia	"	0725526382	
26	Anicota Cakaura	"	0716476736	
27	Betty Wanja	"	0719334308	
28	Geoffrey Muriithi	"	0713387763	
29	Musa Mugo	"	0742546179	
30	Linus Murithi	"	0790774836	
31	Charles Mugendi	"		
32	Nicolus [illegible]	"	0707225509	
33	Eustace Mideniwa		0740847778	
34	Amison Mugambi	"	0723944970	
35	Alex Mugambi	"	0799161121	
36	Joseph Mutua	"	0717591256	
37	Timothy Mwiti	"	0789101	
38	[illegible]	"	0720214277	
39	Doras Nkeri	"	0715041998	
40	Fedrick Njiru	"	0703276992	
41	Joyce Gathiuri	"	0717848752	

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Annex 4:Practicing License of EIA Lead Expert

FORM 7 (r.16(2))

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

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

License No : NEMA/EIA/ERPL/18806

Application Reference No: NEMA/EIA/EL/24784

M/S **Alex Nthiwa**
(individual or firm) of address
P.O. Box 3073 - 90100 Machakos

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

registration number **11541**

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

Issued Date: **2/2/2023** Expiry Date: **12/31/2023**

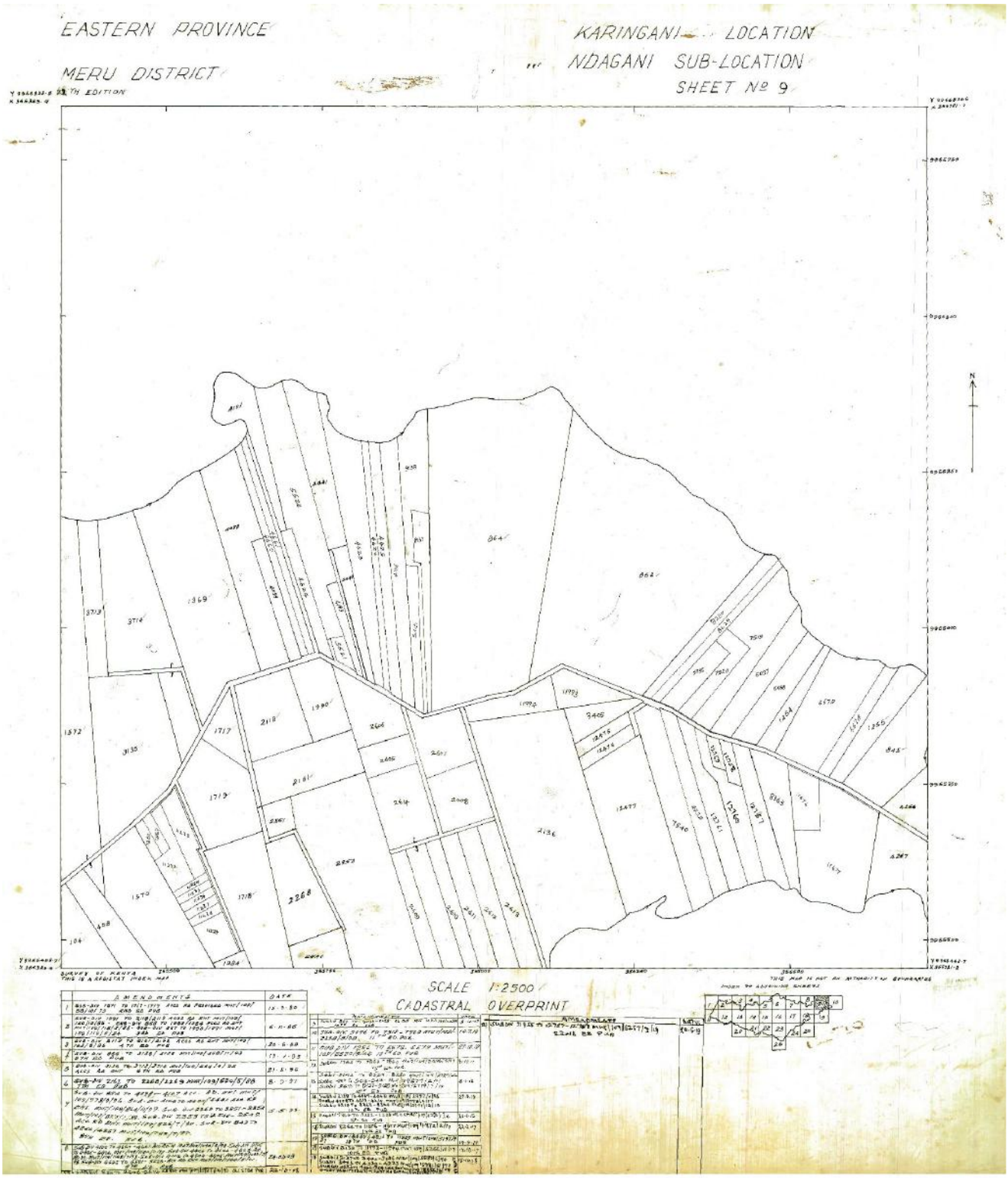
Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001:2015 Certified

