


## **TANA WATER WORKS DEVELOPMENT AGENCY**

### **National Urban Water Supply and Sanitation Program**

# **ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PROJECT REPORT FOR KERUGOYA –KUTUS SEWERAGE LAST MILE CONNECTIVITY (LMC) PROJECT IN KIRINYAGA COUNTY**



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**24 APRIL 2024**

## DECLARATION BY THE PROPONENT

### TANA WATER WORKS DEVELOPMENT AGENCY

I certify that this Environmental and Social Impact Assessment (ESIA) study report for **Kerugoya Kutus Sewerage Last Mile Connectivity Project** was conducted under my direction.

Signature..... Date.....

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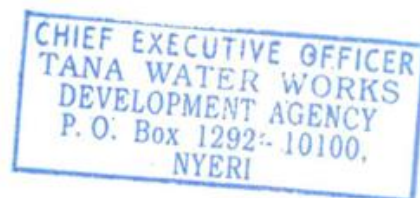
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### **CERTIFICATION**

I hereby certify that the content of this Environmental and Social Management (ESIA) study report for the proposed construction of Kerugoya-Kutus Sewerage Project Last Mile Connectivity, Kirinyaga County is factual and all the information is accurate and truthful representation of all findings as relating to the proposed project.

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Date: **24/04/2024**

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## LIST OF ACRONYMS AND ABBREVIATIONS

<b>Abbreviation</b>	<b>Description</b>
AfDB	African Development Bank
AIDS	Acquired Immune Deficiency Syndrome
CoK	Constitution of Kenya
CPP	Consultation and Public Participation
EA	Environmental Audit
EMCA	Environmental Management & Coordination Act, Cap 387
ESMMP	Environmental and Social Management and Monitoring Plan
ESMP	Environmental and Social Management Plan
ESIA	Environmental and Social Impact Assessment
HIV	Human Immuno-deficiency Virus
HSE	Health Safety and Environment
Km	Kilometers
Ksh	Kenyan Shillings
KWS	Kenyan Wildlife Service
KICOWASCO PLC	Kirinyaga County Water and Sanitation PLC
LMC	Last Mile Connectivity
Masl	Meters above sea level
NEMA	National Environmental Management Authority
OHS	Occupation Health and Safety
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Act

PA	Protected Areas
PAPs	Project Affected Persons
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
TWWDA	Tana Water Works Development Agency
WASREB	Water Services Regulatory Board
WWTP	Waste Water Treatment Plant

## **EXECUTIVE SUMMARY**

### **Overview of the Project**

Tana Water Works Development Agency (TWWDA) is one of the nine Water Works Development Agencies (TWWDAs) established under the Water Act, 2016 and whose areas of jurisdiction are Nyeri, Meru, Embu, Kirinyaga and Tharaka Nithi County. Among the Agency's mandate is; undertake the development, maintenance and management of the national public water works within its area of jurisdiction

Tana Water Works Development Agency endeavours to undertake the development of proposed Kerugoya Kutus Sewer last mile connectivity Project under the funding of AfDB, to increase the Sanitation coverage to the residents of Kerugoya Kutus towns and environs to improve hygiene, sewage and fecal sludge management services.

The main objectives revolve around improving sanitation, infrastructure, public health and environmental sustainability by expanding sewerage network to previously underserved areas to provide access to proper sanitation facilities to residents.

The scope of the proposed last mile connectivity system includes Sewer Sub Mains: Varying in diameter from 250 mm to 300 mm SN8 HDPE DWC pipe 7.94 km lengths. Associated works include construction of man holes and inspection chambers, etc. Potential areas were identified for sewer collection: Kerugoya town: Kibingo, Prison, Level 5 hospital, Roswam, Kerugoya boys, Gakoigo and Karia and Kutus town: Kutus Mjini, Rukenya, KTI and ACK.

The total project cost has been estimated at (One Hundred Ninety-One Million Eight Hundred Forty-Nine Thousand One Hundred Ninety-four Kenya Shillings (KES. **191,840,194.48**).

### **Main activities**

#### **Pre-construction preparation**

A detailed programme of construction activities is necessary before the actual implementation of the project. Such a programme would consider factors such as topography, hydrology and presence of pre-existing infrastructural facilities within the project area. The proponent and design engineers should employ the services of a contractor with experience in similar works and ensure that a proper programme sequencing project activities is developed.

The construction methodology should respect the laws and regulations that pertains to this project, follow mitigation measures outlined in the project ESIA and agreement statements between the

proponent and the land owners. Before construction begins, the contractor should familiarize himself with the surveyed route for sewage conveyance system to minimize damage to private property.

**a) Construction of access roads**

Some of the project alignment areas may not be accessed by existing paths or roads. The contractor will therefore be required to construct new access roads for transporting equipment, materials and personnel to the construction sites. Existing roads in poor conditions that may jeopardize the safety of workers and the public will need rehabilitation.

conditions in the vicinity of the sites should be well guarded by the contractor and his staff.

**b) Mobilization activities**

Materials and equipment will be transported to the construction sites. Such materials include rock aggregate, sand, cement, steel, pipes, plant and equipment. Workers will also be transported to the sites.

**Brief description of the project site**

The proposed project covers Kirinyaga West and Kirinyaga Central sub counties. Specifically, the sewerage infrastructure will serve the towns of Kerugoya, Kutus and Kagumo. The key highlights of the target towns are as given below;

**Kerugoya Town**

Kerugoya Town lies between latitude 0° 30' South and 37° 16' East and is located about 124km Northwest of Nairobi, 10 kilometres east of Karatina and 40 kilometres west of Embu towns.

**Kutus Town**

Kutus Town is the Headquarters of Kirinyaga County and is located about 10.5 km South West of Kerugoya town. The town lies between latitude 0° 30' South and 37° 16' East.

**Policy, Legal and Regulatory Frameworks**

The Environmental Management and Co-ordination Act 1999 Revised in 2015, is the legislation that governs ESIA preparation in Kenya. The proposed project is classified as a medium risk based on NEMA Public Notice on ESIA and Legal Notice No. 31 thus requiring Comprehensive project report (CPR) and also categorized by African Development Bank (AfDB) as category 2 with moderate risk operations likely to cause adverse environmental and social impacts and readily minimized by applying appropriate management and mitigation measures.

Key national laws such as Water Act 2016, Public Health Act 2012, Occupational Health and Safety Act of 2007, Constitution of Kenya(2010), Physical and Land Use planning act of 2019 among other

national laws and AfDB Operational safeguards- OS1 Assessment and Management of Environmental and Social Risks and Impacts,, OS 2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation, OS 3: Biodiversity and Ecosystem Services, OS 4: Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency and OS 5: Labour Conditions, Health and Safety have been discussed in this report.

### **Environmental and Social Baseline Information**

Rainfall distribution is bimodal with long rains commencing from mid-March to May while short rains occur between October and December, with the average annual rainfall ranging between 1,000–2,000 mm. The landscape of the county is greatly affected by Mt. Kenya and other topographical features. Thus, the topography can be characterized into three major zones namely; lowland areas that fall between 1,158metres to 2,000 meters above sea level, the midland areas which lie between 2,000 meters to 3,400metres above sea level and the highland comprising areas of falling between 3,400 meters to5,380 meters above sea level.

The geology is characterized by the Thiba basaltic rocks are underlain by red volcanic soils (Nitosols) derived from the weathering of the underlying basalts. The project area falls within the 4DA sub-catchment comprising the Thiba River and its tributaries of which Kiringa River is one of the main tributaries. A The total road network of in the county is 1,109.11 Km, out of which 106.5 Km is bitumen, 462.05 Km is gravel and 540.5 Km is earth surfaced roads.

Agriculture is the largest driver of the local economy. It supports about 87% of the population with 72% of household income coming from agribusiness activities especially from banana farming and tea farming

### **Stakeholders Consultations and Feedback**

Stakeholder consultations played a pivotal role in achieving several key objectives. These included the dissemination of comprehensive information regarding project specifics, its anticipated impacts, proposed mitigation measures, and the array of benefits it promises to deliver. Additionally, these consultations served as a vital platform for facilitating the exchange of knowledge and opinions pertaining to the proposed project.

Public consultation involved extensive discussions with key stakeholders in water resource management which include: National Environmental Management Authority, Public health, institutions like Schools, Kerugoya prisons and Kirinyaga County Water and Sanitation PLC (KICOWASCO PLC). Community meetings at the local level were conducted in February,2024. This was facilitated by the relevant National Government Administration Offices (NGAOs). The outcomes

of these extensive stakeholder consultations have yielded critical insights which are covered in this report.

### **Potential Project Impacts and mitigation measures**

Assessment of Project Impacts was based on analysis of the proposed project components and existing environmental conditions. The impacts arising during each of the phases of the proposed development namely pre-construction, construction, operation and decommissioning will be analyzed. Successful implementation of the project will have high socio-economic benefits to the people and will contribute to the health and wellbeing.

### **Positive Impacts**

- (i) The proposed project will improve hygiene and reduce water borne diseases associated with improper management of waste water in the region.
- (ii) Efficient sewage collection will protect the environment, surface and underground water resources thus improving environmental quality.
- (iii) The project will reduce the costs incurred by the business community in the construction and management of pit latrines and time to exhausting of septic tanks on their properties.
- (iv) Employment opportunities will be generated during both construction and operation phase of the project. These opportunities will mainly benefit the local people.
- (v) It is expected that the development will attract more investment to the region and this will benefit the people of Kirinyaga County.

Overall, expected negative impacts are related to pipeline and associated works such as transmission lines construction. These impacts are localized and not considered significant and long-lasting and can be mitigated through appropriate mitigation measures.

### **Environmental Negative impacts during the construction project period**

- Pressure on natural resources from obtaining construction materials
- Disruption of businesses and traffic flow
- Noise and excessive Vibration impacts from construction plant and machinery
- Air pollution from fugitive dust
- Health and safety impacts to both construction workers and community.
- Construction debris and related waste generation and improper disposal
- Soil and water contamination from oil spills
- Visual intrusion impacts as a result of dust and hording on site.
- Displacement and loss of property to give way for construction activities
- Socio-economic impacts



- Damage to existing underground infrastructures and public utilities
- Impacts on biodiversity from vegetation clearance of the construction sites

#### **Environmental Negative impacts during the Operation project period**

- Water and soil pollution from sewage leaks and overflows
- Waste generation and improper disposal (solid and liquid)
- Odours from the Waste Water
- Exposure to chemical hazards
- Physical hazards from the sewer structures
- Treated waste water and sludge use

For the environmental impacts identified, adequate mitigation measures have been proposed in order to alleviate the expected negative impacts and to make the project environmentally and socially acceptable. An ESMP has been prepared, and it includes: the mitigation plan; the monitoring and enforcement requirements; and the responsible persons/organizations.

The table below provides a summary of the identified negative impacts both for the construction and operation phases of the project and the proposed mitigation measure.

**Table 0-1 Summary of Impact during construction and Operation phases and proposed mitigation measures**

**Table 0-1: Summary of Impacts and Mitigation Measures**

POTENTIAL IMPACT	MITIGATION FACTORS
Impacts of obtaining materials	<ul style="list-style-type: none"> <li>• Strip and stockpile topsoil from borrow pits and quarries for use in siterestoration.</li> <li>• Close all borrow pits and quarries in accordance with an approved plan to maximize future use and minimize health and safety hazards</li> <li>• Re-use excavated materials from the works as fill.</li> </ul>
Impacts on businesses and traffic flow	<ul style="list-style-type: none"> <li>• Avoid transporting materials during periods of peak traffic activity</li> <li>• Trenching and laying of pipes should be completed within the planned time frames to avoid prolonged disruption to businesses</li> <li>• Provide alternative routes for traffic where total closure of roads is expected during trenching</li> </ul>

	<ul style="list-style-type: none"> <li>• Erect appropriate road signs to warn road users of the construction activities.</li> <li>• Provide temporary bridges over open trenches to facilitate access</li> </ul>
Air pollution (Exhaust emissions from vehicles & Dust)	<ul style="list-style-type: none"> <li>• Service and maintain machinery according to manufacturer's instructions to improve fuel combustion and reduce exhaust emission to the atmosphere.</li> <li>• Spray water on access roads, stockpiles and cleared areas to minimize dust pollution.</li> <li>• Cover all vehicles ferrying construction materials such as sand or aggregate to avoid dispersal of particles/dust along the roads</li> <li>• Provide personal protective equipment gear such as dust masks to workers who may be exposed to excess dust</li> <li>• Impose vehicle speed limits to 10 km/h in all areas within the site boundaries.</li> </ul>
Soil erosion and contamination	<ul style="list-style-type: none"> <li>• Vegetation should only be removed from clearly marked areas</li> <li>• Excavated materials and stockpiled soils should be covered or kept at appropriate sites</li> <li>• Undertake appropriate soil erosion control measures along the trenches</li> <li>• Construction vehicles and machines must be maintained properly to ensure that oil spillages are kept at a minimum.</li> <li>• Spill trays must be provided if refueling of construction vehicles are done on site</li> <li>• Materials, fuels and chemicals must be stored in a specific and secured area to prevent pollution from</li> </ul>

	<p>spillages and leakages. The basic EMCA Regulations on of hazardous waste management must be applied fully.</p> <ul style="list-style-type: none"> <li>• Train drivers and workers on oil and fuel management</li> </ul>
Noise Pollution	<ul style="list-style-type: none"> <li>• Schedule road traffic movements to normal working hours (0800H –1700H).</li> <li>• Noisy equipment and vehicles on the site should be equipped with noisesuppressing measures and kept in proper working conditions.</li> <li>• Provide personal protection equipment such as ear muffs to workersoperating in noisy areas</li> <li>• Pumps and generators should be stationed far away from areas that aresensitive to noise such hospitals</li> <li>• Avoid unnecessary hooting and revving of engines</li> </ul>
Solid Wastes	<ul style="list-style-type: none"> <li>• Develop a Waste Management Plan to guide the handling, storage, transportand disposal of solid and hazardous wastes in compliance with Solid Waste Regulations 2006</li> <li>• Recycle or re-use solid wastes where applicable in line with soundenvironmental management practices</li> <li>• Dispose of non-recycled wastes to sites designated by Kirinyaga Municipal Council as dumpsites</li> <li>• Organic wastes from construction camps can be composted</li> <li>• Solid wastes from sewage inflow and site offices should be collected anddumped at designated dumpsites</li> <li>• Sludge if not suitable for agriculture should be disposed of by land filling</li> </ul>
Surface and ground water contamination	<ul style="list-style-type: none"> <li>• Construct oil-water interceptors or sumps to capture discharge of oils,fuels and other polluting liquids</li> <li>• Provide pit latrines/portable toilets at the camp and construction sites foruse by workers</li> </ul>

	<ul style="list-style-type: none"> <li>• Store all raw materials away from the vicinity of water bodies along the project sites to avoid contamination.</li> <li>• Sensitize workers not to dump waste generated from camps and construction sites into rivers</li> </ul>
Damage to existing underground infrastructures	<ul style="list-style-type: none"> <li>• Obtain maps of existing underground infrastructure from relevant institutions to avoid damaging them.</li> <li>• Locate, mark and exercise caution when excavating trenches to minimize chances of damaging such infrastructure</li> <li>• Notify responsible institutions of any damage to ensure that services are restored within the shortest time possible.</li> </ul>
Occupational Safety and Health hazards	<ul style="list-style-type: none"> <li>• The Contractor shall conform to all the requirements of the Occupational Health and Safety Act, 2007.</li> <li>• The contractor shall provide ample warning signs and protection around open excavations, stacks of material, etc. and shall be held liable for all claims as a result of neglect of such precautions and provisions.</li> <li>• Train workers on the use of firefighting equipment and first aid</li> <li>• Ensure that persons handling equipment and materials are suitably trained, and supervised</li> <li>• Ensure that emergency contact numbers of the police, fire brigade and ambulance are available at the construction sites.</li> <li>• Provide sanitary facilities at construction sites and potable drinking water</li> <li>• Report and record health, safety and environmental incidences as required by law</li> </ul>

Displacement of people and damage to property	<ul style="list-style-type: none"> <li>• Undertake a detailed valuation of property likely to be lost or damaged and prepare report on compensation before project commencement.</li> <li>• Compensation for loss of land or property should be done promptly and should be based on market rates</li> <li>• Constitute a grievance redress mechanism comprising of representatives of all stakeholders</li> <li>• Resettlement and compensation should be implemented in accordance to National and International guidelines</li> </ul>
Impacts on biodiversity	<ul style="list-style-type: none"> <li>• Vegetation clearance should be restricted and confined to marked work stations</li> <li>• Rehabilitate all disturbed areas by back filling and planting appropriate trees and grasses</li> <li>• Establish access roads for use to avoid unnecessary trampling of vegetation outside work areas</li> </ul>
Contamination of soil and water from sewage leakages and over flows	<ul style="list-style-type: none"> <li>• Regular monitoring and inspection of sewer lines to identify broken pipes and damaged manholes for repair or maintenance.</li> <li>• Use of high-quality materials that can withstand anticipated sewage loads and as recommended by the design engineers to prevent leakages and overflows.</li> <li>• Clear and unclog blocked sewer lines within the shortest time possible to contain sewage spills and overflows</li> <li>• Clean and disinfect contaminated sites</li> </ul>
Odours from waste water treatment	<ul style="list-style-type: none"> <li>• Maintaining proper operations and maintenance practices such as sewer inspections and management to avoid odours</li> <li>• Provide adequate buffer areas such as trees between waste water treatment Plant (WWTP) site and potential receptors</li> </ul>

	<ul style="list-style-type: none"> <li>• Minimize hydraulic detention times in pipes and wet wells</li> <li>• Reduce turbulence by minimizing the use of drop manholes</li> <li>• Cover emission points (e.g., aeration basins, clarifiers, sludgethickeners, tanks, and channels),</li> <li>• Explore the use of modern technology systems such as bio-filters and chemical scrubbers to control odours</li> </ul>
Exposure to Chemical Hazards	<ul style="list-style-type: none"> <li>• Train WWTP operators in safe handling of waste water treatment chemicals and emergency response procedures</li> <li>• Provide appropriate personal protective equipment for use by WWTP workers</li> <li>• Install safety showers and eye wash stations near areas where hazardous chemicals are stored or used</li> </ul>
Improperly treated effluent discharge and sludge	<ul style="list-style-type: none"> <li>• Comply with effluent discharge quality standards as stipulated in EMCA Water Quality Regulations 2006.</li> <li>• Sludge intended for agricultural purposes must be properly tested and certified by accredited research institutions before being put into use</li> <li>• Farmers should be trained on how to safely use treated waste water for use in their farms.</li> </ul>
Physical hazards and safety	<ul style="list-style-type: none"> <li>• Erect perimeter fence around waste water treatment facilities to restrict access and prevent physical injuries from people and animals</li> <li>• Post security guards to secure the site.</li> <li>• Provide emergency rescue facilities such rescue buoys and throw bags and train workers on how to use them in case of an emergency</li> <li>• Provide adequate security lighting around the WWTP</li> </ul>

The monitoring plan for the implementation of the ESMP revolves around three fronts, namely:



#### Physical environment

- Noise and air quality of the project sites;
- Surface water quality at Inlet and outlet stream;
- Solid and liquid waste management;

#### Biological environment

- Rehabilitation of work sites (landscaping);

#### Social-economic environment

- Implementation of the Resettlement Action Plan;
- Occupational and community health and safety; and
- Efficiency at water treatment works once operational.

In order to guarantee the effective implementation of the ESMP, the responsibilities and authority of the various persons/ institutions which will be involved in the project need to be clearly defined. The roles of and responsibilities of each party in administering the ESMP are provided in Table 0-2;

**Table 0-2: Roles and Responsibilities of key Stakeholders**

Party	Roles and Responsibilities
Tana Water works Development Agency (TWWDA)	<ul style="list-style-type: none"><li>• Drafting of comprehensive tender documents that include environmental specifications in the tender specifications</li><li>• Selection of qualified, environmentally conscious contractors</li><li>• Supervision to ensure that objectives of this ESMMP are met</li></ul>
Construction Consultant	<ul style="list-style-type: none"><li>• Ensure that the proposed ESMMP is up to date and is being used by the contractor</li><li>• Conduct periodic audits of the ESMMP to ensure that its performance is as expected</li></ul>
Construction Contractor	<ul style="list-style-type: none"><li>• Ensure compliance environmental specifications of the ESMMP</li><li>• Engage a competent Environment Safety Health and Safety Advisor/officer to advise them on the ESMP compliance;</li><li>• Undertake risk assessments and prepare project specific Construction ESMPs for review and approval.</li></ul>
NEMA	<ul style="list-style-type: none"><li>• Exercise general supervision and co-ordination over all matters relating to the environment</li></ul>

	<ul style="list-style-type: none"> <li>• Conduct periodic visits to ensure that the terms of the project license are being observed.</li> </ul>
Water Resources Authority	<ul style="list-style-type: none"> <li>• Give water permits</li> <li>• Protection of riparian zones</li> </ul>
County Government	<ul style="list-style-type: none"> <li>• The County Governments have powers to control or prohibit all businesses, factories and other activities including new projects which maybe or become a source of danger, discomfort or annoyance to the neighbourhood and to prescribe conditions subject to which such activities shall be carried.</li> </ul>
DOSH	<ul style="list-style-type: none"> <li>• Inspecting workplaces to ensure compliance with safety and health laws, including:</li> <li>• Examination and testing of regulated equipment;</li> <li>• Measurements of workplace pollutants for purposes of their control;</li> <li>• Investigation of occupational accidents and diseases with a view to preventing recurrence;</li> <li>• Medical examinations of workers;</li> <li>• Training on OSH, first aid and fire safety; and</li> <li>• Disseminating information on occupational safety and health to beneficiaries</li> <li>• Workplace registration</li> </ul>
KICOWASCO PLC	<ul style="list-style-type: none"> <li>• Oversee the mainstreaming environmental and social sustainability of the project.</li> <li>• Supervising ESMP implementation by the contractor and responsible for monitoring during project's operation.</li> </ul>

The African development bank as the financier will be involved in:

- Reviewing and clearance of ESIAs
- Providing technical support including safeguards compliance, and supervision of the project through periodic implementation support missions and supervision missions to monitor progress of implementation.