Annex 5:Registered Index Map of Karingani/Ndagani Registration Section, SHEET No 9


EASTERN PROVINCE
MERU DISTRICT
KARINGANI LOCATION
NDAGANI SUB-LOCATION
SHEET No 9
SCALE 1:2500
CADASTRAL OVERPRINT
AMENDMENTS
DATE

Annex 6:Official Searches for the proposed parcels for acquisition for the solid waste site in Ndagani

Form LRA-85 CHUKA - SOLID WASTE SITE (r.84(3))

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

THE LAND REGISTRATION (GENERAL) REGULATIONS, 2017

CERTIFICATE OF OFFICIAL SEARCH

TITLE NO. KARINGANI / NDAGANI / 12760

SEARCH NO. 10

On the 1st day of DEC 20 20 the following were the subsisting entries on the register of the above-mentioned title:

Part A — Property Section (easements, etc.)

Nature of title ABSOLUTE

Approximate area (0.716 HA) ZERO DECIMAL SEVEN ONE SIX HA

Part B — Proprietorship Section

Name and address of proprietor 1. 23.5.2019 M'KANGA M'ITHINGITHU

Inhibitions, cautions and restrictions ....

Part C — Encumbrances Section (leases, charges, etc.)

....

The following applications are pending:

(a) ....

(b) ....

(c) ....

(d) ....

The following certified copies are attached as requested:

(a) ....

(b) ....

(c) ....

(d) ....

Date 1st day DEC 20 20

Signed by the Registrar Seal ....

Name: ....

Signature: ....

GPK (L) 082—400m—7/18

Form LRA-85 (r.84(3))

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

THE LAND REGISTRATION (GENERAL) REGULATIONS, 2017

CERTIFICATE OF OFFICIAL SEARCH

TITLE NO. KAKUNGANI/NDAGANI/1276

SEARCH NO. 09

On the 1ST day of DEC 2020 the following were the subsisting entries on the register of the above-mentioned title:

Part A — Property Section (easements, etc.)

Nature of title ABSOLUTE

Approximate area (0.724Ha) ZERO DECIMAL SEVEN TWO FOUR Ha

Part B — Proprietorship Section

Name and address of proprietor 1.23.5.2019 MR KANGA M'TIINGATHI

Inhibitions, cautions and restrictions /

Part C — Encumbrances Section (leases, charges, etc.)

/

The following applications are pending:

(a) /

(b)

(c)

(d)

The following certified copies are attached as requested:

(a) /

(b)

(c)

(d)

Date 1ST day DEC 20 20

Signed by the Registrar Seal

Name:

Signature:

P.K. Nyaa 576

GPK (L) 082—400m—7/18

(r.84(3))

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

THE LAND REGISTRATION (GENERAL) REGULATIONS, 2017

CERTIFICATE OF OFFICIAL SEARCH

TITLE NO. KAKUNGANU/NJIRAINI/12757

SEARCH NO. 13

On the 1ST day of DEC 20 22 the following were the subsisting entries on the register of the above-mentioned title:

Part A — Property Section (easements, etc.)

Nature of title ABSOLUTE

Approximate area (0.699HA) ZERO DECIMAL SIX NINE NINE HECTS

Part B — Proprietorship Section

Name and address of proprietor 1·23·5·2019 M'KUNGU M'ITHINGITHU

Inhibitions, cautions and restrictions .....

Part C — Encumbrances Section (leases, charges, etc.)

.....

The following applications are pending:

(a) .....

(b) .....

(c) .....

(d) .....

The following certified copies are attached as requested:

(a) .....

(b) .....

(c) .....

(d) .....

Date 1ST day DEC 20 22

Signed by the Registrar

Seal .....

Name: .....

Signature: .....

GPK (L) 082—400m—7/18

M. K. Nyaa 510

Form LRA-85 (r.84(3))

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

THE LAND REGISTRATION (GENERAL) REGULATIONS, 2017

CERTIFICATE OF OFFICIAL SEARCH

TITLE NO. KARINGANI/NDAGANI/12758

SEARCH NO. 12

On the 1ST day of DEC 20 22 the following were the subsisting entries on the register of the above-mentioned title:

Part A — Property Section (easements, etc.)

Nature of title ABSOLUTE

Approximate area 0.1304HA/ ZERO DECIMAL ONE THREE NINE MEAN

Part B — Proprietorship Section

Name and address of proprietor 1.23.5.2019 M'KANIA M'ITHINGITHU

Inhibitions, cautions and restrictions .....

Part C — Encumbrances Section (leases, charges, etc.)

.....

The following applications are pending:

(a) .....

(b) .....

(c) .....

(d) .....

The following certified copies are attached as requested:

(a) .....