- Monitors compliance with E&S standards

**Table 0-3: Estimated Costs for ESMP Implementation**

<b>Proposed action</b>	<b>Number</b>	<b>Unit Cost (KES)</b>	<b>Total Cost (KES)</b>
Training and Capacity building staff /contractors/Stakeholders	4	1,000,000	4,000,000
Training of Grievance Redress Management	4	300,000	1,200,000
Grievance Redress Management Meetings	12	100,000	1,200,000
Routine Monitoring of ESMP implementation	24	250,000	6,000,000
Annual review/Audit	2	100,000	200,000
Implementation of Mitigation Measures	lump sum	1,000,000	1,000,000
<b>TOTAL</b>			<b>13,600,000</b>

### **Conclusion**

The proposed construction of the sewerage facilities within Kerugoya Town and environs will improve public health and sanitation in the region. Improper disposal of human waste due to lack of a complete sewage system will be minimized. It is expected that the project will attract more development to the region as it will reduce the economic costs of sewage management through septic tanks.

### **Recommendation**

Potential negative environmental and social impacts associated with this project have been identified in this report and appropriate mitigation measures proposed. The consultant has developed an Environmental and Social Management and Monitoring Plan (ESMP) which should be strictly followed and those with responsibilities and timelines in project implementation and operation should perform their functions as indicated.

## **CHAPTER 1: INTRODUCTION**

### **1.1 Background information**

Tana Water Works Development Agency(TWWDA), herein referred to as the proponent has proposed to implement the Kerugoya-Kutus Sewer Last Mile Connectivity Project under the **National Urban Water Supply and Sanitation Program** to increase the Sanitation coverage to the residents of Kerugoya, Kutus and its environs to improve hygiene, sewage and fecal sludge management services .In complying with the Kenyan development regulations and AfDB Integrated safeguards systems(ISS) operational safeguards(OS1), the proponent commissioned Aqua Green consultant to review and update the ESIA report prepared in 2017 to incorporate the project components.

The Project is situated in Kirinyaga County in the Central part of Kenya. The total area of the county is approximately 1,478.1 km<sup>2</sup> and lies between latitudes 0° 1' and 0° 40' south and 37° and 38° East. The county lies between 1,158 metres and 5,380 metres above sea level. Kerugoya Town lies between latitude 0° 30' South and 37° 16' East and is located about 124km Northwest of Nairobi,10 kilometres east of Karatina and 40 kilometres west of Embu towns. The town of Kutus is the Headquarters of Kirinyaga County and is located about 10.5 km South West of Kerugoya town. Sagana town is on the South-Eastern part of the Kirinyaga county and about 20 km from Kutus while Kagio Town is 18 km south of Kerugoya town and about 12 km from Kutus town.

### **1.2 Proposed Justification**

Kerugoya and Kutus towns currently have an incomplete a sewer system, the existing structures of the sewerage system are sewer trunk line and waste water treatment plant at Ahiti Ndomba. The properties generally dispose of their sullage water to the surface drains and their human waste to pit latrines, soakage pits and septic tanks. Therefore, the proposed project will operationalize the system by installing the sewer lines and sewer conveyance.

### **1.3 ESIA Objectives**

The main objective of the study is to carry an Environmental and Social Impact Assessment for the proposed project- Kerugoya-Kutus Sewerage LMC project Project. As part of the project planning, the ESIA process is meant to identify significant environmental and social impacts associated with the design, construction, commissioning and decommissioning proposed project and recommend appropriate enhancement and mitigation measures for the positive and negative impacts respectively.

The ESIA will generate an Environmental Management Plan that describes in detail the mitigation measures to be carried out, costing, scheduling and responsibility of such measures, and a detailed monitoring process and its schedule.

## **1.5 Methods used to conduct ESIA**

### **1.5.1. Scoping**

Preliminary meetings were held with the project consultant and a field visit conducted with the aim of identifying and mapping significant issues to be addressed by the ESIA team. Key issues were identified, deliberated upon and work plan drawn for executing the ESIA.

### **1.5.2. Approach**

The Assessment process adopted a participatory and collaborative approach in the course of the assignment. These approaches encouraged active involvement of the stakeholders, who had crucial perspectives and knowledge of the areas' conditions, traditions and social structure. It also assisted the personnel to acquire reliable data, using a variety of formal and informal techniques that could be employed within a short timescale.

The assignment was conducted in line with the NEMA guidelines for an ESIA outlined in Environmental Management and Coordination Act (EMCA) 1999, and in consideration of international guidelines on environmental and social policies, guidelines and assessment procedures.

### **1.5.3 Methodology**

The assessment was guided by the methodology described by the EMCA 1999 and the Environmental (Impact assessment/ Audit Regulations (2003).and AfDB Operational Safeguards. The various amendments to the Act, notably, the EMCA (amendments) 2015 and Legislative Supplement No. 63 of 19 August 2016 were also consulted extensively during the assessment.

The ESIA study was carried out through a mix of methods namely; desk review, field assessments and public consultations with the communities of possible project beneficiaries, the project affected persons and relevant County and National Government institutions and agencies. The method followed is as described in the following sections;

#### **i. Desk review**

A desktop study was conducted to review available published and unpublished reports, development plans and maps to compile relevant baseline biophysical and socio-economic information about the study area. The biophysical information was compiled on environmental aspects such as Topography, Climate, Soils, Water Resources, land use and flora and fauna. On

the socio-economic environment, the study compiled information on aspects such as population, access to water, and health.

ii. Field visits

Field visits were conducted to assess the project area, collect environmental data and site-specific information on the biophysical and socio-economic environment. The exercise was meant to verify and supplement secondary data. Specific key features were captured in photographs. While at the site, environmental data were recorded and potential impacts identified. In addition, environmental features relevant to the study were noted and photographs taken as record of key features.

iii. Public Consultations

Public consultations were undertaken through key informant interviews and public meetings (barazas). The consultations were meant to create awareness of the proposed project, assess the reaction of the affected communities and identify any potential adverse social and environmental effects.

a) Public Consultations meetings

Consultations with the communities were conducted in the project area with the help of the local administration especially the chiefs and assistant chiefs. The discussions during these public meetings were centered on key emerging issues relating to the project as well as the communities especially on loss of assets and livelihood during project implementation.

b) Key Informant Interviews (KII)

One-on-one interviews with county and national government agencies and institutions in the project area were undertaken i.e. from KICOWASCO PLC, the water departments, the roads department, NEMA, Public Health Offices in Kerugoya and the County Environment Departments.

These interviews were conducted to augment and confirm data and information obtained using the other tools and methodologies.

iv. Impact assessment and analysis

The assessment and analyses methodologies for ESIA studies were based on multi-disciplinary approaches and structured to allow for holistic study and assessment of the following key components of the environment in relation to the proposed Project:

- Physical/chemical component;



- Biological/ecological component;
- Sociological/cultural component; and
- Economic/operational component.

The anticipated project impacts were then classified as either positive or adverse and appropriate mitigation measures assessed before recommendation.

## CHAPTER 2: PROJECT DESCRIPTION AND LOCATION

### 2.1 Project location

The proposed project covers Kirinyaga West and Kirinyaga Central sub counties. Specifically, the sewerage infrastructure will serve the towns of Kerugoya, Kutus and Kagumo. The key highlights of the target towns are as given below;

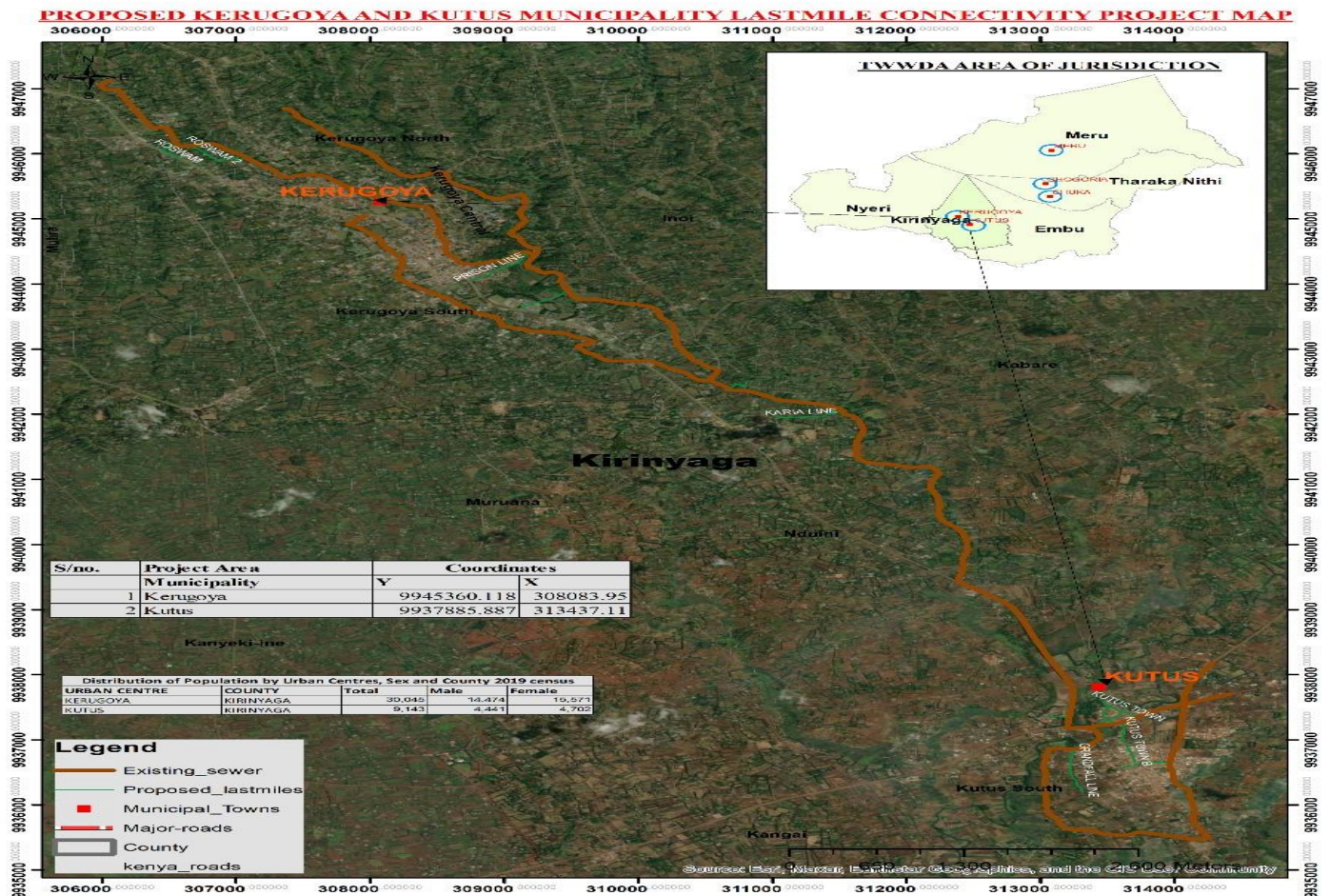
#### Kerugoya Town

Kerugoya Town lies between latitude  $0^{\circ} 30'$  South and  $37^{\circ} 16'$  East and is located about 124km Northwest of Nairobi, 10 kilometres east of Karatina and 40 kilometres west of Embu towns.

#### Kutus Town

Kutus Town is the capital Town of Kirinyaga County and is located about 10.5 km South West of Kerugoya town. The town lies between latitude  $0^{\circ} 30'$  South and  $37^{\circ} 16'$  East.

**Figure 0-1 The proposed project area**



## 2.2 Proposed Project Objectives

The overall goal of the project is to set up a sewer conveyance system within Kerugoya-Kutus towns and environs in response to the emerging needs of the region. This revolves around improving sanitation, infrastructure, public health and environmental sustainability by expanding sewerage network to previously underserved areas to provide access to proper sanitation facilities to residents. The project will entail installation of 6.96 Km of sewer lines as an expansion of the existing works of sewer trunk and waste water treatment plant.

## 2.3 Project Description

In planning and designing this project, the project engineers endeavored to realign the trunk sewers along road reserves and valleys and in such a way as to avoid interfering with existing private properties and developments. The design of sewers aimed at optimizing the pipe gradients in order to minimize the earthworks.

The proposed Kerugoya Kutus sewerage Last Mile-Connectivity project shall consist of approximately 6.96 km of sewer network with concrete and HDPE DWC pipes 300mm the proposed project sewer collection and conveyance system design is described below.

### 2.3.1 Sewer Collection and Conveyance System Design

#### 2.3.1.1 Sewer Pipe Sizes.

The sewers have been designed for the ultimate year (2043) design flows, a minimum diameter of 300 mm dia for the trunk sewers.

The potential areas for sewer collection are: Kerugoya town: Kibingo, Prison, Level 5 hospital, Roswam, Kerugoya boys, Gakoigo and Karia, Kutus town: Kutus Mjini, Rukenya, KTI and ACK.

**Table 2-1: Summary of resultant Sewer Design**

Last Mile Line ID	PIPE MATERIAL	Pipe Dia (mm)	Length (Km)
ACK Mt. Kenya	DWC	300	0.42
Mjini	DWC	300	0.28
KTI	DWC	300	0.41
Kirinyaga University	DWC	300	0.15

Kutus Town	DWC	300	0.40
Kutus Town A1	DWC	300	0.16
Kutus Town B	DWC	300	0.65
<b>Total</b>			<b>3.43</b>

#### Kerugoya Town

<b>Last Mile Line ID</b>	<b>PIPE MATERIAL</b>	<b>Pipe Dia (mm)</b>	<b>Length (Km)</b>
Roswam	DWC	300	0.35
Roswam 2	DWC	300	0.52
Kerugoya Boys	DWC	300	0.45
Karia Line	DWC	300	0.53
Gakoigo	DWC	300	0.25
Prison Line	DWC	300	0.63
Town	DWC	300	0.80
<b>Total</b>			<b>3.53</b>

#### 2.3.1.2 Pipe material

The use of DWC HDPE pipes has been proposed for the sewers for durability

#### 2.3.1.3 Hydraulic design

The area serviced by the proposed sewerage scheme has been divided into drainage areas. Flows into manholes have been computed as proportions of the total catchment area served by the sewer section upstream of each manhole.

#### 2.3.1.4 Manholes

Use of cast in situ or precast concrete manholes and precast concrete manholes/slab and covers. Manholes are provided at every change of alignment, change of gradient, at the head of sewers or branches, at every junction of two or more sewers, and wherever there is a change in sewer pipe sizes. The Heavy-duty cast-iron manhole covers are provided for in sections accessible to vehicular traffic.

**Table 2-2 Recommended Manhole spacing**

Sewer Size		Manhole Spacing	Min. Manhole Dia.	Construction Wayleave	Permanent Wayleave
From	To				
mm	mm	m	mm	m	M
230	375	60	1050	4	3
450	610	80	1200	5	4.5
635	900	100	1500	6	6.0

#### **2.3.1.5 Maximum velocities**

A maximum velocity of 3m/s is recommended to avoid abrasion of the sewer pipes.

#### **2.3.1.6 Sewer Pipe Beddings, Haunch and Concrete Surrounds**

The pipe bedding, haunch and surround details vary along the lengths of the sewer lines. The choice of the pipe bedding, haunch and surround details is based on the design criteria.

### **2.4 Population Projections, water demand and Waste Water Flow Projections**

#### **2.4.1 Population Projections**

##### **i. General Population**

Based on the per capita demand trends, standards and criteria laid out in the Practice Manual for Water supply services in Kenya – 2005, demand forecasting was updated for the integrated Kerugoya – Kutus – Sagana - Kagio system up to 2040. System demands were estimated based on population forecasts and per capita water use trends anticipated to represent probable future demands. The result was a revised projection for the average day demands forecasted for the covered area to 2040. The forecast demands at major intervals derived from adopted design horizons are presented.

**Table 2-3: Population Projections for Waste Water flow**

NO.	TOWN	2023	2033	2047
1	Sagana	2,917	4,528	7,031
2	Kagio	1,318	2,046	3,177
3	Kerugoya	3,421	4,047	4,816
4	Kutus	1,921	2,982	4,630
5	Kagumo	1,119	1,736	2,696
6	Rural	14,293	16,004	17,785
	<b>TOTAL</b>	<b>24,989</b>	<b>31,344</b>	<b>40,134</b>

**ii. Institutional population**

Kirinyaga County has 348 ECD centers, 326 primary schools, 143 secondary schools and 29 tertiary institutions. There are 14,672 registered pupils in pre-school, 111,400 pupils in primary schools and 39,988 students in secondary schools. School attendance has been estimated from the demographic data (population in school-going age) and from enrolment rates information collected.

**Table 2-4 County Population Projections for selected age groups**

Age Group	Population	Percentage of Total Population
Under 1	12,095	2.29%
Pre School	36,778	6.96%
Primary School	95,211	18.03%
Secondary School	83,458	15.8%
18+	300,512	56.91%
Total	528,054	100.00%

*Source: 2009 Kenya Population and Housing Census.*

Data from the ministry of education as of the year 2012 shows that for the age (14-17 – Supposed to be in secondary school), only 50% of them were in school.

For the secondary school enrolment, we assume 50% are in boarding schools and 50% in day

schools.

Of the 326 primary schools, 19 are boarding schools. This translates to 5.82%. For day schools, it has been assumed they do not have water closets. The Post high school education institutions in the project and their populations are shown in Table 4 Below:

**Table 2-5 Post High School Institutions Enrolment**

<b>Institution</b>	<b>Student + Staff population</b>
Kirinyaga university	2000
Kibingoti Youth Polytechnic (Ndia Constituency)	180
Kiamuthambi Youth Polytechnic (Kirinyaga Central)	150
Kiambwe Youth Polytechnic (Ndia)	200
Kaitheri Youth Polytechnic (Kirinyaga Central)	200
Mutitu Youth Polytechnic (Kirinyaga Central)	180
Mutira Youth Polytechnic Central Constituency	150
Ahiti Ndomba	450

#### **Health Institutions Population Projection**

An inventory of existing health facilities has been compiled from existing data. Major health facilities and their bed capacities are tabulated below:

**Table 2-6 Health facilities in the area**

<b>NO.</b>	<b>FACILITY</b>	<b>AVERAGE INPATIENTS</b>
1	Baricho Health Centre	1
2	Gathambi Health Centre	1
3	Gatithi Dispensary	1
4	Gatwe Health Centre	1
5	Kandong'u Dispensary	1
6	Kangaita Health Centre	1
7	Kerugoya District Hospital	169

8	Kiangai Health Centre	1
9	Kibirigwi Health Centre	1
10	Kutus Dispensary	1
11	Njegas Health Centre	1
12	Sagana Sub-District Hospital	5
13	Thiba Health Centre	2
	<b>TOTAL</b>	<b>186</b>

In addition to the above facilities, there are 30 dispensaries in the project area. The MWI Design Manual (2005) gives the criteria for determining the water demands for health facilities. For the do ultimate demand, one-health center and two dispensaries should be planned for to serve 35-40,000 people while 0.8 hospital bed is assumed to serve 1000 people.

The project area has a current population of 253,247 persons. This translates to 0.74 hospital beds per person, 1.1 health centers per 35,000 persons, 4 dispensaries per 35,000 persons

### **iii. Commercial population**

The commercial activity is dominated by small scale enterprises engaged in trade and services. These enterprises mainly consist of small shops offering a variety of goods and services for the general needs of the area and the Peri-urban inhabitants. It is assumed that the future increase in commercial activity shall be associated with the growth in the population of the Project Area.

In order to get an estimate of commercial establishments, business outlets licensing data from the revenue department was collected for the four urban centers of Kerugoya, Kutus, Kagio and Sagana. In the processing of the data, the following assumptions were made: -

- The data got for Kerugoya and Kutus were combined. To apportion the number of commercial establishments in the two towns, the percentage of the populace of the two was determined and used to estimate the number of commercial establishments in the two centres. These two towns according to the KNBS 2009 census had a population of 16,369.00 for Kerugoya and 6,209 Kutus. This means that if we to combine the two towns, Kerugoya would contribute 72% and Kutus 28% of the populace.
- Apart from the Hotels and bars, all the others commercial establishments were classified as shops.



- Only the licensed commercial establishments were considered.

From the data got, the table below shows the number of commercial establishments in the project area.

**Table 2-7: Commercial Establishments**

	<b>Kutus</b>	<b>Kerugoya</b>	<b>Sagana</b>
Shops	826	2123	1464
High class hotels	0	2	
Low class hotels	12	32	51
Middle class hotels	8	22	
Bars	21	53	51

For the rural areas, the distribution of commercial establishments has been evenly distributed since the data collected did not specify the actual location for those establishments. As per the Ministry of Water services manual, 2005, it is anticipated that the future increase in commercial activity would be directly related to growth in population for the 31 rural sub locations, there are 630 shops and 101 bars and restaurants. This translates to 20.3 shops and 3.25 bars & restaurants respectively per sub location. The major hotel side identified in the project area are Roswam Hotel and Bekam Hotel in Kerugoya Sagana Resort hotel in Sagana.

#### **2.4.2 Total Design Flows**

	<b>Total Waste Water Projections (m<sup>3</sup>/day)</b>
Total DWF	11,109
Add 5% infiltration	555.43
<b>TOTAL</b>	<b>11,664</b>
<b>Assume 11,700m<sup>3</sup>/d</b>	

### **2.5 Project Inputs**

#### **2.5.1 Input during construction**

- Land is a core component to the establishment of this project. Suitable The installation of sewerage conveyance facilities also requires land. The sewerage pipeline network mainly passes along the valleys and road reserves.
- Labour - both skilled and unskilled labour will be required to actualize the project.

- Water for construction activities will be sourced from the existing water projects in the area under KICOWASCO PLC or community.
- Materials such as building sand, gravel, natural stones, and timber among others, will be required during the construction stage. Other materials required include concrete blocks, sand, cement, precast units for drains, iron/steel bars, concrete pipes and uPVC pipes for sewer reticulation, barbed wires and chain link for security fence.
- Construction tools and equipment including vehicles and earthmoving machinery will also be required at this stage.

### **2.5.2 Inputs during operation.**

During the operation phase, inputs required will be those that are consistent with the running and maintenance of the WWTP and sewage conveyance systems. These include fuel for vehicles, labour, material for repair and maintenance and chemicals for waste water treatment among others.

## **2.6 Project Construction activities**

An outline of the activities to be carried out during the implementation of the proposed project is given as follows:

### **2.6.1 Pre-construction preparation**

A detailed programme of construction activities is necessary before the actual implementation of the project. Such a programme would consider factors such as topography, hydrology and presence of pre-existing infrastructural facilities within the project area. The proponent and design engineers should employ the services of a contractor with experience in similar works and ensure that a proper programme sequencing project activities is developed.

The construction methodology should respect the laws and regulations that pertains to this project, follow mitigation measures outlined in the project ESIA and agreement statements between the proponent and the land owners. Before construction begins, the contractor should familiarize himself with the surveyed route for sewage conveyance system to minimize damage to private property.

#### **a) Construction of access roads**

Some of the project alignment areas may not be accessed by existing paths or roads. The contractor will therefore be required to construct new access roads for transporting equipment, materials and

personnel to the construction sites. Existing roads in poor conditions that may jeopardize the safety of workers and the public will need rehabilitation.

#### **b) Mobilization activities**

Materials and equipment will be transported to the construction sites. Such materials include rock aggregate, sand, cement, steel, pipes, plant and equipment. Workers will also be transported to the sites.

### **2.7 Waste generation**

The proposed project will generate solid, liquid and gaseous wastes during construction, operation and decommissioning phases. Whereas human waste will be disposed of on-site (pit latrines), solid waste will need to be properly managed to avoid attracting scavenging birds and animals. Table 8 gives a summary of the wastes and outputs from the project.

**Table 2-8: Summary of Project Wastes/Outputs**

<b>Project Phase</b>	<b>Type of waste/output</b>
Construction phase	<ul style="list-style-type: none"> <li>• Organic wastes including food remains, vegetative matter, wood etc</li> <li>• Papers and workshop waste e.g. used oil filters etc</li> <li>• Non-biodegradable wastes, plastics, polythene, glass, metal etc</li> <li>• E-waste, batteries, computer components and other electronics</li> <li>• Used oil from vehicles and machines</li> <li>• Waste water from construction activities</li> <li>• Gaseous waste such as exhaust emissions from vehicles and machinery</li> <li>• Dust emissions</li> <li>• Noise and vibrations</li> </ul>
Operation phase	<ul style="list-style-type: none"> <li>• Solid waste</li> <li>• Sludge</li> <li>• Odours from waste water treatment plant</li> </ul>
Decommissioning phase	<ul style="list-style-type: none"> <li>• Solid wastes, dust, noise and vibrations etc</li> </ul>

## **2.8 Project construction period**

The project has been planned to take 24 months from the time when construction works begin to completion.

## **2.9 Project Cost**

The total project cost has been estimated at One Ninety-One Million, Eight Hundred and Forty Thousand one Hundred and Ninety-Four (**Ksh. 191,840,194.48**).

## **CHAPTER 3: POLICY, LEGAL AND REGULATORY FRAMEWORK**

### **3.1 Introduction**

This chapter highlights the Constitution of Kenya, relevant National Environmental Policies, National Strategic Plans, Legislations and pertinent regulations and Multilateral Environmental Agreements (MEAs), African Development Bank Operational Safeguards relevant to the proposed Kerugoya-Kutus Sewerage LMC project.

The Report has been prepared in line with the provisions of relevant policies, legislation and institutional frameworks that guide preparation of ESIA at both National and at the African Development Bank.

In Kenya, several legal frameworks govern sewerage projects, ensuring they adhere to standards, regulations, and environmental considerations. Here are the key legal frameworks relevant to sewerage projects in Kenya:

### **3.2 Policy provisions**

These policy provisions provide the regulatory framework and guidelines for the planning, implementation, and management of sewerage projects in Kenya, contributing to improved sanitation, public health, and environmental sustainability.

#### **3.2.1 National Environment Policy, 2014**

The National Environmental Policy is an outcome of the Sessional Paper No. 10 of 2014. The overall goal of the policy is better quality of life for present and future generations through sustainable management and use of the environment and natural resources. One of the objectives of the policy is to promote and support research and capacity development as well use of innovative environmental management tools such as Environmental Impact Assessments (EIAs) and Environmental Audits that is necessary to ensure environmental quality and resource productivity on long term basis.

The policy among other important objectives calls for promotion of domestication, coordination and maximization of benefits from Strategic Multilateral Environmental Agreements (MEAs). The policy further calls for integration of environmental concerns into development policies, plans and activities.

The National Environmental Policy proposes a broad range of measures and actions responding to key environmental issues and challenges. It seeks to provide the framework for an integrated approach to planning and sustainable management of natural resources in the country. It recognises

the various vulnerable ecosystems and proposes various policy measures not only to mainstream sound environmental management practices in all sectors of society throughout the country but also recommends strong institutional and governance measures to support the achievement of the desired objectives and goal.

### **Relevance to the proposed Project**

This ESIA study will develop an environmental and social management and monitoring plan to mitigate the impacts that may result during the construction and operation phases of the project. This tool is aimed at promoting coordination of environmental management of the project such that sensitive ecosystems are not destabilized by the subsequent project activities. The policy requires that projects such as this one, which are likely to have significant environmental and social impacts should be undertaken with sound environmental management plan.

### **3.2.2 Kenya Vision 2030**

Vision 2030 is Kenya's long-term development blueprint aimed at transforming the country into a middle-income, industrialized nation by the year 2030. It was launched in 2008 and is anchored on three key pillars: economic, social, and political governance. It addresses various aspects related to infrastructure development, environmental sustainability, public health, and socio-economic transformation.

### **Relevance to the proposed project**

Kenya Vision 2030 recognizes the importance of infrastructure development, including water and sanitation infrastructure, in supporting economic growth and improving living standards. The proposed Kerugoya –Kutus Sewerage project is essential components of infrastructure development, as it will provide critical sanitation services that contribute to public health, environmental sustainability, and quality of life. The project will comply with environmental standards and regulations to minimize pollution, protect water quality, and safeguard ecosystems. Proper wastewater treatment and disposal are essential for mitigating the environmental impact of urbanization.

### **3.2.3 National Land Policy, 2009**

The policy recognizes problems associated with rapid urbanization, inadequate land use planning; unsustainable production, poor environmental management, inappropriate ecosystem protection and management are common and require appropriate policy responses. The policy further

recognizes that land use planning is essential to the efficient and sustainable utilization and management of land and gives guidelines on development of land in urban and peri-urban areas. The policy also recognizes Environmental Assessment and Audit as Land Management Tools

#### **Relevance to the proposed Project**

The proposed project shall pass through the existing public road reserve and as such, the proponent is required to ensure environmental protection of the subject land. Moreover, this study is what is advocated for in the policy on top of the public consultations conducted.

#### **3.2.4 The National Environmental Action Plan (NEAP) 2009 -2013**

The NEAP was a deliberate policy effort to integrate environmental Considerations into the country's economic and social development. The integration process was to be achieved through a multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and conservation of natural resources are an integral part of societal decision making. The NEAP proposes interventions of identifying environmental problems and issues, raising environmental awareness, building national consensus, defining policies, legislation and institutional needs and planning environmental projects.

#### **Relevance to the Proposed Project**

The proposed project will interact with the various elements and components of the physical, social and economic environments in ways that could lead to negative impacts. Issues of environmental integrity will be addressed through robust environmental assessment processes and public participation.

#### **3.2.5 Gender Policy,2011**

This Policy Framework aims at mainstreaming 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. The policy provides direction for setting priorities to ensure that all ministerial strategies and their performance frameworks integrate gender equality objectives and indicators and identify actions for tackling inequality. In addition, each program will develop integrated gender equality strategies at the initiative level in priority areas. Within selected interventions, the policy will also scale-up specific initiatives to advance gender equality.

### **Relevance to the proposed project**

This policy will be referred to during project implementation especially during hiring of staff to be involved in the implementation of the project.

### **3.2.6 The National Biodiversity Strategy, 2007**

The overall objective of the National Biodiversity Strategy and Action Plan (NBSAP) is to address the national and international undertakings elaborated in Article 6 of the Convention on Biological Diversity (CBD). It is a national framework of action to ensure that the present rate of biodiversity loss is reversed and the present levels of biological resources are maintained at sustainable levels for posterity.

The general objectives of the strategy are to conserve Kenya's biodiversity to sustainably use its components; to fairly and equitably share the benefits arising from the utilization of biological resources among the stakeholders; and to enhance technical and scientific cooperation nationally and internationally, including the exchange of information in support of biological conservation.

### **Relevance to the Proposed Project**

Activities during the construction of the new water treatment plant, rising mains and distribution lines are bound to impact negatively on the flora around the area. As such, during construction, the contractor will be required to reinstatement of the environment to its original state. This will be in order to reverse the loss of biodiversity or to maintain the levels of biological resources at sustainable levels for posterity.

### **3.3 Legislative Framework**

Applications of national statutes and regulations on environmental management suggest that the project proponent will have a legal duty and social responsibility to ensure that the proposed development is carried out without compromising the status of the natural resources in the area, public health and safety. This subsection details the various pertinent national laws governing environmental management. The supreme environmental resources management legislation is the Environmental management and Coordination Act (EMCA 1999) which supersedes any contradicting regulation at all times.

The key national laws that have direct relevance to the proposed project are briefly discussed below



### **3.3.1 Constitution of Kenya (CoK) 2010**

The Constitution of Kenya is relevant to the sewerage project in several ways, as it provides the overarching legal framework that governs various aspects of governance, natural resources management, public health, and environmental protection.

The constitution of Kenya spells out the fundamental rights of every Kenyan citizen. Article 42 of the bill of rights of the 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. The Constitution of Kenya devolves certain powers and functions to county governments, including responsibilities related to water and sanitation services. County governments are mandated to plan, implement, and manage sewerage projects within their jurisdictions, in line with the principles of devolution outlined in the Constitution.

The Constitution contains provisions aimed at protecting water resources and the environment. Article 69, for example, mandates the state to ensure sustainable exploitation, utilization, management, and conservation of water resources.

### **Relevance to the proposed Project**

The proposed Sewerage project will play a critical role in ensuring clean water sources, proper sanitation, and the safe disposal of wastewater, thereby contributing to the realization of the constitutional right. The KICOWASCO PLC which is under county government will oversee the operation running of the project. The Sewerage project must adhere to environmental standards and regulations to minimize pollution and protect water quality, in accordance with constitutional principles.

### **3.3.2 The Environmental Management and Coordination Act (EMCA)**

The EMCA 1999 and The Environmental management and Co-ordination (Amendment) Act, 2015 provide the main legal and institutional framework under which the environment in general is to be managed. EMCA is implemented by the guiding principle that every person has a right to a clean and healthy environment and can seek redress through the High Court if this right has been, is likely to be or is being contravened.

Section 58 of the Act makes it a mandatory requirement for an EIA study to be carried out by proponents intending to implement projects specified in the Second Schedule of the Act. Such projects have a potential of causing significant impacts on the environment. Similarly, section 68 of the same Act requires operators of existing projects or undertakings to carry out Environmental Audits (EA) in order to determine the level of conformance with statements made during the EIA study. The proponent is required to submit the ESIA and EA reports to NEMA for review and necessary action.

### **Relevance to the Proposed Project**

This project is listed under Medium Risk projects for which an Environmental and Social Impact Assessment Study report would be prepared. An ESIA License will need to be obtained prior to commencement of the project.

The following regulations under EMCA are also relevant to the proposed project;

- (a) **Environmental (Impact Assessment and Audit Regulations) 2003 and (Amendment) Regulations, 2016**

The EIA and Audit Regulations state in Regulation 3 that “the regulations should apply to all policies, plans, programmes, projects and activities specified in Part IV, Part V and the Second Schedule of the Act. Part II of the Regulations indicates the procedures to be taken during preparation, submission and approval of the full study report

### **Relevance to the Proposed Project**

This report has been compiled in compliance with the above regulations. TWWDA will also be expected to carry out Environmental audit of the project annually thereafter the completion of the project. The project is expected to get clearance from NEMA before commencement.

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

The Regulations provides for sustainable management of water resources including prevention of water pollution and protection of water sources (lakes, rivers, streams, springs, wells and other water sources). It is an offence under Regulation No. 4 (2), for any person to throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution.

Regulation No. 11 further makes it an offence for any person to discharge or apply any poison, toxic, noxious or obstructing matter, radioactive waste or other pollutants or permit the dumping or discharge of such matter into the aquatic environment unless such discharge, poison, toxic, noxious or obstructing matter, radioactive waste or pollutant complies with the standards for effluent discharge into the environment.

### **Relevance to the Project**

During the construction, operation and maintenance phases of the project, there will be waste water and other liquid waste generated from oil spills, machine cleaning and vehicles among other sources.

#### **(c) The Environmental Management and Co-ordination (Waste Management) Regulations, 2006**

The regulations provide details on management (handling, storage, transportation, treatment and disposal) of various waste streams including:

- Domestic waste;
- Industrial waste;
- Hazardous and toxic waste;
- Pesticides and toxic substances;
- Biomedical wastes; and
- Radioactive waste.

Regulation No. 4 (1) makes it an offence for any person to dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle.

Regulation 5 (1) provides categories of cleaner production methods that should be adopted by waste generators in order to minimize the amount of waste generated and they include:

- i. Improvement of production process through
  - Conserving raw materials and energy;
  - Eliminating the use of toxic raw materials and wastes; and
  - Reducing toxic emissions and wastes.
- ii. Monitoring the product cycle from beginning to end by
  - Identifying and eliminating potential negative impacts of the product;

- Enabling the recovery and re-use of the product where possible, and
- Reclamation and recycling; and
- Incorporating environmental concerns in the design and disposal of a product.

Regulation 6 requires waste generators to segregate waste by separating hazardous waste from non-hazardous waste for appropriate disposal. Regulation 15 prohibits any industry from discharging or disposing of any untreated waste in any state into the environment. Regulation 17 (1) makes it an offence for any person to engage in any activity likely to generate any hazardous waste without a valid Environmental Impact Assessment license issued by NEMA.

### **Relevance to the proposed Project**

The proposed project, during construction phase will generate wastes such as soil debris, cement bags, plastic containers, vehicles spare parts, stripped off vegetation and any other waste which will need to be disposed as per the guidelines in the regulations.

### **(d)The Environmental Management and Coordination Act (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009**

These regulations were published as legal Notice No. 61 being a subsidiary legislation to the Environmental Management and Co-ordination Act, 1999(Amendment). The regulations provide information on the following:

- Prohibition of excessive noise and vibration beyond defined thresholds;
- Provisions relating to noise from certain sources;
- Provisions relating to licensing procedures for certain activities with a potential of emitting excessive noise and/or vibrations; and
- Noise and excessive vibrations mapping.

According to regulation 3 (1), no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.

Regulation 4 prohibits any person to (a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or (b) cause to be made excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source.

**Relevance to the Proposed Project**

Noise and vibrations are expected during the construction phase of the project when the excavation is on-going. The contractor /sub-contractor for civil works will be required to ensure compliance with the above regulations in order to promote a healthy and safe working environment throughout the construction phase. This shall include regular inspection and maintenance of equipment and prohibition of unnecessary hooting of vehicles.

**(e) Environmental Management and Coordination (Air Quality) Regulations, 2014**

These Regulations cover air quality standards that are requisite to protect human health and allow an adequate margin of safety. These Regulations specify priority air pollutants, mobile and stationary sources as well as stipulates emission standards.

**Relevance to the proposed project**

The emissions generated from construction activities (such as running vehicle and equipment engines) have the potential of polluting the immediate atmospheric environment. Vegetation clearing, earthworks and bulk delivery of construction material, if unmanaged may result in generation of dust. Thus, need for strict adherence to these Regulations and standards therein in preventing possible pollutants and managing sources.

**3.3.3 Occupational Safety and Health Act (OSHA), 2007**

The act requires that all practicable measures be taken to protect persons employed in the factory and other places of work from any injury. The Act provides that adequate measures should be taken to ensure safety, health and welfare of the all stakeholders in the work place.

They outline the safety requirements that need to be observed when machinery to prevent accidents and injuries. At the same time construction sites should be registered as a workplace.

**Relevance to the Proposed Project**

At the start of the project construction, the pipe route and associated material storage areas will become work places. All activities conducted at such places will have to comply with the act. The proponent shall ensure that the provisions under this act are applied appropriately. The contractor and TWWDA will be required to comply with all the provisions of the Act throughout the project cycle such as registering the construction site as place of work, management of hazards, forming health and safety committees and reporting all the accidents and near misses and provision of First-Aid kits as necessary.

#### **3.3.4 Water Act ,2016**

The Water Act No. 43 of 2016 was assented to on 20th September 2016 and repealed the Water Act 2002. The enactment of this law aimed at aligning national water management and water services provision with the requirements of the Constitution of Kenya 2010 particularly on the clauses devolving water and sanitation services to the county governments.

The Water Act 2016 provides for the management, conservation, use and control of water resources and for acquisition and regulation of rights to use water; to provide for the regulation and management of water supply and sewerage services.

Section 143 of the Act prohibits anyone to throw or convey or cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive or unwholesome matter or thing into or near to water resource in such a manner as to cause, or be likely to cause, pollution of the water resource.

The act states that a permit is required for the discharge of a pollutant into any water resource. It is the duty of a licensee receiving trade effluent into its sewerage system to ensure that it has in place measures for the receipt and handling of the effluent without causing pollution of the environment; harm to human health; damage to the sewerage system.

#### **Relevance to the proposed project**

This Act shall be relevant during both construction operation phases of the Project whereby the contractor and proponent shall ensure that all relevant water resources are not polluted from both liquid and solid wastes. Proponent shall also obtain authorization by WRA before discharging treated sewer into the river channels.

#### **3.3.5 Physical Planning Act 1996**

Section 29 of the Act empowers the local Authorities (now county governments) to reserve and maintain all land planned for open spaces, parks, urban forests and green belts as well as land assigned for public social amenities. The same section allows for prohibition or control of the use and development of an area. Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respective local authority.

### **Relevance to the Proposed Project**

The act regulates and harmonizes development and use of land over the Country, the entire pipeline route has been designed within the way leave. The proponent is advised to design the sewer lines on existing wayleaves to avoid cases of acquisition of private property and resettlement complications.

#### **3.3.6 Land Act 2012**

The act provides for the conversion of private land to public land through compulsory acquisition, transfer, surrender or reversion of leasehold interest to Government. Under the act the National Land Commission is given mandate for creation of public rights of way (ROW) or way-leaves and that just compensation shall be paid promptly in full to all persons whose interests in the land have been affected.

#### *Relevance to the proposed project*

Installation of the sewerage pipeline network may lead to destruction of private property including trees, crops etc. Any such a loss shall be promptly and justly compensated.

#### **3.3.7 The Public Health Act (Cap. 242),**

The Public Health Act (Cap. 242), in Part IX Section 8 & 9 states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Any noxious matter or waste water flowing or discharged into a water course is deemed as a nuisance. Part XII Section 136 states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitates the breeding or multiplication of pests shall be deemed nuisances. The Act addresses matters of sanitation, hygiene and general environmental health and safety.

### **Relevance to the Project**

Wastes generated from the construction material and by the construction workers should be disposed in manner that ensures the project area residents' health is not affected. The proponent shall adhere to these provisions especially during the construction stage of the project. Appropriate mitigation measures shall be instituted to comply with these requirements

#### **3.3.8 Work Injury Benefits Act (WIBA)**

It is an Act of Parliament to provide for compensation to workmen for injuries suffered in the course of their employment. It outlines the following:

- Employer's liability for compensation for death or incapacity resulting from accident
- Compensation in fatal cases;
- Compensation in case of permanent partial incapacity;
- Compensation in case of temporary incapacity;
- Persons entitled to compensation and methods of calculating the earnings;
- No compensation shall be payable under this Act in respect of any incapacity or death resulting from a deliberate self-injury; and
- Notice of an accident, causing injury to a workman, of such a nature as would entitle him for compensation shall be given in the prescribed form to the director.