(b) .....

(c) .....

(d) .....

Date 1ST day DEC 20 22

Signed by the Registrar Seal .....

Name: .....

Signature: ..... Reg. No. 376

Form LRA-85 (r.84(3))

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

THE LAND REGISTRATION (GENERAL) REGULATIONS, 2017

CERTIFICATE OF OFFICIAL SEARCH

TITLE NO. KIAMBU/NDIAGANI/12759

SEARCH NO. 11

On the 1ST day of DEC 2020 the following were the subsisting entries on the register of the above-mentioned title:

Part A — Property Section (easements, etc.)

Nature of title ABSOLUTE

Approximate area (0.103HA) ZERO DECIMAL ONE ZERO THREE HECTARES

Part B — Proprietorship Section

Name and address of proprietor 26.11.19 MICHENI GITAU KAMAU

Inhibitions, cautions and restrictions 3.26.11.19 TITLE DEED ISSUED

Part C — Encumbrances Section (leases, charges, etc.)

The following applications are pending:

(a)

(b)

(c)

(d)

The following certified copies are attached as requested:

(a)

(b)

(c)

(d)

Date 1ST day DEC 2020

Signed by the Registrar Seal

Name:

Signature:

M. K. Njue 376

GPK (L) 082—400m—7/18

Form LRA-85 (r.84(3))

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

THE LAND REGISTRATION (GENERAL) REGULATIONS, 2017

CERTIFICATE OF OFFICIAL SEARCH

TITLE NO. KARINGANI/NDACANI/4222

SEARCH NO. 15

On the 1ST day of DEC 2022 the following were the subsisting entries on the register of the above-mentioned title:

Part A — Property Section (easements, etc.)

Nature of title ABSOLUTE

Approximate area (0.81HA) ZERO DECIMAL EIGHT ONE HECTARES

Part B — Proprietorship Section

Name and address of proprietor 2.10.3.2010 CHRISTOPHER WAWERU NGUNJIRI

Inhibitions, cautions and restrictions 3.11.3.2010 MARGARET KANUMI NJUE TITLE DEED ISSUED

Part C — Encumbrances Section (leases, charges, etc.)

.....

The following applications are pending:

(a) .....

(b) .....

(c) .....

(d) .....

The following certified copies are attached as requested:

(a) .....

(b) .....

(c) .....

(d) .....

Date 1ST day DEC 20 22

Signed by the Registrar Seal .....

Name: .....

Signature: ..... M. K. Njue 370

GPK (L) 082—400m—7/18

Form LRA-85

(r.84(3))

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

THE LAND REGISTRATION (GENERAL) REGULATIONS, 2017

CERTIFICATE OF OFFICIAL SEARCH

TITLE NO. KARINGANI/NDAIGANI/7540

SEARCH NO. 071/12

On the 1ST day of DEC 2020 the following were the subsisting entries on the register of the above-mentioned title:

Part A — Property Section (easements, etc.)

Nature of title ABSOLUTE

Approximate area (1.215HA) ONE DECIMAL TWO ONE FIVE HECTARES

Part B — Proprietorship Section

Name and address of proprietor 2.31.12.09 MARGARET KARIMI NJUE CHRISTOPHER WAWERU NJOKI

Inhibitions, cautions and restrictions 3.31.12.09 TITLE DEED ISSUED

Part C — Encumbrances Section (leases, charges, etc.)

.....

The following applications are pending:

(a) .....

(b) .....

(c) .....

(d) .....

The following certified copies are attached as requested:

(a) .....

(b) .....

(c) .....

(d) .....

Date 1ST day DEC 2020

Signed by the Registrar

Seal .....

Name: .....

Signature: .....

GPK (L) 082—400m—7/18

Form LRA-85 Sheet 9 (r.84(3))

REPUBLIC OF KENYA

THE LAND REGISTRATION ACT

THE LAND REGISTRATION (GENERAL) REGULATIONS, 2017

CERTIFICATE OF OFFICIAL SEARCH

TITLE NO. KAJIADO/NDITEANI/12477

SEARCH NO. 08/12

On the 1st day of DEC 20 2... the following were the subsisting entries on the register of the above-mentioned title:

Part A — Property Section (easements, etc.)

Nature of title ABSOLUTE

Approximate area (2.787 Ha) TWO DECIMAL SEVEN EIGHT SEVEN HA ONLY

Part B — Proprietorship Section

Name and address of proprietor 1·17·10·18 EPHANTUS NJAU

Inhibitions, cautions and restrictions /

Part C — Encumbrances Section (leases, charges, etc.)

/

The following applications are pending:

(a) /

(b)

(c)

(d)

The following certified copies are attached as requested:

(a) /

(b)

(c)

(d)

Date 1st day DEC 20 2...

Signed by the Registrar Seal

Name:

Signature:

GPK (L) 082—400m—7/18

Annex 7: Bills of Quantities

Annex 8:Payment receipt