### **Relevance to the proposed project**

The contractor and TWWDA will be required to comply with all the provisions of the Act throughout the project cycle such as management of hazards, forming health and safety committees and reporting all the accidents and near misses. They will also be required to accord injured persons their dues in terms of shouldering the medical expenses or compensation of the families should there be loss of life

### **3.3.9 Employment Act 2007**

Provides for the State's restriction in employing child of between thirteen and sixteen years of age to attend machinery.

Section 58 (1) No person shall employ a child of between thirteen and sixteen years of age, other than one serving under a contract of apprenticeship or indentured learnership in accordance with the provisions of the Industrial Training Act, in an industrial undertaking to attend to machinery. (2) No person shall employ a child in any opencast workings or subsurface workings that are entered by means of a shaft

### **Relevance to the Proposed Project**

Manual labour is expected in trenching for the pipeline and backfilling of the excavated areas. The proponent shall be required to monitor the employment process for the local community to ensure that no persons of minority age are engaged in the construction work and during project operation



### **3.3.10 Climate Change Act, 2016**

This is an Act of Parliament to provide for a regulatory framework for enhanced response to climate change, to provide for mechanism and measures to achieve low carbon climate development, and for connected purposes.

One of the main goals of this act is to enhance energy conservation, efficiency and use of renewable energy in industrial, commercial, transport, domestic and other uses;

#### **Relevance to the Proposed Project**

During construction, the vehicles and machines to be used may contribute to additional GHG emissions.

### **3.3.11 The Penal Code Cap 63**

Chapter XVII of the Penal Code strictly prohibits the release of foul air into the environment which affects the health of the persons. It states “Any person who voluntarily vitiates the atmosphere in any place so as to make it noxious to the health of persons in general dwelling or carrying on business in the neighbourhood or passing along a public way is guilty of a misdemeanour”.

#### **Relevance to the proposed project**

The provisions of the Code that prohibit the fouling of water (section 191) and fouling of air (Section 192) should be adhered to by the contractor and project proponent to ensure the environment and health of people is safeguarded.

The contractor and proponent will be required to ensure strict adherence to the Environmental Management Plan throughout the project cycle in order to mitigate any possible negative impact associated with dust, noise, and effluent discharge that might likely affect the public.

### **3.3.12 The Kenya roads Act, 2007**

The Act stipulates the legal and institutional aspects of the road sub-sector policy. The Act provides for the establishment of three independent Road Authorities, namely: (i) Kenya National Highways Authority (KeNHA), responsible for the administration, control, development and maintenance of all class A, B and C roads in Kenya, (ii) Kenya Rural Roads Authority (KeRRA), responsible for rural and small-town roads including class D, E roads and Special Purpose Roads and (iii) Kenya Urban Roads Authority (KURA) responsible for all City and Municipal Roads.

### **Relevance to the Proposed Project**

The sewer pipeline shall be crossing some sections of the project area roads. The proponent shall liaise with the relevant road authority in acquisition of permits for road crossings

#### **3.3.13 County Government Act 2012.**

Part II of the Act empowers the county government to be in charge of function described in

Article 186 of the constitution, (county roads, water and Sanitation, Health), Part XI of the Act vest the responsibility of planning and development facilitation to the county government with collaboration with national government, this arrangement has been adopted for interventions in order not to conflict with provisions of the Kenyan Constitution.

### **Relevance to the Project**

The contractor shall be hand over the project once complete to Kirinyaga County Water and Sanitation PLC.

#### **3.3.14 HIV and AIDS Prevention and control act, 2006**

This legislation prevents discrimination in all forms against persons with or persons perceived or suspected of having HIV and AIDS. Without prejudice to the generality of subsection (1), no person shall compel another to undergo an HIV test as a precondition to, or for continued enjoyment of employment.

### **Relevance to the Project**

All employees, suppliers and contractors in this project shall be treated fairly and in accordance to the provisions of this Act.

#### **3.3.15 Eviction Way Leave and Rehabilitation Bill (2014)**

The Bill main objective is to set out appropriate procedures applicable to evictions and resettlement, the bill also has outlined principles that are intended to guide the resettlement and eviction procedures including:

- Every person shall be protected from arbitrary eviction;
- the persons, affected by an eviction should not suffer detriment to their human rights;
- the State while carrying out eviction and resettlement, must observe the human dignity, equity, social justice, human rights, non-discrimination and protection of the marginalized and vulnerable groups; and

- every person has the right to administrative action that is expeditious, efficient, reasonable and procedurally fair.

Part (111) section (17) of the bill elaborates of the process to be undertaken when the government intends to evict persons from their land to create room for project, the bill gives power to the cabinet secretary based on the Environmental and Social Impact Assessment Report prepared, prepare a plan for the resettlement of the affected persons after consultation with the representatives of the affected persons.

### **Relevance to the Proposed Project**

The proponent shall utilize the existing sewer wayleaves. The Act together with reference to the AfDB Operational Safeguards OS 2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation shall be used as reference during preparation and implementation of Project in case private assets and sources of livelihood are impacted.

### **3.4: African Development Bank Operational Safeguards**

The Bank's commitment to improving environmental and social sustainability in its investments is reflected in the several related policies and tools it has adopted and the changes in its institutional set-up to ensure effective implementation of these policies and tools.

#### **3.4.1: OS 1: Assessment and Management of Environmental and Social Risks and Impacts.**

This overarching safeguard governs the process of determining a project's environmental and social category and the resulting environmental and social assessment requirements: the scope of application; categorisation; use of ESIA, where appropriate; Environmental and Social Management Plans; climate change vulnerability assessment; public consultation; community impacts; appraisal and treatment of vulnerable groups; and grievance procedures. It updates and consolidates the policy commitments set out in the Bank's policy on the environment.

#### **3.4.2: OS 2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation**

This safeguard consolidates the policy commitments and requirements set out in the Bank's policy on involuntary resettlement, and it incorporates refinements designed to improve the operational effectiveness of those requirements. In particular, it embraces comprehensive and forward-looking notions of livelihood and assets, accounting for their social, cultural, and economic dimensions. It also adopts a definition of community and common property that emphasizes the need to maintain

social cohesion, community structures, and the social interlinkages that common property provides. The safeguard retains the requirement to provide compensation at full replacement cost; reiterates the importance of a resettlement that improves standards of living, income-earning capacity, and overall means of livelihood; and emphasizes the need to ensure that social considerations, such as gender, age, and stakes in the project outcome, do not disenfranchise particular project-affected people.

### **3.4.3: OS 3: Biodiversity and Ecosystem Services**

The overarching objective of this safeguard is to conserve biological diversity and promote the sustainable use of natural resources. It translates into OS requirements the Bank's commitments in its policy on integrated water resources management and the UN Convention on Biological Diversity. The safeguard reflects the importance of biodiversity on the African continent and the value of key ecosystems to the population, emphasising the need to "respect, conserve and maintain [the] knowledge, innovations and practices of indigenous and local communities... [and] to protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirement.

### **3.4.4: OS 4: Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency**

This safeguard covers the range of impacts of pollution, waste, and hazardous materials for which there are agreed international conventions and comprehensive industry-specific standards that other multilateral development banks follow. It also introduces vulnerability analysis and monitoring of greenhouses

### **3.4.5: OS 5: Labour Conditions, Health and Safety**

This safeguard establishes the Bank's requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation. It covers working conditions, workers' organisations, occupational health and safety, and avoidance of child or forced labour

### **Relevance to the proposed Project**

The Project is being financed by AfDB, was therefore checked against the above listed operation safeguards likely to be triggered under each policy was summarized in table 3-1 below

Table 3-1: AfDB Operational Safeguards Triggered

<b>POLICY</b>	<b>Criteria</b>	<b>Discussions</b>
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OS 1 Assessment and Management of Environmental and Social Risks and Impacts.	Yes	The Project components will trigger safeguards and is Category 2 due to the interaction with the physical, biological and social setting within the immediate surroundings
OS 2: Involuntary Resettlement, Land Acquisition, Population Displacement and Compensation.	Yes	The Project shall be constructed within existing sewer way leaves, and road reserves, however, cases of encroachment to existing wayleaves and road reserves were observed which implies that RAP has to be prepared as a separate report.
OS3: Biodiversity and Ecosystem Services.	No	Project activities have no direct linkage to biological diversity and ecosystem services OS 1 shall be applied in isolated minor cases of biodiversity and ecosystem services.
OS 4: Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency.	Yes	The Projects shall utilize raw materials both during construction and operation phase that could result to pollution of biophysical environment if not handled appropriately. Project activities shall not result to significant amount of greenhouse gases, The Project design has ensured that the sewer flows through the sewerage infrastructure by gravity hence reducing the need for pumping.
OS 5: Labour Conditions, Health and Safety.	Yes	The Project shall involve workers both during construction and operation phases of the project. this policy read together with OSHA 2007 shall form integral instruments to be used in ensuring health, safety and working conditions of both works and community

### 3.5 International Conventions

There exist several international conventions on environment that have social and/or environmental aspects tied to them. Kenya is a signatory to some of these conventions and

applies them in environmental management. Some of the conventions that the State is signatory to or has acceded to are summarized in table 10

**Table 3-2: List of International Conventions related to Environmental Management**

Convention	Date Ratified/Acceded to
1. African Convention for the Conservation of Nature and Natural Resources (2003)	Ratified (12 May 1969)
2. Convention on Biological Diversity (1992)	Ratified (26 July 1994)
3. Vienna Convention for the Protection of the Ozone Layer (1985)	Acceded to (9 November 1988)
4. UNESCO Convention for the Protection of the 5. World Cultural and Natural Heritage (1972)	Acceded to (1 May 1964)
6. Convention on the Conservation of Migratory Species of Wild Animals (1985) 7. The African-Eurasian Water-bird Agreement (AEWA). 8. The Agreement on the Conservation of African Eurasian Migratory Water birds (AEWA).	Acceded to (26 February 1999)
9. Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)	Acceded to (13 December 1978)
11. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1995)	Acceded to (1 June 2000)
12. Convention on Biological Diversity (2006)	Ratified (26 July 1994)
13. Convention on Climatic Change and the Kyoto Protocol (1997)	Ratified (25 February 2005)

14. Lusaka Agreement on the Cooperative Enforcement Operations Directed against Illegal trade in Fauna (1994)	Ratified (17 January 1997)
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The above listed conventions present intentional best practices that can be adopted on Kenya for environmental management. They serve as complimentary guides to environmental protection regulations in development projects.

### **3.6. Institutional Framework for Environment Management**

Environmental Management in Kenya is largely stipulated in EMCA 1999. The Act has established several institutions responsible for environment regulation and monitoring. The Ministry in charge of overall environmental management guidance is the ministry of environmental. Under it are several other bodies and authorities as detailed in this subsection

#### **3.6.1 Ministry of Environment and Natural Resources (MENR)**

The Ministry is charged with the responsibility to monitor, protect, conserve and manage the environment and natural resources through sustainable exploitation for socio-economic development aimed at eradication of poverty, improving living standards and ensuring that a clean environment is sustained. MENR's mission statement and key objective is to facilitate good governance in the protection, restoration, conservation, development and management of the environment and natural resources for equitable and sustainable development.

#### **3.6.2. National Environment Management Authority (NEMA)**

NEMA is the administrative body that is responsible for the coordination of the various environmental management activities in Kenya. NEMA is also the principal government authority for implementing all environmental policies. NEMA is also responsible for granting EIA approvals and for monitoring and assessing activities in order to ensure that the environment is not degraded by such project activities.

The authority's core functions are:

- Advise the Government on legislative and other measures for the management of the environment or the implementation of relevant international conventions, treaties and agreements.
- Undertake and coordinate research, investigation and surveys, collect, collate and disseminate information on the findings of such research, investigations or surveys.

- Promote the integration of environmental considerations into development policies, plans, programmes and projects, with a view to ensuring the proper management and rational utilization of environmental resources, on sustainable yield basis, for the improvement of the quality of human life in Kenya.
- Coordinating the various environmental management activities being undertaken by the lead agencies
- To take stock of the natural resources in Kenya and their utilization and conservation.
- Initiate and evolve procedures and safeguards for the prevention of accidents, which may cause environmental degradation and evolve remedial measures where accidents occur e.g. floods, landslides and oil spills. Carry out surveys, which will assist in the proper management and conservation of the environment.
- Mobilize and monitor the use of financial and human resources for environmental management.
- Identify projects and programmes for which environmental audit or environmental monitoring must be conducted under this Act.
- Monitor and assess activities, including activities being carried out by relevant lead agencies, in order to ensure that the environment is not degraded by such activities. Management objectives must be adhered to and adequate early warning on impending environmental emergencies is given.

### **3.6.3. National Environmental Council (NEC)**

The body was established under section 4(3) of EMCA 1999 and it consists of the line Ministry's Cabinet Secretary as the chairman, the principal secretary, representatives from public universities, research institutions, NGOs, the Director General to NEMA and such number of members as may from time to time be determined by the line Ministry's Cabinet Secretary

### **3.6.4. National Environmental Tribunal (NET)**

The tribunal is provided for under Section 125 of the Act. Its core purpose is to preside over appeals from administrative decisions by organs responsible for enforcement of environmental standards. An appeal may be lodged by a project proponent upon denial of an EIA license or by a local community upon the grant of an EIA license to a project



proponent. NEMA may also refer any matter that involves a point of law or is of unusual importance or complexity to NET for direction.

### **3.6.5. National Environmental Action Plan Committee**

The committee was established under Section 37 of the Act. The committee is responsible inter alia, for the development of a five-year national environment action plan. The national environment action plan contains among other aspects analysis of the natural resources of Kenya and their distribution, quantity and various uses.

The committee is also responsible for recommending legal and fiscal incentives for business that incorporate environmental requirements into their planning and operational processes as well set out guidelines for the planning and management of the environment and natural resources. Upon adoption by Parliament, the national environment action plan becomes binding on all organs of government.

### **3.6.6. Standards and Enforcement Review Committee (SERC)**

The SERC operates under NEMA as established under Section 70 of EMCA 1999. It serves as a technical committee mandated with the task of formulation of environmental standards, methods of analysis, inspection, monitoring and technical advice on necessary mitigation measures. The Principal Secretary under the Cabinet Secretary is the Chairman of the SERC. The members of the SERC are set out in the third schedule of EMCA 1999.

### **3.6.7. National Environmental Complaints Committee**

The National Environmental Complaints Committee (NECC) is the body charged with the task of investigating complaints or allegations regarding the condition of the environment in Kenya and suspected cases of environmental degradation. The NECC also undertakes public interest litigation on behalf of the citizens in environmental matters. It is composed of seven members appointed by the Cabinet Secretary for Environment and Natural Resources headed by a chairman who is a person qualified to be appointed as a judge of the High Court of Kenya and members nominated by the Attorney-General, the Council of County Governors (Secretary), the Law Society of Kenya and the business community.

### **3.6.8. County Environment Committees**

Section 29 (1) of EMCA 1999 provides that the Cabinet Secretary shall by notice in the gazette appoint County Environment Committees of NEMA in respect of every County. These committees assist NEMA in effectively carrying out its function of proper management of the

environment at this level. It is instructive to note that the membership of these committees includes inter alia representatives of farmers or pastoralists, business community, women and youth

### **3.7. Institutional Structure of the Water Sector**

Water resources management in Kenya is currently guided by the National Policy on Water Resources Management and the Water Act 2002. The National Water Development Policy aims to facilitate the provision of water in sufficient quantity and quality and within a reasonable distance to meet all competing used in a sustainable, rational and economical way. The policy distinguishes policy formulation, regulation and services provision and defines clear roles for sector actors within a decentralized institutional framework and includes private sector participation and increased community development.

The following administrative agencies are responsible for regulation of water and sanitation development in Kenya.

#### **3.7.1. Ministry of Water and Irrigation (MWI)**

This is the overall Ministry in charge of water in Kenya. It is responsible for policy development, sector co-ordination, monitoring and supervision to ensure effective Water and Sewerage Services in the Country, sustainability of Water Resources and development of Water resources for irrigation, commercial, industrial, power generation and other uses. Its mission statement is to contribute to national development by promoting and supporting integrated water resource management to enhance water availability and accessibility. The MWI has the following technical departments: Water Services, Water Resources, Water Storage and Land Reclamation, and Irrigation and Drainage.

#### **3.7.2. Water Resources Authority (WRA)**

WRA is a state corporation, established under the Water Act 2002 and charged with being the lead agency in water resources management. Among other functions, WRA is responsible for issuing permits for water use. The Authority charged with the responsibility of ensuring sustainable management of the Nations water resources through;

- Regulation and protection of water resources quality from adverse impacts,
- Classification, monitoring and allocation of water resources.
- Implementation of policies and strategies relating to management of Water resources
- Development of principles, guidelines and procedures for the allocation of water,

- Development of Catchments level management strategies including appointment of catchments area advisory committees,

### **3.7.3. Water Services Regulatory Board (WASREB)**

The Board is responsible for the regulation of the water and sewerage services in partnership with the people of Kenya. Its mandate covers the following key areas;

Regulating provision of water and sewerage services including licensing, quality assurance and issuance of guidelines for tariffs, prices and disputes resolution.

- Overseeing the implementation of policies and strategies relating to provision of water services licensing of Water Services Boards and approving their appointed Water Services Providers,
- Monitoring the performance of the Water agencies and Water Services Providers,
- Establishes the procedure of customer complaints,
- Informs the public on the sector performance,
- Provides advice to the Minister in charge of water affairs.

### **3.7.4. Water Works Development Agencies**

The WWDAs are charged with the responsibility of providing water and sewerage services in their areas of jurisdiction efficiently and economically. KICOWASCO PLC falls under the Tana Water Works Development Agency is mandated to;

- Appoint and contract Water Service Provider
- Develop the facilities, prepare business plans and performance targets
- Plan for efficient and economical provision of Water and sewerage services within their areas of jurisdiction;
- Asset holding of Central Government facilities
- Build capacities of water service providers to embrace efficiency, accountability and responsibility to water supplies,
- Monitoring and supervision of water and sewerage services provision by WSPs.

### **3.7.5. Water Services Providers (WSP)**

These are state owned utilities or water companies that have been since commercialized to enhance their performance and efficiency while aiming to achieve financial autonomy,

accountability and strategic investment. The relevant water service provider under this project is the Kirinyaga County Water and Sanitation PLC (KICOWASCO PLC).

## CHAPTER 4. ENVIRONMENTAL AND SOCIAL BASELINE INFORMATION

### 4.1 Geographical Location

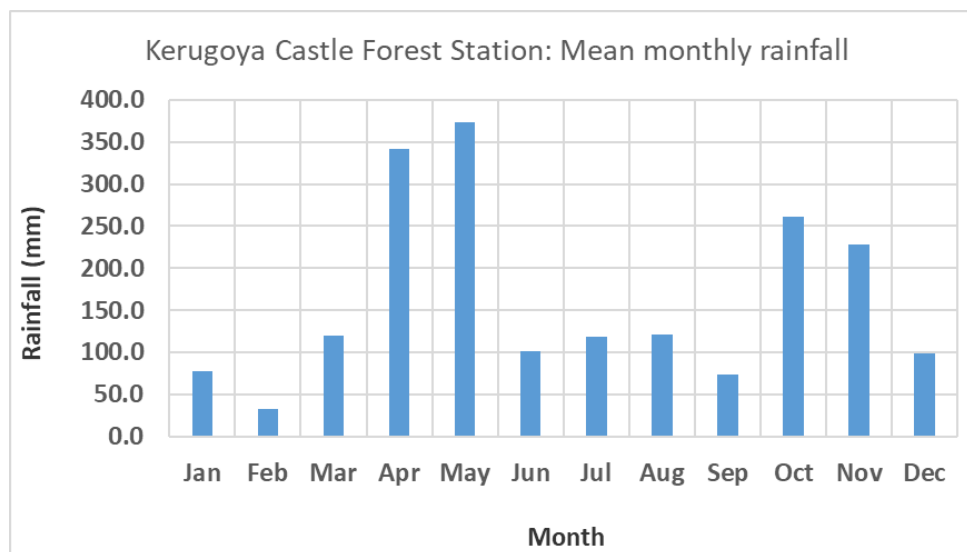
The Project is situated in Kirinyaga County in the Central part of Kenya. The total area of the county is approximately 1,478.1 km<sup>2</sup> and lies between latitudes 0° 1' and 0° 40' south and 37° and 38° East. The proposed project covers Kirinyaga West and Kirinyaga Central sub counties. The sewerage infrastructure will serve the towns of Kerugoya, Kutus and Kagumo.

### 4.2 Physical Environmental Conditions

#### 4.2.1 Climatic Conditions

The Kerugoya Kutus sewer area is on the windward side of Mt Kenya thus influencing its climatic condition. The average annual temperature is 18.7 °C. The average annual rainfall is 1,412 mm. The municipality has two rainy seasons. The long rains occur between March and May averaging 2,146mm while the short rains occur between October and November averaging 1,212 mm.

**Table 4-1 Climate of Kirinyaga, Kenya**



#### 4.2.2 Topography

The topography of the upper reaches of Kiringa and Thiba Rivers, which are the source-rivers for the proposed project, comprise mountainous topography that is replaced by undulating topography - steep ridges and valleys- in the lower settled areas. However, at an altitude of about 1500m, the topography changes into gently undulating and level topography. At an altitude of about 1100m, the land rolls out into the dry plains of Mwea. The proposed sources of water are in Thiba and Kiringa rivers at approximate altitudes of 2028masl and 1943masl respectively while the treatment plant located at elevation 1920masl, thus the project covering the lowland areas. `

### **4.2.3 Geology and Soils**

The area, like most of the southern slopes of Mt. Kenya geological suite, is underlain by the Thiba basalts (a uniform series of usually non-porphyritic, fine-grained grey basalts erupted from the vents of Mt. Kenya), which are Pleistocene in age. Over much of the area, the basalts rest directly on the Basement System rocks. The Thiba basaltic rocks are underlain by red volcanic soils (Nitosols) derived from the weathering of the underlying basalts.

## **4.3 Hydrology**

### **4.3.1 Ground Water Resources**

Largely due to the proximity of the region to Mt. Kenya, the source of all surface water draining the catchment, ground water sources have not been extensively exploited. Shallow wells are the most prevalent category of ground water sources. They are found in homesteads in areas where the water table is high. Community water schemes in the area which provide raw water are the main source of water in areas not covered by the water service providers. They draw the water upstream ensuring that the systems are gravity fed. This negates the need to exploit ground water sources which could prove to be more expensive to initiate and operate.

### **4.3.2 Surface Water Resources**

The project area falls within the 4DA sub-catchment comprising the Thiba River and its tributaries of which Kiringa River is one of the main tributaries. All the major rivers in the 4DA sub-catchment originate from Mt. Kenya and drain into the Kaburu Dam on the Tana through Thiba River. There are numerous springs and small streams in the highlands that all flow into these major rivers.

#### **4-1: Rivers within the project location**



River Thiba at Kutus bridge	River Kiriinga
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### **4.3 Biological Environment**

#### **4.3.1 Vegetation and Flora**

Biodiversity of the project location is highly influenced by the Mt Kenya forest ecosystem with respect to indigenous plant cover species. However, due to human activities, the indigenous plant species have been displaced by exotic species that have also acquired economic values among the communities. Such plant species include tea, coffee, Eucalyptus spp, Cypress ssp., Caussurina spp. and Graveria SSP and wattle trees species. Other plant features include grass species, ferns, nappier grass, avocado, banana, yams (mainly in the river flood plains), cassava, sugar cane, pineapple, arrowroots, and coffee).

#### **4.3.2 Fauna**

Human habitation and agricultural activities have also significantly interfered with both terrestrial and aquatic habitats in the project areas. There is no terrestrial wildlife observed in the project areas since most land is under agricultural use for many years pushing the animals into the Mt Kenya forest. However, limited rodents like squirrels, moles and different bird species among others are found in the area (specific habitats characteristics will be established during the detailed assessment. Among the aquatic species present include frogs, fresh water fishes are found naturally in the rivers. Livestock keeping is significant with dairy cows, sheep, goats, poultry and house pets (dogs and cats) may also constitute part of the wider biodiversity).

### **4.4 Social Setup**

#### **4.4.1 Population**

The Kenya population and housing census 2009 report indicate the population of the county was 528,054 with an annual growth rate of 1.5%. The table below summarizes the projections in line with the project design horizons.

**Table 4-2 Population projections**

Locations	Growth Rate	Population 2009	Projected Population Initial Year 2020	Projected Population Future Year 2030	Projected Population Ultimate Year 2040
Sagana	4.50%	9,889.00	16,048	24,923	38,704
Kagio	4.50%	3,357.00	5,448	8,460	13,139
Kerugoya	1.50%	16,369.00	19,282	22,377	25,970
Kutus	4.50%	6,209.00	10,076	15,648	24,301
Kagumo	4.50%	3,499.00	5,678	8,818	13,695
Total Urban		39,323	56,533	80,227	115,809

**4.4.2 Education**

There are 138 educational facilities in Kerugoya Kutus water LMC project area as shown in the table below:

**Table 4-3: Educational facilities in the Kerugoya Kutus Municipality**

Facility	Number		
	Public	Private	Total
ECDE	22	27	49
Primary schools	19	37	56
Special schools	1	–	1
Secondary schools	15	9	24
Vocational college	1	–	1
Technical training institutions	1	4	5
Tertiary	2	–	2

The Post high school education institutions in the project and their populations are shown in Table Below:



**Table 4-4:Post High School Institutions Enrolment**

<b>Institution</b>	<b>Student + Staff population</b>
Kerugoya university	2000
Kibingoti Youth Polytechnic (Ndia Constituency)	180
Kiamuthambi Youth Polytechnic (Kirinyaga Central)	150
Kiambwe Youth Polytechnic (Ndia)	200
Kaitheri Youth Polytechnic (Kirinyaga Central)	200
Mutitu Youth Polytechnic (Kirinyaga Central)	180
Mutira Youth Polytechnic Central Constituency	150
Ahiti Ndomba	450

**4.4.3 Health Facilities**

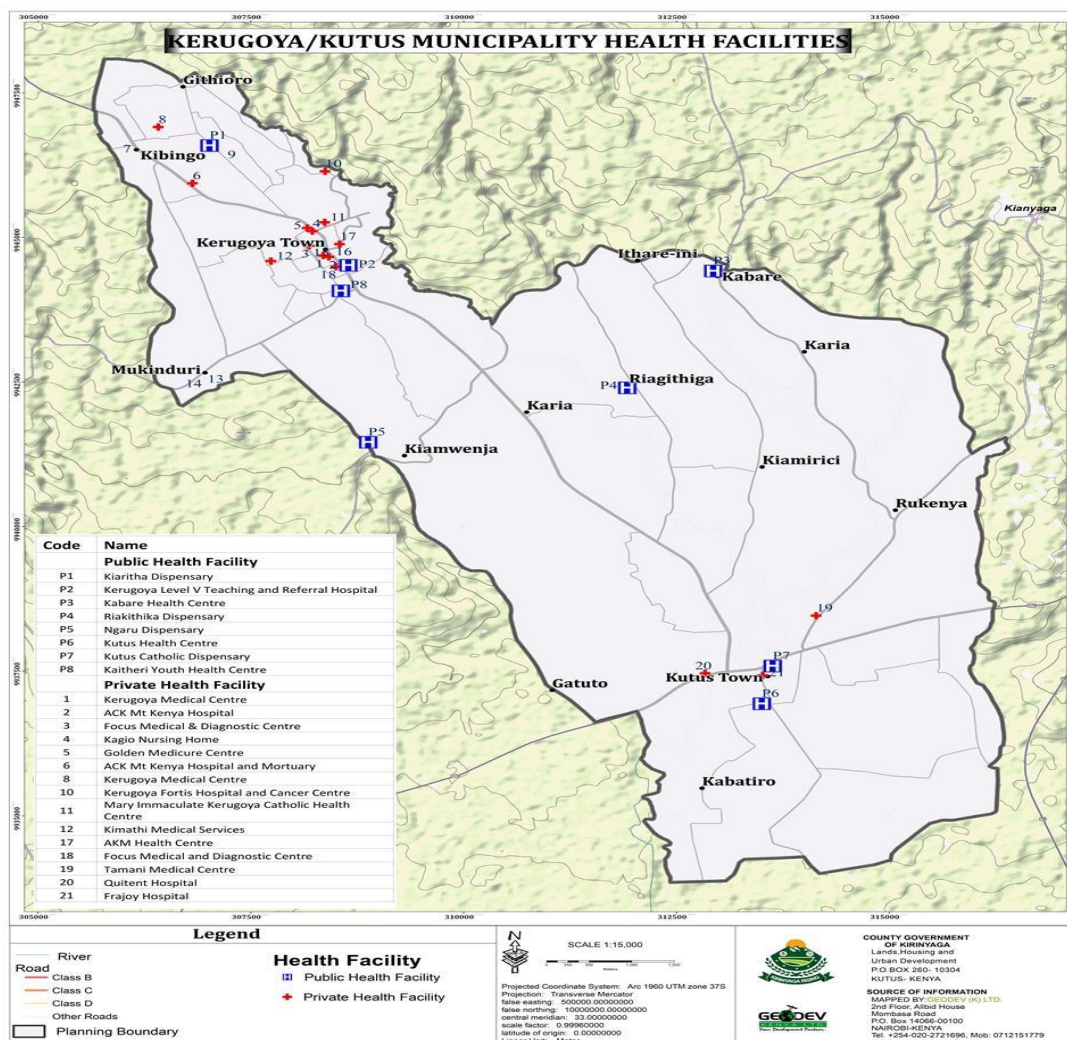
There are several health facilities in the in the project area. An inventory of existing health facilities has been compiled from existing data. Major health facilities and their bed capacities are tabulated below:

**Table 4-5:Health facilities in the area**

	<b>FACILITY</b>	<b>AVERAGE INPATIENTS</b>
1	Baricho Health Centre	1
2	Gathambi Health Centre	1
3	Gatithi Dispensary	1
4	Gatwe Health Centre	1
5	Kandong'u Dispensary	1
6	Kangaita Health Centre	1
7	Kerugoya District Hospital	169
8	Kiangai Health Centre	1
9	Kibirigwi Health Centre	1
10	Kutus Dispensary	1
11	Njegas Health Centre	1

12	Sagana Sub-District Hospital	5
13	Thiba Health Centre	2
	<b>TOTAL</b>	<b>186</b>

**Figure 4-1 Health facilities in the project area**



#### 1.4.4 Transport and Communication

The County's communications infrastructure is satisfactory. The total road network of in the county is 1,109.11 Km, out of which 106.5 Km is bitumen, 462.05 Km is gravel and 540.5 Km is earth surfaced roads. The county has an established road network with 7 tarmac roads passing through it namely Makutano – Embu road, Kutus –Karatina road, Baricho road, Kiburu road, Kutus – Sagana road, Kutus – Kianyaga

road and Kabare – Kimunye road. The County is well served by several tarmac roads; these are Nairobi – Sagana – Karatina Highway, Nairobi –Makutano – Mwea- Embu Highway, Sagana – Kutus – Embu road and Kutus – Kerugoya – Karatina road. The County is well covered by all four mobile service providers and internet services are available in all urban Centers.

Besides the main roads connecting these towns the project area is served by a dense network of earth roads some of which are dusty in the dry season and muddy and impassable during the rainy season. The major soils are red coffee soils, which is sticky and slippery making it impossible for vehicles to reach interior when wet. The sticky soils also make movements by people difficult during rainy season.

#### **4.4.5 Economic Activities**

Agriculture is the largest driver of the local economy. It supports about 87% of the population with 72% of household income coming from agribusiness activities especially from banana farming and tea farming. Other economic activities include tourism largely due to the presence of Mt. Kenya National Park and mining of ballast and sand. The major industries in the County are involved agro-produce processing especially tea and coffee. Numerous financial institutions are also found in the County. These include 17 banks, 8 micro-finance institutions, 18 building societies and 5 insurance companies.

#### **4.4.6 Industry and trader characteristics**

The target towns under study display a wide population variance but nonetheless exhibit some common economic dependency types including;

- Farming-dependent – the towns serve as market major for farming communities and as such, agriculture contributes a percentage of total labour and proprietor income.
- Government dependent –both County and Central Governments use these centers as service hubs contributing a portion of the weighted annual average of total labour and proprietor income.
- Goods and Services dependent – formal and informal Service activities (private and personal services, agricultural services, wholesale and retail trade, finance and insurance, transportation and public utilities) contributing a portion of the weighted annual average of total labour and proprietor income.

Kerugoya being the initially established headquarter for former Kirinyaga District, serves as service hub hosting health Institutions such as County Referral Hospital and most Government offices. Kutus on the other hand has been chosen to host the County headquarters and already houses the county government offices. Most of the commercial both formal and informal activities are in the central business centres as well as in the market places while the peri-urban serve as boarding abodes.

#### **4.4.7 Sanitation**

The current population in Kerugoya and the expected growth in population and commercial activities in the Kutus Town coupled with the proposed increase in water supply to the Towns by year 2020 makes these two towns ripe for water borne sanitation system. Therefore, the need to have sewerage LMC project and waste water collected from these towns will be treated at existing Kerugoya Kutus treatment works and effluent discharge released to Murubara stream.

#### **4.4.8 Liquid Waste Disposal**

The project area has a reticulation system which terminates at Ahiti Ndomba Treatment Plant which is to be completed under LMC. The system is incomplete, and liquid waste from septic tanks and pit latrines is collected using exhausters which dumps this waste at the sewer treatment plant in Embu. However, there are instances of liquid waste discharge into the major rivers in the project area. This has greatly compromised the quality of water in the rivers over time.

#### **4.4.9 Solid Waste Management**

On average, it is estimated that each person generates 0.74kg of waste per day (*World bank, 2016*). With a projected population of 42,762 as of the year 2020, solid waste generated in Kerugoya/Kutus is approximately 31,643.9kg/day. According to field survey, 2020, approximately 58% of residents in the municipality do not sort their waste during disposal. Only 42% sort the waste as biodegradable and non- biodegradable materials.

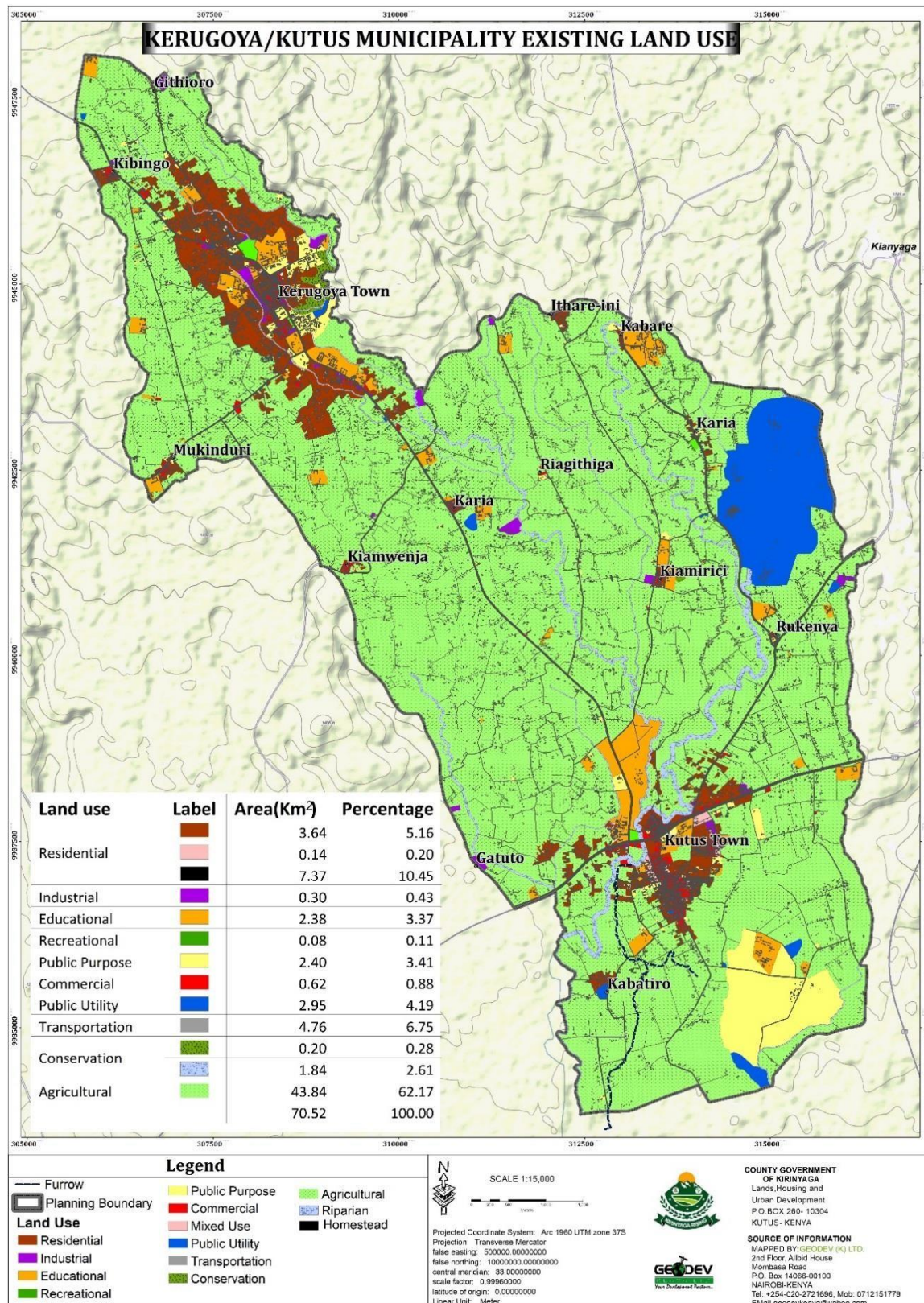
#### **4.4.10 Land holding ad Land Uses**

Agriculture remains the most important economic activity in Kenya, the contribution of the agricultural sector to Kenya's GDP stands 19% while employing 75% of the labour force. However, subsistence agriculture is the important contributor to the livelihoods of as over 90% of the project area households. As such land is a very treasured resource for rural households like the ones residing in the proposed site with 77.74% of polled households owning some agricultural

land. The mean land holding in the reservoir area is 1.5 acres. The mean area under cultivation per household is 1 acre while 50% of households have just 0.75 acres under cultivation.



Figure 4-2 Land Use Map for the project area



## **CHAPTER 5: PROJECT ALTERNATIVES**

### **5.1 Introduction**

The environmental management plans proposed for the entire project cycle are considered adequate to mitigate the identified potential negative environmental and social impacts. However, it is important to analyze the possible alternatives to the project to inform decision making by relevant government agencies and improve the environmental performance of the project. For the proposed project, alternatives are feasible as follows;

- With Project Alternative
- Without Project Alternative
- Alternative Design and Technology

### **5.2 With Project Alternatives**

Under this alternative the project will not be implemented and hence the status quo will be retained. This alternative represents the ideal mitigation measure for the negative environmental and social impacts as they will not occur as a result of the project. The option will also lead to negative and long-term impacts to Kerugoya Kutus community including:

- KICOWASCO will not be able to provide sewer services to its consumers. This will limit their sustainability and revenue base
- Pollution of surface waters by raw sewage being washed into these bodies.
- Continued use of exhauster services which is a costly and inconvenient way of waste disposal
- Stunted economic growth within the urban areas as a result of poor sanitation
- Poor economic stimulation as a result of unemployment
- Skills of the locals will remain underutilized

This scenario is not appropriate on either social or environmental grounds.

### **5.3 Without Project Alternatives**

This alternative envisions that the proposed project will be implemented as proposed in its entirety. It is the best alternative in mitigating the potential loss of benefits to the proponent, the community and the Government of Kenya. In addition, the project will improve the development to Kerugoya and Kutus residents and Kirinyaga County at large.

#### **5.4 Route alternative**

The considerations used in identifying alternative project routes included but are not limited to the following:

- i.** Engineering Technical Considerations: They are designed to run along depressions to allow for maximum coverage and drainage of the raw sewerage. The gradient of the sewer ensures the gravity flow of the sewerage.
- ii.** Financial Considerations: A cost-benefit analysis and sustainability during construction and operation of the project were factored into identifying the project route alternatives.
- iii.** Environmental Impact- The route is designed to ensure environmental damage is minimized.
- iv.** Displacement and Compulsory Acquisition: The sewers were designed to follow public wayleaves as much as possible and reduce compulsory displacement.

#### **5.5 Analysis of alternative Construction materials and Technology**

The proposed project will be constructed using the following materials mainly; High density Polyethylene (HDPE), Survey equipment, Excavation equipment, Vehicles including dumber tippers, Micro tunneling equipment and Epoxy coated steel pipes and sleeves.

This ESIA proposes that heavy use of timber and wood during construction should be discouraged to minimize destruction of trees. The exotic tree species should be preferred to indigenous species in the construction of the project components where need will arise as they can be replanted with ease. The equipment and vehicles should have highest levels of combustion efficiency, capability for cleaner fuels and should have enhanced safety features.



## **CHAPTER 6: PUBLIC PARTICIPATION AND STAKEHOLDERS CONSULTATIONS**

### **6.1 Introduction**

Public consultation is not only one of the most effective means of encouraging and obtaining community input and feedback, it also serves to inform the community members and key stakeholders on the proposed projects. four public participation meeting were held in the proposed project area to discuss the proposed project (see appendix 2) for consultation minutes and attendance list). Key stakeholders were also consulted through key informant interviews

The aim of the consultation was to ensure that the views of stakeholders and the interests of the communities were identified and considered at the earliest during the ESIA study. Local communities were mobilized with the help of the National, County and local administration.

### **6.2 Stakeholders Engagement Plan**

The objective of the engagements will be to enhance project acceptance and make a significant contribution to successful project design and implementation. The stakeholder engagements will be done timely, with relevant, understandable, and accessible information, in a culturally appropriate way free of manipulation, interference, coercion, discrimination, and intimidation.

The process of stakeholder engagement will involve:

Stakeholder identification and analysis: As discussed below but also when identifying participants in consultations involving multiple stakeholders, choose a wide range of interests and opinions, paying particular attention to women, the poor and to more vulnerable groups (young people, vulnerable ethnic minorities, elderly people, etc.).

- i. Planning how the engagement with stakeholders will take place, including identification of appropriate venues, consideration on how to ensure inclusivity, Identification of socio-cultural factors that could influence the consultation process, Definition of the parameters, goals and expected results of the consultation process, Consideration of the various alternative approaches based on the particularity of the sub-project and adapting the participation process to the preferences of the stakeholders or context (individual meetings, focus groups, advisory committee, workshop, etc.); undertaking logistics for the consultation etc

- ii. Consultation with stakeholders including disclosure of information in an open and transparent manner to ensure meaningful consultations, providing a response to the concerns expressed (if applicable);
- iii. Addressing and responding to grievances;
- iv. Reporting to stakeholders
- v. Recording the key issues raised and addressing these in the design of the project or ensuring that the results of the consultation are reflected in the ESIA studies and in the documents prepared throughout the cycle of the project.

### **Stakeholder Analysis**

Stakeholder analysis is a process of examining the relative influence that different individuals and groups have over a project as well as the influence of the project over them. The purpose of stakeholder analysis will be to: study their profile and the nature of the stakes, understand each group's specific issues, concerns as well as expectations from the project and gauge their influence on the Project.

The significance of a stakeholder group will be categorized considering the magnitude of impact (type, extent, duration, scale, and frequency) or degree of influence (power and proximity) of a stakeholder group and urgency/likelihood of the impact/influence associated with the stakeholder group in the project context. The magnitude of stakeholder impact/influence will be assessed by taking the power/responsibility and proximity of the stakeholder group and the group is consequently categorized as negligible, small, medium, or large.

**Table 6-1 Stakeholders and Potential role in the project**

<b>NO</b>	<b>Stakeholder</b>	<b>Potential role</b>	<b>Interest</b>
1.	Project Affected Persons	Affected by the project impacts or may own the land on which some of the project will be located	High
2.	Local Administration	Local Administration would facilitate in identifying and organizing the direct beneficiaries. Security	Medium
3.	KeNHA	The Kenya National Highway Authority will give approval to all road crossings done along their roads within the project area.	High

4.	KeRRA	Kenya Rural Roads Authority will give approval for the road crossings and access of the road reserve that will be used for pipeline laying within the project area.	High
5.	KICOWASCO	The WSP would facilitate in giving briefs about the advantages of the project since the project would be handed over to them for operation and maintenance.	High
6.	Public Health Office	The office will give health issues regarding water borne diseases cases experience in Kirinyaga Central and west sub counties health facilities.	High
7.	Physical Planning Department	They will give us the layout of Kirinyaga central Constituency and various land use, land use changes and physical setup of the study of the area.	High
8.	Sub County Administrator	The will guide on administrative ward and the leadership aspect	medium
9.	NEMA	Ensure environmental and social compliance	High
10.	County Governments including various technical departments	Grant approvals for the project	High
11.	DOSH.	Oversight on occupational Health & safety compliance	High
12.	Contractor	Construction of the project	High
13.	AfDB	Financing partner Monitoring of Compliance	High
14.	Other Government Agencies (KWS,KFS, )	Provide approval for clearances for project locations in sensitive environments	High

### **Stakeholder Engagement Schedule and Methods**

Stakeholder engagement is a continuous process that will be carried out till project implementation. Various methods will be used such as: Baseline surveys, Public barazas, Focused group discussions, Questionnaires, Key Informants Interviews and stakeholders' meetings.

### **Disclosure**

This stakeholders Engagement plan will be disclosed on the AfDB website as well as TWWDA'S website for easy access to persons with internet. Similarly, all RAPs and ESIA's prepared for the project will also be disclosed on TWWDA website as well as availed on site.

### 6.3 Stakeholders' meetings

The aim of this was to ensure that all the stakeholders likely to be affected or influence the project are identified and targeted as part of the ESIA study. The following stakeholders were engaged in the ESIA review study and they include; -

- County Government
- Project Project affected Person's (PAPs;)
- Ministry of Lands and Physical Planning;
- Kerugoya Prisons;
- County Administration-County Commissioners, Deputy County Commissioners Assistant County Commissioners, Chiefs and Assistant Chiefs, Village elders etc.

The table below indicates a detailed stakeholder identified and consulted during the assessment-

**Table 61 Stakeholder Consulted**

NO	Stakeholder	Potential role
1.	Project Affected Persons	Affected by the project impacts
2.	Local Administration	Local Administration would facilitate in identifying and organizing the direct beneficiaries.  Security -DCC, ACC, Chiefs and Assistant Chiefs
3.	KeNHA	The Kenya National Highway Authority will give approval to all road crossings done along their roads within the project area.
4.	KeRRA	Kenya Rural Roads Authority will give approval for the road crossings and access of the road reserve that will be used for pipeline laying within the project area.
5.	KICOWASCO PLC	The WSP would facilitate in giving briefs about the advantages of the project since the project would be handed over to them for operation and maintenance.

6.	Public Health Office	The office will give health issues regarding water borne diseases cases
7.	Physical Planning Department	They will give us the various land use, land use changes and physical setup of the study of the area.
8.	Sub-County, Ward Administrator	The will guide on administrative ward and the leadership aspect
9.	NEMA	Ensure environmental and social compliance
10	County Governments including various technical departments	Grant approvals for the project
11	DOSH.	Oversight on occupational Health & safety compliance
12	Member of Parliament Kirinyaga Central	Sensitization of the community about the project

Methods used for public participation (PP) to identify anticipated impacts and possible mitigation measures from the community members included

1. The administration of pre-designed questionnaires
2. Public meeting/*baraza*
3. Taking of pictures of community members in the attendance.
4. List of participants and Minutes

Methods used for stakeholder consultations (SC) included

1. Direct interviews with stakeholders using Key informants. (KI) questionnaires
2. List of participants.
3. Minutes (Appendix 2)

#### **6.4 Public Meetings**

Public meetings were conducted in Kirinyaga Central and West Sub counties in order to explain the project and its effects to community as well as to obtain the views of the community on the proposed project. The schedule of the meetings was as below.

Date	Attendance			Sub county	Venue
	M	F	T		
23/02/2024	30	10	40	Kirinyaga Central	Kerugoya Chiefs Office
23/02/2024	22	13	35	Kirinyaga Central/East	Catholic Church Kutus
Total	52	23	75		

These public meetings were scheduled in consultations with the local administration and the project proponent (TWWDA) The members of public targeted at this meeting were those who reside along the sewer lines. They were identified as those who would likely to be affected by the project especially.

Typically, the agenda for the consultations was:

- Presentation of the proposed project layout;
- Obtaining from the respondents their environmental and socio-economic concerns, and perceptions as well as suggestions/comments regarding the proposed project.

These public consultations were documented and the records of consultation are presented within this report. (Appendix 2). The records include the date and location of the consultation meetings, list of attendees and their contact addresses and finally summarized minutes. These records are supported by photographs.

#### **6.4.1 Issues arising from the Stakeholder and Public Consultations**

The Consultant undertook Public Meetings to create awareness about the project from 21/02/2024 to 23/02/2024. The Client TWWDA, representatives from KICOWASCO PLC, Area MP representative and the Local Administration (Chiefs and Assistant Chiefs) were present in the meetings. The Consultant provided a brief of the project Scope, upcoming field activities then had a question and answer session with the attendees. The team first met with the Key Informants/Stakeholders before conducting the public meetings. They are all supportive of the project as lack of sewer system is a critical issue in the area.

#### 6.4.2 Summary of key opinions and responses from Consultation forums

**Table 6-2: summary of key concerns and responses from the Developer**

Concern/Issues/opinion	Response
Employment opportunities	The locals should be given first priority in the available job opportunities especially during construction to ensure skills and knowledge are transferred.
Compensation	The affected persons should first be compensated using market rates.
Scope of Sewer System Areas	the project areas to be clear and rules and regulations set for future connections for those far from the mainline
Wayleave The community wanted to know the distance reserved for roads	The roads will be marked clearly to show the extent of the road reserve
Impact of Sewerage issue of smell and diseases	The raw sewer water will not mix with the clean water as they have separate pipelines In case of spillage, KICOWASCO PLC has to be having routine checks and have a communication system where the public can alert them and repair immediately.
Air pollution the community felt that sewer system can lead to	This was clarified that the system will be maintained well with authorized connections.
Loss of Businesses during construction	the participants were informed that there will be compensation for any loss of assets or livelihood

#### 6.5. Future Stakeholders Engagement

After collection of public views on the proposed water supply, the Proponent will be required to set the ground for future consultations with key stakeholders and the general public

The following methods could be used to gather information from and continuously engage the various community members and other stakeholder groups:

- Key Informant Interviews;
- Focus Group Discussions (FGDs);
- Public meetings (barazas); and
- Roundtable meetings.

TWWDA and KICOWASCO PLC should maintain consultation records including attendance registers, signed minutes, sample photographs for meetings, mails etc.

#### **6.5.1 Public availability of documents**

Subject to the existing legal framework, relevant approved project reports and licensing documents should be made available (at designated public offices and the project website) for public inspection/access on request.

We propose that the ESIA report findings be disclosed to the public through the Kirinyaga County NEMA office and the Deputy County Commissioners offices. Any comments raised by the public should be communicated to TWWDA through NEMA.

In addition, the final ESMP adopted for construction phase should also be made available to the public. Its availability should be publicized electronically through the Proponent and/or Contractor's website. Hard copies should be deposited at the contractor's camp site(s) and at the Deputy County Commissioners office for inspection.

#### **6.6.2 Notification on forthcoming works**

Prior to the commencement of construction, the Proponent and Contractor should mobilize and, in liaison with other stakeholders, facilitate consultation with the local community among other stakeholders including project affected persons (PAPs) in addition to those already identified in this report.

The Proponent and Contractor should continuously consult adjacent property owners with respect to project activities affecting their properties/environment and mitigation measures and, where necessary, jointly fine tune the proposed ESMP actions.



### **6.6.2 Publicity signages**

Prior to the commencement of construction, the contractor should erect publicity signages detailing the nature of forthcoming water works at various strategic locations along the distribution lines. The Publicity signage should be as required and approved by the Ministry of Transport, Infrastructure Housing Urban Development and Public works as well as National Construction Authority (NCA), and the by-laws of Kirinyaga County.

### **6.6.3 Localized notifications**

For any working front, the Proponent in conjunction with the contractor will post notifications of forthcoming works, especially the disruptive ones. In addition, localized notifications should be made for:

- Job opportunities available;
- Any traffic disruptions or controls or changes to abutting property access; and
- Any irregular/hazardous work practices such as excessively noisy works etc.

## **6.6 Grievance Redress Mechanism**

The section describes the processes and steps that shall be followed during Grievances management. A Grievance Redress Mechanism (GRM) shall be established to address any grievances that will emerge during the implementation of the proposed Kerugoya –Kutus Sewer LMC project. Identifying and responding to grievances supports the development of positive relationships between projects and affected communities, and other stakeholders. The AfDB standards outline requirements for grievance mechanisms

### **6.6.1 Grievances Procedure**

The Grievance management provides for three tiers of amicable review and settlement, with the first tier at the site level, second level will integrate a mediation committee in case the grievance cannot be solved at first level and finally there will be an option for each of the complaint to resolve to the court of law (third level) in case there is no resolution of the grievance with the mechanism.

The first tier will comprise of a Grievance Redress Committee whose members include:

- Project Ad-Hoc committee (PAP's representatives)
- Village elder

- Chiefs and Assistant Chiefs
- A representative of groups e.g. the religious groups, business groups, youth and women group
- TWWDA representative
- Contractor representative
- Supervising engineer representative

The second tier involves a Mediation Committee whose members will include representatives from:

- Project Ad-Hoc Committee (PAP's representatives)
- National Government representative
- County Government representative
- TWWDA representative
- Contractor representative
- Deputy County Commissioner/Assistant County Commissioner

### **6.6.2 Grievance Mechanism**

The grievance mechanism may include the following:

(a) Different ways in which the community can submit their grievances, which may include submissions in person or anonymously, by phone, text message, mail, email or via a web site.

(b) A log where grievances are registered in writing and maintained as a database.

A PAP will report a complaint at the grievance desk that will be set up at the Contractor's office, will be recorded in the grievance record and the Grievance Redress Committee will investigate and evaluate the nature of the complaint and provide a solution to the PAP within 14 days.

(c) Publicly advertised procedures, setting out the length of time users can expect to wait for acknowledgement, response and resolution of their grievances.

(d) Transparency about the grievance procedure, governing structure and decision makers; and (e) An appeals process (including the national judiciary) to which unsatisfied grievances may be referred when resolution of grievance has not been achieved.

### **6.6.3 Anticipated grievances from the Community**

Grievances and complaints could arise with regards to land compensation, business interruptions activities associated with the construction project activities, social issues or any other subject related to the project.

## 6.7 Resettlement Action Plan

Tana Water Works Development Agency (TWWDA)), has proposed to implement the Kerugoya-Kutus Sewer LMC Project to improve sanitation in Kerugoya, Kutus towns and environs. Even though no structures are affected to trigger displacement of people, imminent loss of land use is envisaged during construction. The loss of land use would only occur at the pipeline wayleave therefore leading to partial loss of use during construction. Even though not many farms were traversed by the proposed sewer line, these issues have necessitated the client through the consultant to carry out a resettlement action plan (RAP) which is included in this ESIA report.

The main objective of Resettlement Action Plan (RAP) is to provide a plan for Compensation of the Project Affected Persons (PAPs) so that their losses are adequately compensated and their standard of living improved or at least restored to the pre- project status. The study entailed carrying out census of all the affected persons along the proposed route for the Kerugoya- Kutus Sewer LMC project.

The parcels of land and crops affected will be paid in full by the client to cover for the loss of land use and produce that would have been harvested and sold during the construction period.

**Table 6-3RAP implementation Matrix**

Type of loss	Specification	Entitled Person	Category	Compensation entitlement
Land /Businesses	Private Land	Owners	All categories of land	Provide easement allowance for the piece of land used for pipe laying at open market rate
Crops	Crops damaged as a result of the wayleave acquisition and construction activities	Owners	All crops	Crop damage compensation rates will be at market rates

## **CHAPTER 7 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

### **7.1 Introduction**

Development of this Project is expected to cause some impacts, both positive and negative. They are generally grouped into those affecting soil, water resources, air quality, flora and fauna, community and their economic activities, aesthetics and landscape, noise and human health.

The likely environmental impacts associated with this project will arise from activities associated with the construction works as well as the operation and maintenance of the sewerage system. During Construction the impacts arising are of short duration but can pose a significant impact on the environment if remedial measures are not considered. Lack of effective operation and consistent maintenance of the system is likely to impact negatively on the project area and its environs.

### **7.2 Impact identification**

#### **7.2.1 Sources of impacts**

The impacts associated with the proposed project will emanate from project inputs, activities and outputs. These are highlighted below:

##### **a) Project inputs**

The project inputs that shall be potential sources of impacts include:

- Aggregate materials taken from the local sources including crushed rocks, stones gravel, steel and cement.
- Skilled and unskilled workforce exerting indirect demand for energy, water supply, sanitation, health services etc.
- Heavy machinery including excavators, earth moving equipment etc used in the project construction process.

##### **b) Construction/outputs**

Establishment of associated work and support infrastructure including construction camps, accessories etc.

- Obtaining raw materials e.g. quarrying etc
- Transportation of raw materials, machinery and labour to the site
- Health and safety of workers and the public
- Excavation and backfilling
- Refuse and sewerage wastes from construction camps

- Spillage (oil and fuel)
- Resurfacing and replanting disturbed areas.

#### **Operation activities/outputs**

- Sewage leakages and overflows
- Emission of offensive odours
- Sludge and effluent discharge

#### **7.2.2 Receptors of impacts**

The anticipated negative impacts will be received by both the physical and human environments as below:

##### **(i) Human environment**

- Settlements within the project sites
- Peoples' property and assets
- Local population's exposure to public health and safety hazards
- Residents' exposure to increased noise levels (during construction)

##### **(ii) Natural environment**

- Terrestrial and aquatic fauna and flora
- Soil structure and susceptibility to erosion
- Surface and ground water resources

#### **7.3 Impact Assessment criteria**

The significances of the impacts were determined through a synthesis of the criteria below:

**Probability:** This describes the likelihood of the impact actually occurring.

**Improbable:** The possibility of the impact occurring is very low, due to the circumstances, design or experience.

**Probable:** There is a probability that the impact will occur to the extent that provision must be made therefore.

**Highly Probable:** It is most likely that the impact will occur at some stage of the development.

**Definite:** The impact will take place regardless of any prevention plans, and there can only be relied on mitigation actions or contingency plans to contain the effect.

**Duration:** The lifetime of the impact

Short term:	The impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.
Medium term:	The impact will last up to the end of the phases, where after it will be negated.
Long term:	The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.
Permanent:	Impact that will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.

**Scale:** The physical and spatial size of the impact

Local:	The impacted area extends only as far as the activity, e.g. footprint
Site:	The impact could affect the whole, or a measurable portion of the above-mentioned properties.
Regional:	The impact could affect the area including the neighboring residential areas.

**Magnitude/Severity:** Does the impact destroy the environment, or alter its function.

Low:	The impact alters the affected environment in such a way that natural processes are not affected.
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Medium:	The affected environment is altered, but functions and processes continue in a modified way.
High:	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases

**Significance:** This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

Negligible:	The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.
Low:	The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
Moderate:	The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
High:	The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

The following weights were assigned to each attribute:

**Table 7-1: Assessment of Significance of Environmental Impacts**

Aspect	Description	Weight
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Scale	Local	1
	Site	2
	Regional	3
Magnitude/ Severity	Low	2
	Medium	6
	High	8
Significance	Sum (Duration, Scale, magnitude) x Probability	
	Negligible	<20
	Low	<40
	Moderate	<60
	High	>60

The significance of each activity was rated without mitigation measures and with mitigation measures for both construction, operational and decommissioning phases of the proposed.

#### **7.4 Identification of Key Impacts**



The key impacts listed in the following section have been determined through the following avenues:

- Professional understanding by the project team on environmental issues;
- Views of interested and affected parties;
- Existing legislation and regulations

### **7.5 Impact analysis and proposed mitigation measures**

The findings of the impact assessment have been consolidated in the sections below. The impacts have been classified as impacts on the biophysical environment and impacts on the socio-economic environment. The impacts are further classified in terms of the phase of the development in which they are likely to occur, namely the construction phase, the operational phase and the decommissioning phase (where applicable). During their analysis, specialists were required to consider the impact significance before and after mitigation measures are implemented. The mitigation measures are also highlighted in this chapter. Even though some impacts are perceived to be of high severity, it must be highlighted that the probability of these impacts occurring might be low and therefore the significance of the impact is reduced.

#### **(i) Biophysical Environment**

- Impacts of obtaining construction materials;
- Impact on soil and water resources
- Impacts of waste generation
- Biodiversity impact
- Atmospheric pollution;

#### **(ii) Socio-Economic Environment**

- Displacement and loss of property
- Noise Impact
- Impact on businesses and traffic flow
- Health and Safety;
- Socio-economic impact
- Visual impact

### **7.6 Potential Positive Impacts**

The following positive impacts are anticipated during planning, construction and operation phases of the project:

- i The proposed activities will avert pollution of the streams, Rivers and the Lake since all waste water will be adequately treated before allowing it to flow to the streams.
- ii Community benefits: The infrastructure will improve air quality, preserve open space, and create local jobs.
- iii Provision of employment opportunities during construction and operation phases- Labour is a must therefore residents will have ready opportunities which shall boost their daily income.
- iv There shall be improved aesthetic value of the area due to cleaning up of the mess that is currently experienced in Storm water drains in the areas of blocked drains
- v Quality of surface and ground water will improve on public health, and on socio-economic development of the project area, taking into consideration that there is high probability of disposal/discharges of untreated raw sewage into rivers.
- vi The public health of the community will be upgraded due to improved standard of wastewater management.

## **7.7 Potential Negative Impacts and Mitigation Measures at Pre-Construction**

### **7.7.1 Delay in Implementation of the Project due to objections and stop orders**

Seeking approvals from NEMA for the ESIA and other organizations such as WRA and KENHA, KURA and KERRA may take more time than expected. This may be due to objections before implementation or after approval and at the inception of the project. This may be mitigated by:

#### **Mitigation measure**

- ✓ The Proponent and the Contractor shall ensure that all pertinent permits, certificates and licenses have been obtained prior to any activities commencing on site and are strictly enforced/ adhered to;
- ✓ The Proponent and the Contractor shall maintain a database of all pertinent permits and licenses required for the contract as a whole and for pertinent activities for the duration of the contract.

### **7.7.2 Risks of Environmental degradation**

All activities to be undertaken on site will have the environmental and health and safety risk associated with them. This requires the contractor to minimize the risks by applying appropriate mitigation measures as follows: -

#### **Mitigation measures**

- ✓ The Contractor shall be aware of the environmental requirements and constraints on construction activities contained in the provisions of the ESMMP.
- ✓ The Contractor will be required to provide for the appropriate Environmental Training and Awareness as described in this ESMMP in his costs and programming.
- ✓ An initial environmental awareness training session shall be held prior to any work commencing on site, with the target audience being all project affected persons.

### **7.7.3 Risks of Increased HIV and AIDS Transmission in the Area**

HIV/AIDS transmission is likely to increase due to the influx of workers from other areas to the project areas. To mitigate this, application of the mitigation measures below is recommended.

#### **Mitigation measure**

- ✓ The Contractor shall institute HIV/AIDS awareness and prevention campaign amongst his workers for the duration of the contract, & contracting organization, with preference for an organization already working on this issue in the project area.
- ✓ The Contractor's Camp layout shall consider availability of access for deliveries and services and any future works.
- ✓ The campaign shall include the training of facilitators within the workers, information posters in more frequented areas in the campsite and public areas, availability of promotional material, availability of condoms (free)

#### **7.7.4 Delay in Project Implementation due to Opposition from Aggrieved Community Members**

Recruitment of people for labor may lead to complains from the local community as there may be disparities in the employment. Gender issues related to labor may also lead to complaints. Moreover, the stakeholder engagement may be conducted in a manner that may not be accepted by the community therefore leading to grievances. To mitigate for these impacts, the recommended mitigation measures below may be applied.

#### **Mitigation measure**

- ✓ Wherever possible, the Contractor shall use local labor, and women must be encouraged to be involved in construction work.
- ✓ The contractor shall ensure compliance to the gender balance as required by the 2/3 gender rule.
- ✓ Contractor to hire community liaison officers who will act as a link between the community and contractor.
- ✓ Identification and engagement of all stakeholders to be undertaken.
- ✓ A working Grievance Redress Mechanism to be established before commencement of works.

### **7.8. Construction Phase**

#### **7.8.1 Interference with the physical setting**

The proposed project could result into the following negative impacts:

- a) Changes in the local topography during laying of pipes among others
- b) Blockage of natural drainage system at valley crossings

#### **Significance Rating**

The impact can be described as moderate and short term. However, with mitigation measures the impact will be low.

### **Mitigation Measures**

- The proponent shall as much as possible complete the works in such a way that natural aesthetics shall be retained at the locations;
- Restoration shall be undertaken to ensure that the original setting is as much as possible retained.

### **7.8.2 Displacement and loss of Land**

This may be occasioned by the nature of the project particularly where the sewer pipes are being laid.

### **Mitigation measures**

- Ensure the affected PAPs are adequately compensated based on the market rates;
- In case there are realignments during the implementation of the project and private parcels of land are affected, valuation should be undertaken and the affected persons are compensated accordingly.

### **Significance Rating**

The impact can be described as moderate and short term. However, with mitigation measures the impact will be low.

### **7.8.3 Impacts of obtaining construction materials**

The project will require some amount of materials for construction of project related infrastructure. Staff offices will be built at the site as well as other infrastructures. The project will require quarries to obtain rocks and stones for building works. These need to be sited, accessed, operated and closed to minimize impacts on land users and avoid the creation of safety or health hazards (e.g. steep slopes, malarial ponds). The project will also require sand. Sand mining from rivers is associated with habitat destruction due to changes in channel morphology.

Opening up of quarries to obtain building materials has various impacts which are long term in nature. With mitigation measures, the significance of the impacts will be reduced to low.

Project phase	Impact: Impacts of obtaining construction materials						
	Activity	Probability	Duration	Scale	Magnitude/ Severity	Significance	
						WOM	MM

Construction	Opening up of quarries to obtain aggregates and soil Delivery of materials to the site leading to air pollution.  Health and safety issues from the quarries (Mosquitoes and drowning)	Probable (WOM)  Probable (WM)	Long term	Local	low	Moderate	Low
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WOM = without mitigation measures. WM = With mitigation measures

### **Mitigation Measures**

- Maximize the re-use of excavated materials in the works, as fill.
- Site quarries and borrow pits carefully so as to minimize impacts on existing land uses.
- Strip all available topsoil from borrow pits and quarries and store it safely for use in site restoration.
- Close all borrow pits and quarries in accordance with an approved plan to maximize their long-term biological productivity (capacity for plant growth) and minimize health and safety hazards.
- Carry out ESIA for quarry site if new quarries are to be opened for purposes of this project

### **7.8.4 Impacts on Businesses and Traffic flow**

Excavation of trenches and the presence of construction vehicles on site will have an impact on businesses and the traffic situation along the roads in Kerugoya and Kutus town. Open trenches and piling of soil along trench lines will restrict access to some business establishments. Equally, closing of roads for trench works may also lead to heavy traffic jams within the town.

### **Significance Rating**

The impact can be described as moderate and short term. However, with mitigation measures the impact will be low. The impact on traffic during the operational phases of the project is negligible.

Project phase	Impact: Impact on Businesses and Traffic flows						
	Activity	Probability	Duration	Scale	Magnitude/ Severity	Significance	
						WOM	MM
Construction	Impact of excavated trenches on businesses	Highly Probable	Short term	Local	Medium	Moderate	Low
	Impact of excavated trenches on traffic	Highly Probable	Short term	Local	Medium	Moderate	Low

WOM = without mitigation measures. WM = With mitigation measures

#### **Mitigation Measures**

- Trenching and laying of pipes should be completed within the planned timeframes to avoid prolonged disruption to businesses
- Provide alternative routes for traffic where total closure of roads is expected during trenching
- Avoid complete closure of roads where trenches are excavated across the road. Partial closure is recommended to allow traffic to flow
- Adequate and appropriate road signs should be erected to warn road users of the construction activities.
- Sensitize drivers on safe driving and working practices
- Avoid transporting materials during periods of peak traffic activity
- No construction vehicle should be allowed outside the demarcated areas on-site.

#### **7.8.5 Site related Oil spills**

During construction, oil spills may result from construction site equipment and storage.

#### **Mitigation Measures**

- The Contractor develop, sensitize workers and display a work instruction for oil spills and leaks from storage tanks for the construction machinery through induction and safety training;
- In case of spillage the Contractor should isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent material and/or other materials approved by the Resident Engineer;
- All vehicles and equipment should be kept in good working order, serviced regularly and stored in an area approved by the Resident Engineer;
- The Contractor should assemble and clearly list the relevant emergency telephone contact numbers for staff, and brief staff on the required procedures.
- All vehicle works should be done in one place to avoid chances of spillage in different parts of the camp.
- The Contractor is supposed to hire a licensed used oil transporter to remove the used oil from the site to avoid spills. Prior to collection the used oil should be stored well and labelled.

#### **7.8.6 Noise pollution**

Significant impacts regarding the noise environment will be expected during the construction phase. The noise will be due to construction activities, excavation equipment, concrete mixers and the transportation of equipment, materials and people. Noise and vibration from construction will be minimal and manageable.

#### **Significance Rating**

Residential areas are not so close to the boundary of the sewage treatment site. The magnitude of the impact at the nearest dwellings is thus rated as being 'low'. The excavation of trenches for trunk sewers lines near residential, institutional and commercial areas may cause disturbance noise. This will be mitigated as appropriate to lower the impacts.

Project phase	Impact: Noise						
	Activity	Probability	Duration	Scale	Magnitude/ Severity	Significance	
						WOM	MM



Construction	Noise Impact associated with construction of the project	Highly Probable (WOM)  Probable (WM)	Short term	Local	Medium (WOM)  Low (WM)	Moderate	Low
Operation	Noise impact associated with monitoring and inspection of the project:	Probable	Long term	Local	Low	Low	Low

### **Mitigation Measures**

- Schedule road traffic movements to normal working hours (08H00 –17H00).
- All equipment and vehicles on the site should be equipped with noise suppressing measures and kept in proper working order.
- Provide personal protection equipment such as ear muffs to workers operating in noisy areas
- Pumps and generators should be stationed far away from areas that are sensitive to noise such hospitals
- Avoid unnecessary hooting and revving of engines

#### **7.8.7Air Pollution**

The expected air pollutants from the proposed Project will include dust, particulate matter and gaseous emissions. Dust will be generated from the excavations, earth moving and materials delivery. Particulate matter will come from dry materials including sand, cement, gravel, murram, etc. Smoke, hydrocarbons and nitrogenous gases will be emitted from machinery exhausts. These will be expected to increase slightly and will be localized hence expected to be experienced within a small radius of less than 100m at the project sites. The dust generated during the construction

period is expected to be a temporal nuisance and will not significantly impact the health of the surrounding communities.

### Significance Rating

Dust from construction operations and emissions from operating machinery are unlikely to affect residents/institutions in any significant way. Risks of dust pollution from rock crushing and from open cuts and earthmoving operations will be controlled by dampening down during dry periods as need may arise. The impact of offensive odors from the WWTP will be low if the project design standards and operating procedures are adhered to. Every significant emission could be mitigated to a significance of low to negligible.

Project phase	Impact: Atmospheric pollution						
	Activity	Probability	Duration	Scale	Magnitude/Severity	Significance	
						WOM	MM
Construction	Dust pollution from earthworks and increased traffic	Highly Probable (WOM) Probable (WM)	Short term	Regional (Local)	Medium	Moderate	Low
Operation	Odors from the release of Hydrogen Sulphide, methane and other gases from WWTP	Probable (WM)	Long term	Local	Low	Moderate	Low

### Mitigation Measures

- Impose speed limits (10 km/h in all areas within the site boundaries).
- Engines for construction vehicles and equipment should be regularly serviced and maintained
- No refuse wastes will be allowed to be burned on the premises or surroundings.
- Spray water on access roads, stockpiles and cleared areas to minimize dust pollution.

- Ensure that no refuse wastes are burnt on the premises or surroundings. Refuse wastes should be removed by an official contractor and dumped at an approved site in compliance with local laws regulations.
- Proper rehabilitation of disturbed areas is required in order to minimize bare patches.
- Transported materials must be done in such a manner that they do not fly or fall off the vehicle by covering or wetting friable materials.
- Sprinkle water before undertaking very dusty operations to reduce dust pollution.
- Provide personal protective equipment gear such as dusk masks to workers who may be working in dusty areas.

### 7.8.8 Occupational Health and Safety impacts

Activities associated with construction such as excavating of trenches, movement of construction vehicles, the use of equipment and the congregation of workers and staff on site increase the risk of injury. Construction activities will also result in access of the area by vehicles delivering materials to the site that may result in accidents/incidents. Work at the proposed site may involve hazards such as accidental falls into open trenches, slippery walkways, working at heights, exposure to energized circuits, and heavy equipment. Work at the project site may also involve entry into confined spaces, including manholes and storage tanks among others. Open trenches and excavations may pose risks to the public and lead to injury or death.

### Significance Rating

Most health and safety impacts during construction will be concentrated along the project site and will be short term in nature. The significance of the impacts will be low with implementation of appropriate mitigation measures. Health and safety impacts during the operation phase will also be of low magnitude and significance with appropriate training and mitigation measures.

Project phase	Impact: Health, Safety and fire hazards						
	Activity	Probability	Duration	Scale	Magnitude/ Severity	Significance	
						WOM	MM

Construction	Construction activities – increased risk of accidents.	Highly Probable (WOM)  Probable (WM)	Medium term	Site	High (WOM)  Medium (WM)	Moderate	Low
Operational	Handling and Treatment of sewage (Chemical & physical hazards)	Highly Probable (WOM)  Probable (WM)	Long term	Site	High (WOM)  Medium (WM)	Moderate	Low
Construction and operation	Fire hazards	Highly Probable (WOM)  Probable (WM)	Long Term	site	High	Moderate	Low

### **Mitigation Measures**

- The Contractor shall conform to all the stipulations of the Occupational Health and Safety Act, 2007. The Act requires the designation of a Health and Safety representative when more than 20 employees are deployed.
- The contractor shall provide ample warning signs, guard rails, warning tape, etc., around open excavations, stacks of material, debris, etc. and shall be held liable for all claims as a result of neglect of such precautions and provisions.
- Proper access control should be enforced to ensure that no unauthorised persons enter the site.
- Construction vehicles should be under the control of competent personnel. Ensure that persons handling equipment and materials are suitably trained, supervised and adequately instructed.

- Ensure that the contact details of the police or Security Company, fire brigade and ambulance services are available on site.
- Ensure the welfare of workers is taken care of by providing sanitary facilities at construction sites and potable drinking water
- Report and record health, safety and environmental incidences as required by law

### 7.8.9 Soil and water Contamination

Fuel spillage from storage and refueling of construction vehicles and Water pollution from inadequate sanitation facilities at the project site may contaminate soil, surface and ground water resources. The location of stockpiled or excavated soil material must be done in such a way as to prevent siltation of drainage systems. The magnitude of the impact is rated as medium, because although the affected environment will be altered it will still be able to function in a modified way. The duration will be medium term, but can be mitigated by direct human action. The impact has a high probability of occurrence in the absence of any mitigation measures. The mitigation efficiency will however be effective in reducing the impact significance to low.

#### Significance Rating

The above-mentioned impacts have a regional extent during the operational phase as well as medium severity. Even though they can be mitigated, probability of occurrence has been rated as low – there still is a probability that it may occur in the absence of appropriate mitigation measures, rendering this impact moderate. Mitigation measures proposed will however reduce the impact to low.

Project phase	Impact: Soil and water quality						
	Activity	Probability	Duration	Scale	Magnitude/ Severity	Significance	
						WOM	MM
Construction	Sedimentation of drainage systems	Highly Probable (WOM) Probable (WM)	Medium term	Regional	Medium	Moderate	Low

	Fuel spillage from storage and refueling of construction vehicles	Highly probable (WOM) Improbable (WM)	Medium term	Local	Medium	Moderate	Low
Operational	Leakages and overflows of sewage may contaminate water resources and soils	Highly Probable (WOM) Probable (WM)	Short term	Local	Medium	Moderate	Low
	Use of improperly treated sludge cake as manure	Highly Probable (WOM) Probable (WM)	Short term	Local	Medium	Moderate	Low

WOM = Without mitigation measures. WM = With mitigation measures

### **Mitigation Measures**

- Bins containing organic solvents such as paint and thinners shall not be cleaned on site, unless containers for liquid waste disposal are placed for this purpose on site.
- Construction vehicles and machines must be maintained properly to ensure that oil spillages are kept at a minimum. Oil residue shall be treated with oil absorbent and removed to an approved waste site. Spill kits must be easily accessible and workers must undergo training in the use thereof.
- Conduct an environmental education program to reinforce sound environmental principles with regard to littering and water pollution for construction workers

- All such materials, fuels and chemicals must be stored in a specific and secured area to prevent pollution from spillages and leakages. The basic NEMA regulations of hazardous waste management must be applied fully.
- Spill trays must be provided if refuelling of construction vehicles is done on site.

#### **7.8.10 Solid Waste generation**

Construction will result in the creation of various solid wastes, principally surplus earth and rock, metal scraps, plastics (wrappings and containers), cardboard, paper, wood, office wastes including e.g. used toner cartridges, kitchen wastes, workshop wastes including e.g. used oil filters, and waste concrete; various liquid wastes including used oils and solvents and runoff from camp. The project will also involve the use of stationary and mobile plant and equipment requiring refueling, mainly with diesel, and the construction of permanent and temporary fuel storage. During the operation phase solid wastes will be generated from site offices and from suspended solid wastes trapped at the primary screening stage.

#### **Significance rating**

Solid wastes from excavation and trenching works, construction camp and oil spills from construction vehicles and machinery will lead to short term impacts whose significance can be reduced to low with implementation of appropriate mitigation measures. It is also expected that solid wastes suspended in raw sewage will be transported to the site and collected at the inlet. The significance of this impact has been rated as low with mitigation measures.

Project phase	Impact: Waste generation						
	Activity	Probability	Duration	Scale	Magnitude/Severity	Significance	
						WOM	MM

Construction	Solid waste from site offices	Highly Probable	Short term	Local	Moderate	Low	Low
	Soil from excavation and trenching works	Highly Probable					
	Oil spills from construction vehicles	Probable					
Operation	Solid wastes in raw sewage	Probable (WOM) Probable (WM)	Long term	Local	Low	Low	Low

#### **Mitigation Measures**

- Design and implement formal Site Waste Management Plan.
- Collect and dispose solid wastes appropriately at designated dumpsites
- Organic wastes from construction camps can be composted
- Provide pit latrines at the camp or portable toilets at construction sites for use by workers
- Apply best practice and Standard Operating Procedures (SOPs) to minimize risk of spills and leakages (including secondary containment of fuel stores, vehicle maintenance on concrete pads with oil and grease traps, avoidance of refuelling within 25 m of watercourses, etc.).
- Ensure spill kits and containment systems are available at site and in vehicles.
- Train staff in use of spill kits in emergency procedures

#### **7.8.11 Biodiversity Loss**

The sewerage pipeline network mainly passes along the valleys and road reserves. These areas are mainly covered with grass, planted trees and agricultural crops. Wild animals do not exist in these areas except various species of livestock kept by farmers. The impact on fauna and flora is therefore low since domestic animals are confined into farms and homesteads while birds' and insects are free ranging and can move to other areas.



### Significance Rating

The construction phase has a definite probability on a site extent, leading to a moderate impact. The probability of occurrence has been rated as definite and the severity is moderate as the area is only covered by planted trees, grass and short vegetation. Mitigation measures would lower the significance of the activity to such an extent that it can be classified as low significance. The impact of sewage overflows on fauna and flora can be described as moderate but with mitigation measures it can be turned into low.

Project phase	Biodiversity Impact						
	Activity	Probability	Duration	Scale	Magnitude/ Severity	Significance	
						WOM	MM
Construction	Clearance and excavation of site.	Definite (WOM)  Definite (WM)	Permanent	Site	Moderate	Moderate	Low
Operation	Sewage overflows	Probable	Short term	Local	Moderate	Moderate	Low

### Mitigation Measures

- Felling of trees and grass shall be restricted to the project alignment area.
- Construction teams and machinery should not be allowed outside the project alignment areas.

### 7.8.12 Visual impact

The assessment of the various landscape impacts has indicated that the most significant impacts will occur during the construction phase of the development. Major and minor earthworks will take place to ensure site preparation; which will entail the removal of the existing vegetation and soil cover. Trenching, excavations, material stockpiles, site offices, construction camps and construction equipment will be present on site, which could give the sites a disordered feel. Visual intrusion will be high within the Kerugoya –Kutus town with the excavation of trenches and piling of soils along the streets.

### Significance Rating

The visual impact created during the construction phase will be high to moderate. The visual impact can be reduced to moderate or low if the construction works are completed in time to allow for cleaning and restoration of disturbed areas. Construction of waste water stabilization ponds at the treatment plant will have a permanent visual impact but this could be moderated through landscaping and re-vegetating of exposed areas.

Project phase	Visual Impacts						
	Activity	Probability	Duration	Scale	Magnitude / Severity	Significance	
						WOM	MM
Construction	Removal of vegetation along trunk sewer lines	Highly Probable	Medium	Site	Low	Medium	Low
	Trenching	Highly Probable	Short term	Site	Low	Medium	Low
	Removal of vegetation & excavation / removal of soil at WWTP site	Definite	Permanent	site	Medium	Medium	Low

### Mitigation Measures

- If practically possible, construction camps should be located in already disturbed areas or where it isn't necessary to remove established vegetation (e.g. naturally bare areas).
- Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance.
- Rehabilitate or vegetate disturbed areas as soon as practically possible after construction. This should be done to restrict long stages of exposed soil and possible erosion that will result in indirect landscape and visual impacts
- All project facilities, fences and sign boards should be painted with a muted earth toned colour that will blend with the background colour of the vegetation.

### 7.8.13 Displacement of people and loss of property

It is expected that the construction of sewerage pipeline network will lead to loss of crops, trees and other assets. It is the responsibility of the proponent and the consultant to map and undertake a detailed valuation of property or assets likely to be affected before commencement of the project. The consultant shall appoint a team comprising of a qualified valuer, a sociologist and local administration to conduct the valuation. Project affected persons must be engaged in meaningful negotiations by the client to arrive at agreeable terms of compensation.

#### Significance Rating

The significance of this impact may be described as high without mitigation measures. But with adequate mitigation measures the impact will be turned to moderate or low. The impact will be confined to the project catchment areas.

Project phase	Impact: Displacement and damage to property						
	Activity	Probability	Duration	Scale	Magnitude/ Severity	Significance	
						WOM	MM
Construction Phase	Loss of land	Highly probable	Long Term	Local	Medium (WOM) Low (WM)	High	Moderate
	Damage to property	Definite	Short Term	Local	Medium (WOM) Low (WM)	High	Moderate

WOM = Without mitigation measures. WM = With mitigation measures

#### Mitigation Measures

- The consultant shall map and undertake a detailed valuation of property that is likely to be lost or damaged to serve as basis for compensation.
- Prepare a detailed report on compensation which shall be made public to avoid corruption and unfairness. Such a report shall contain the list of the PAP, property affected, terms and rates of compensation among other details.
- Constitute a grievance redress mechanism comprising of the client (TWWDA), community representatives, officials from the ministry of lands, local administration among others
- Compensation for loss of land or property should be done promptly and should be based on market rates.
- Resettlement and compensation should be implemented in accordance to National and International guidelines

#### 7.8.14 Socio-Economic Impact

Both positive and negative social impacts were assessed. Categories investigated included:

- Health and social well-being
- Gender impacts

The proposed project has the potential to have a significant positive social impact in the region, but to realize this potential it should be managed carefully. This positive social impact must be balanced with the other potential significant impacts to ensure that the development is sustainable and done in a responsible way. A project of this magnitude will have both positive and negative impacts on the socio-economic character of the project area.

#### Significance Rating

This positive social impact must be balanced with the other potential significant impacts to ensure that the development is sustainable and done in a responsible way. There will be some negative localized social impacts which can be mitigated with different degrees of success.

Project phase	Impact: Socio-Economic						
	Activity	Probability	Duration	Scale	Magnitude/ Severity	Significance	
						WOM	MM
Construction	Impacts of project on employment creation	Definite	Long Term	Local	High	High +	High +
	Impacts of project on gender equity and relations	Highly probable	Long term	Local	Medium	Moderate	Moderate
	Increase HIV/AIDS prevalence	Definite	Long term	Local	Medium (WOM) Low (WM)	High	Moderate

#### Mitigation Measures

##### a. Employment

- Facilitate effective communication to affected communities to ensure that the expectations for job creation do not outweigh actual job availability.

- Set up labour policies and recruitment procedures and make these known publicly.
- Set up a labour office for job seekers to register and their details to be placed on a database.
- Contractors should be expected to provide on-the-job training to local labour in order to up-grade existing skills.

b. Gender impacts

- Employment agencies and employers should give attention to gender distribution in employment and ensure that women get an equitable share of the opportunities.
- The project implementers should ensure an equitable share of work for women and that their employment rights are upheld within the workplace.

c. HIV/AIDS impacts

- Establish and implement an HIV/AIDS prevention programme specifically related to the project's construction phase. The programme should include, at a minimum, the identification of specific risk groups (e.g. bar workers, truck drivers).

### **7.8.15 Interruption of existing infrastructure**

There are various installations that will be crossed, move in or move along installations among them

- Roads both main roads and feeder roads in the towns and estates
- Underground utilities e.g. electricity and water lines with the estates
- Fences and temporal structures along the main roads

These services are critical and have implications with spillover effects on the social and economic performance.

### **Mitigation Measures**

- Formal request for permission to cross, break in and lay the pipelines should be sought from affected property owners; and
- A work plan with clear responsibilities for each party should be developed to ensure smooth execution of the construction.

## **7.9 Negative environmental Impacts during Operation Phase**

### **7.9.1 Impacts on Odour, Flies and Mosquitoes**

Potential odor emissions from the sewerage system would be the main concern during the operation phase. The most common nuisances caused by poor maintenance of wastewater stabilization ponds are odor, flies and mosquitoes.

### **Mitigation measures**

The volumetric BOD loading should lie between 100-400 g/m<sup>3</sup> in order to maintain anaerobic conditions and at the same time control odor release. To reduce odor, flies and mosquitoes, routine maintenance tasks must be attended to punctually.

This involves the following:

- Removal of screenings and grit from the inlet system to reduce blockage.
- Regular cutting and disposal of grass and other herbaceous plants.
- Removal of floating scum and floating macrophytes from the pond surface.
- Removal of accumulated debris and other solids at the inlets and outlets.
- Repair of embankment which are eroded by rainfall or damaged by rodents and livestock grazing.
- Destruction and expulsion of burrowing animals and their nests in the embankment walls
- Explore the use of modern technology systems such as bio-filters and chemical scrubbers to control odours

### **7.9.2 Leaks and Bursts**

During the project duration there may be leaks and bursts caused by various reasons such as blockages due to sand and solid waste, illegal connections, among others

### **Mitigation Measures**

- A program of leak detection to be put in place to identify aging pipes for replacement to avoid major bursts and frequent repairs.
- Leaks and pipe bursts to be promptly repaired to avoid leakage of untreated waste water into the environment.

### **7.9.3 Exposure to chemical hazards**

### **Mitigation Measures**

- Train operators in safe handling of waste water treatment chemicals and emergency response procedures

- Provide appropriate personal protective equipment for use by workers
- Install safety showers and eye wash stations near areas where hazardous chemicals are stored or used

#### **7.9.4 Physical hazards**

##### **Mitigation Measures**

- Erect perimeter fence around waste water treatment facilities to restrict access and prevent physical injuries from people and animals
- Post security guards to secure the site.
- Provide emergency rescue facilities such rescue buoys and throw bags and train workers on how to use them in case of an emergency
- Provide adequate security lighting around the waste water treatment ponds

#### **7.9.5 Air Pollution**

The expected air pollutants from the proposed Project will include dust, particulate matter and gaseous emissions. Dust will be generated from the excavations, earth moving and materials delivery. Particulate matter will come from dry materials including sand, cement, gravel, murram, etc. Smoke, hydrocarbons and nitrogenous gases will be emitted from machinery exhausts. These will be expected to increase slightly and will be localized hence expected to be experienced within a small radius of less than 100m at the project sites. The dust generated during the construction period is expected to be a temporal nuisance and will not significantly impact the health of the surrounding communities.

##### **Mitigation Measures**

- An effective air quality management programme should be compiled for the operations.
- Cover sludge processing facilities and store dewatered sludge at appropriate sites to avoid to reduce the impact of odours
- Odours can be minimized by designing sewers with sufficient slope to maintain flow velocities adequate to prevent solids deposition,
- Hydraulic detention times in pipes and wet wells should be minimized
- Reduce turbulence by minimizing the use of drop manholes
- Provide buffer areas around the WWTP planted with trees

- Maintaining proper operations and maintenance practices such as sewer inspections and management to avoid odours.

### **7.9.6 Soil and water Contamination**

Leakages of sewage from cracked pipes and broken manholes may contaminate soil and local water bodies. The use of improperly treated sludge may also contaminate soils and water resources.

## **7.10 Negative Impacts of decommissioning**

### **7.10.1 Loss of jobs and income**

The people that will be employed to operate and maintain the water supply system will lose their jobs immediately after the closure of the project. The loss of jobs will have far reaching impacts as it will lead to loss of income and social stress.

#### **Mitigation measures include:**

- Notify the employees in advance on the project closure date and adequately compensate them;
- Dismissal procedures to be compliant with Employment Act, 2007;
- Provide counselling & alternative skills for alternative activities;
- Employer should find alternative means of livelihood for the staff who were employed at the solar power plant.

### **7.10.2 Noise Pollution**

Activities likely to produce noise during decommissioning include demolition of structures and excavation of pipeline works and structures at the intake areas as well as any staff offices and quarters built on site.

#### **Mitigation measures:**

- Schedule noisy activities during the day time period;
- Use silencers on machines where possible;
- Ensure machinery is well maintained to reduce noise emitted.

### **7.10.3 Solid Waste Material**

It is expected that large amounts of solid waste material arising during decommissioning will include: glass panels, stones, pipes, wood, metal, paper, plastic, equipment, vegetation, etc. The proper disposal of these materials is critical.



Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment.

**Mitigation measures:**

- Disposal of solid waste in compliance with EMCA 2006 Waste Management Regulations;
- Segregation of waste to encourage reuse and recycling;
- Ensuring that the contracted waste collector is registered with NEMA to collect and dispose wastes.

**7.10.4 Occupational health and safety**

If not handled with care the demolition may lead to exposure of raw sewage to the workers and surrounding communities which poses as health risks to them.

Machinery and equipment used for the same also poses as danger to the workers if not handled well and with the correct PPE.

**Mitigation measures:**

- Provide the correct PPE for the workers when conducting the demolition activities;
- Conduct training on health and safety procedures to the workers prior to commencement of demolition;
- Proper plans should be made prior to demolition so as to contain the raw sewage and other waste water that poses as health risk to human beings and the environment, to prevent the workers and surrounding communities from getting into contact with it.

**7.10.5 Noise and vibration**

The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas. This will be mitigated by the following measures:

- Ensure scheduled demolition timing is observed;
- Contractor to give timely prior information to stakeholders and neighbouring institutions

**7.10.6 Interference with private property**

- Project team should communicate with locals if activities will involve entering private property to avoid conflicts and destruction of property.

## **CHAPTER 8: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)**

### **8.1 Introduction**

The purpose of the ESMP is to ensure that environmental and social impacts and risks identified during the ESIA review are effectively managed during the construction, operation and decommissioning of the proposed project. The ESMP specifies the mitigation and management measures for each impact/ risk, party allocated responsibility, means of monitoring and frequency, objective verifiable indicators and an indicative budget.

The project proponent shall avail this ESMP to the successful contractor awarded the tender for construction work for this project. The contractor will be required to formulate a more specific ESMP and work methods that will ensure construction of the project in compliance with established standards and legislation. The contractor will factor the costs of implementing the ESMP into their budget. The project proponent will take the necessary steps to ensure that the ESMP is fully implemented.

### **8.2 Purpose and Objectives of ESMP**

The specific objectives of the ESMP are to:

- Serve as a commitment and reference for the contractor to implement the ESMP
- Serve as a guiding document for the environmental and social monitoring activities for the supervising consultant, contractor and the client management including requisite progress reports.
- Provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment.

Provide instructions to relevant project personnel regarding procedures for protecting the environment and minimizing environmental effects, thereby supporting the project goal of minimal or zero incidents.

- Document environmental concerns and appropriate protection measures; while ensuring that corrective actions are completed in a timely manner.

### **8.3 Capacity Building**

Capacity building during the project will be conducted for project staff/ construction workers and the local community. The contractor is responsible for ensuring that workers are provided Health Safety and Environment (HSE) training as stipulated in legislation. A training register should be

kept on site for all training conducted as proof for auditing purposes. Training of the construction work-force will include the following content as a minimum;

- The significance of the site HSE policy
- The pertinent HSE issues of the project activities;
- Roles and responsibilities towards conforming with the ESMMP and the HSE policy and procedures
- Potential consequences of departure from specified operating procedures
- Corrective measures to be undertaken as a consequence of non-compliance

The contractor in-collaboration with the proponent will conduct community sensitization on various social issues that include;

- HIV/ AIDS awareness (i.e. transmission, prevention, counselling, treatment)
- Prevention and treatment of other sexually transmitted infections
- Environmental conservation and ecosystem protection
- Access and safety around the project construction site

## ENVIRONMENTAL AND SOCIALMANAGEMENT PLAN(ESMP)

**Table 8-1: Pre-Construction and construction Phase Environmental and Social Management Monitoring plan**

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
Pre- Construction Phase				
Delay in Implementation of the Project due to objections and stop orders	<ul style="list-style-type: none"> <li>The Proponent and the Contractor shall ensure that all pertinent permits, certificates and licenses have been obtained prior to any activities commencing on site and are strictly enforced/ adhered to;</li> <li>The Proponent and the Contractor shall maintain a database of all pertinent permits and licenses required for the contract as a whole and for pertinent activities for the duration of the contract.</li> </ul>	Contractor and proponent	Permits and licenses available	500,000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
<b>Risks of Environmental degradation</b>	<ul style="list-style-type: none"> <li>• The Contractor shall be aware of the environmental requirements and constraints on construction activities contained in the provisions of the ESMMP.</li> <li>• The Contractor will be required to provide for the appropriate Environmental Training and Awareness as described in this ESMMP in his costs and programming.</li> <li>• Environmental awareness training session shall be held prior to any work commencing on site, with the target audience being all project affected persons.</li> </ul>	Contractor	Number of training done	200,000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
<b>Risks of Increased HIV and AIDS Transmission in the Area</b>	<ul style="list-style-type: none"> <li>The Contractor shall institute HIV/AIDS awareness and prevention campaign amongst his workers for the duration of the contract, &amp; contracting organization, with preference for an organization already working on this issue in the project area.</li> <li>The Contractor's Camp layout shall consider availability of access for deliveries and services and any future works.</li> <li>The campaign shall include the training of facilitators within the workers, information posters in more frequented areas in the campsite and public areas,</li> </ul>	Contractor	No of awareness meetings done	50,000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	availability of promotional material, availability of condoms (free)			
<b>Delay in Project Implementation due to Opposition from Aggrieved Community Members</b>	<ul style="list-style-type: none"> <li>• The Contractor shall use local labor, and women must be encouraged to be involved in construction work.</li> <li>• The contractor shall ensure compliance to the gender balance as required by the 2/3 gender rule.</li> <li>• Contractor to hire community liaison officers who will act as a link between the community and contractor.</li> <li>• Identification and engagement of all stakeholders to be undertaken.</li> </ul>	Contractor	Number of grievances recorded	100,000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<ul style="list-style-type: none"> <li>A working Grievance Redress Mechanism to be established before commencement of works.</li> </ul>			
Construction Phase				
Impacts of obtaining construction materials	<ul style="list-style-type: none"> <li>Strip and stockpile topsoil from borrow pits and quarries for use in site restoration</li> <li>Close all borrow pits and quarries in accordance with an approved plan to maximize future use and minimize health hazards</li> <li>Re-use excavated materials from the works as fill</li> </ul>	Contractor	-Environmental status of reinstated burrow pits --Complains from the community on burrow pits and material transportation - Restoration or improvement order from NEMA	300,000
Impact on business and traffic flow	<ul style="list-style-type: none"> <li>Sensitize drivers on safe driving and working practices</li> </ul>	Contractor		20,000



Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<ul style="list-style-type: none"> <li>• Avoid transporting materials during periods of peak traffic activity</li> <li>Trenching and laying of pipes should be completed within the planned time frames to avoid prolonged disruption to businesses</li> <li>• Provide alternative routes for traffic where total closure of roads is expected during trenching</li> <li>• Erect appropriate road signs to warn road users of the construction activities</li> <li>• Provide temporary bridges over open trenches to facilitate access to businesses</li> </ul>			
Air Pollution (Exhaust emissions from vehicles and dust)	<ul style="list-style-type: none"> <li>• Service and maintain machinery according to manufacturer's instructions to improve fuel combustion and reduce exhaust emission to the atmosphere.</li> </ul>	Contractor	Number of incidences of Environment pollution around the plant	400,000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<ul style="list-style-type: none"> <li>• Spray water on access roads, stockpiles and cleared areas to minimize dust pollution Cover all vehicle ferrying construction materials such as sand or aggregate to avoid dispersal of particles /dust along the roads</li> <li>• Provide personal protective equipment gear such as dust masks to workers who may be exposed to excess dust</li> <li>• Impose vehicle speed limits to 10Km/h in all areas within the site boundaries</li> <li>• Avoid open air burning of wastes at the site</li> <li>• Avoid open air burning of wastes at the site</li> </ul>			
Soil erosion and contamination	<ul style="list-style-type: none"> <li>• Vegetation should only be removed from clearly marked areas</li> </ul>	Contractor	Soil erosion extend and intensity on site Soil conservation measures	100.000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<ul style="list-style-type: none"> <li>• Earthworks should be carried out during the dry season to prevent soil from being washed by rain</li> <li>• Excavated materials and stockpiled soils should be covered or kept at appropriate sites</li> <li>• Undertake appropriate soil erosion control measures along the trenches</li> <li>• Construction vehicles and machines must be maintained properly to ensure that oil spillages are kept at a minimum</li> <li>• Spill trays must be provided if refuelling of construction vehicles is done on site</li> <li>• Materials, fuels and chemicals must be stored in a specific and secured area to prevent pollution from spillages and leakages</li> <li>• The basic EMCA Regulations on hazardous waste management must be applied fully</li> </ul>			

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<ul style="list-style-type: none"> <li>• Train drivers and workers on oil and fuel management</li> </ul>			
Oil spills	<ul style="list-style-type: none"> <li>• The Contractor develop, sensitize workers and display a work instruction for oil spills and leaks from storage tanks for the construction machinery through induction and safety training;</li> <li>• In case of spillage the Contractor should isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent material and/or other materials approved by the Resident Engineer;</li> <li>• All vehicles and equipment should be kept in good working order, serviced regularly and stored in an area approved by the Resident Engineer;</li> <li>• The Contractor should assemble and clearly list the relevant emergency</li> </ul>	Contractor	Number of sensitizations for workers	10,000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<p>telephone contact numbers for staff, and brief staff on the required procedures.</p> <ul style="list-style-type: none"> <li>• All vehicle works should be done in one place to avoid chances of spillage in different parts of the camp.</li> <li>• The Contractor is supposed to hire a licensed used oil transporter to remove the used oil from the site to avoid spills. Prior to collection the used oil should be stored well and labelled.</li> </ul>			
Noise Pollution	<ul style="list-style-type: none"> <li>• Schedule road traffic movements to normal working hours(08H00-17H00)</li> <li>• Noisy equipment and vehicles on the site should be equipped with noise suppressing measures and kept in working conditions</li> <li>• Provide personal protection equipment such as ear muffs to workers operating in noisy areas</li> </ul>	Contractor	Reported complaints from neighbor community and institutions	30,000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<ul style="list-style-type: none"> <li>• Pumps and generators should be stationed far away from areas that are sensitive to noise such as hospitals</li> <li>• Switch off engines when vehicles or machines are not in use</li> </ul>			
Solid Waste	<ul style="list-style-type: none"> <li>• Develop a waste Management Plan to guide the handling, storage, transport and disposal of solid and hazardous wastes in compliance with solid waste regulations 2006</li> <li>• Recycle or re-use solid wastes where applicable in line with sound environmental management practices</li> <li>• Dispose of non-recycled wastes designated by Kirinyaga County Government as dumpsites</li> <li>• Organic wastes from construction camps can be composited</li> </ul>	Contractor	Number of complaints from community not happy with waste management of the contractor	10,000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
Surface and ground water contamination	<ul style="list-style-type: none"> <li>• Construct oil –water interceptors or sumps to capture discharge of oils, fuels and other polluting liquids</li> <li>• Provide pit latrines/portable toilets at the camp construction sites for use by workers</li> <li>• Store all raw materials away from the vicinity of water bodies along the project sites to avoid contamination</li> <li>• Sensitize workers not to dump waste generated from camps and construction sites into rivers</li> </ul>	Contractor	Water quality tests	50,000
Occupational safety and Health	<ul style="list-style-type: none"> <li>• The contractor shall conform to all the requirements of the Occupational Health and Safety Act,2007.</li> <li>• Recruit safety and health personnel to develop and implement OSH plan</li> <li>• The contractor shall provide ample warning signs and protection around open excavations, stacks of material,</li> </ul>	Contractor	-Accidents Occurrence incidences - Cases of respiratory complication at nearby health center	20,000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<p>etc. and shall be held liable for all claims as a result of neglect of such precautions and provisions</p> <ul style="list-style-type: none"> <li>• Restrict and control unauthorized access into construction sites to prevent accidents and injuries</li> <li>• Train workers on the use of firefighting equipment and first aid</li> <li>• Ensure that persons handling equipment and materials are suitably trained, and supervised</li> <li>• Ensure that emergency contact numbers of the police, fire brigade and ambulance are available at the construction sites.</li> <li>• Provide sanitary facilities at construction sites and portable drinking water</li> </ul>			



Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<ul style="list-style-type: none"> <li>Report and record health, safety and environmental incidences are required by law</li> </ul>			
Damage to existing underground infrastructures	<ul style="list-style-type: none"> <li>Obtain maps of existing underground infrastructure from relevant institutions to avoid damaging them.</li> <li>Locate, mark and exercise caution when excavating trenches to minimize chances of damaging such infrastructure</li> <li>Notify responsible institutions of any damage to ensure that services are restored within the shortest time possible.</li> </ul>	Contractor, KICOWASCO PLC, KPLC and others	Number of complaints from community due to lack of certain services	200,000
Displacement of people and damage to property	<ul style="list-style-type: none"> <li>Undertake a detailed valuation of property likely to be lost or damaged and prepare report on compensation before project commencement.</li> <li>Compensation for loss of land or property should be done promptly and should be based on market rates</li> </ul>	TWWDA, KICOWASCO PLC, consultant, County Government of Kirinyaga	RAP report	To be determined

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<ul style="list-style-type: none"> <li>Constitute a grievance redress mechanism comprising of representatives of all stakeholders</li> <li>Resettlement and compensation should be implemented in accordance to National and International guidelines</li> </ul>			
Socio-economic impact	<ul style="list-style-type: none"> <li>Give priority to locals when hiring workers for the project</li> <li>Ensure gender balance in employment as far as possible</li> <li>Implement HIV/AIDS and STD awareness and prevention programme for workers and local residents targeting risk groups</li> <li>Constitute a committee to handle social conflicts related to the project</li> </ul>	Contractor/TWWDA	Employment register --No of sensitization meetings	50,000
Biodiversity loss	<ul style="list-style-type: none"> <li>Felling of trees and grass shall be restricted to the project alignment area.</li> </ul>	Contractor	Number of trees cut	5000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<ul style="list-style-type: none"> <li>Construction teams and machinery should not be allowed outside the project alignment areas.</li> </ul>			
Visual Impact	<ul style="list-style-type: none"> <li>Vegetation clearance should be restricted and confined to marked workstations</li> <li>Rehabilitate all disturbed areas by back filling and planting appropriate trees and grasses</li> <li>Establish access roads for use to avoid unnecessary trampling of vegetation outside work areas</li> </ul>	Contractor	No of trees planted	50,000
Total cost				<b>1,230,000</b>

**Table 8-2: Operation Phase Environmental and Social Management Plan**

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
<b>Impacts on Odor, Flies and Mosquitoes</b>	<ul style="list-style-type: none"> <li>• Removal of screenings and grit from the inlet system to reduce blockage.</li> <li>• Regular cutting and disposal of grass and other herbaceous plants.</li> <li>• Removal of floating scum and floating macrophytes from the pond surface.</li> <li>• Removal of accumulated debris and other solids at the inlets and outlets.</li> <li>• Repair of embankment which are eroded by rainfall or damaged by rodents and livestock grazing.</li> <li>• Destruction and expulsion of burrowing animals and their nests in the embankment walls</li> <li>• Explore the use of modern technology systems such as bio-filters and chemical scrubbers to control odours</li> </ul>	KICOWASCO PLC	Inspection reports	50,000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
<b>Leaks and Bursts</b>	<ul style="list-style-type: none"> <li>• A program of leak detection to be put in place to identify aging pipes for replacement to avoid major bursts and frequent repairs.</li> <li>• Leaks and pipe bursts to be promptly repaired to avoid leakage of untreated waste water into the environment.</li> </ul>	KICOWASCO PLC	Evidence of leaks	20,000
<b>Exposure to chemical hazards</b>	<ul style="list-style-type: none"> <li>• Train operators in safe handling of waste water treatment chemicals and emergency response procedures</li> <li>• Provide appropriate personal protective equipment for use by workers</li> <li>• Install safety showers and eye wash stations near areas where hazardous chemicals are stored or used</li> </ul>	KICOWASCO PLC	Training reports Number of PPEs	100,000
<b>Physical hazards</b>	<ul style="list-style-type: none"> <li>• Erect perimeter fence around waste water treatment facilities to restrict access and prevent physical injuries from people and animals</li> <li>• Post security guards to secure the site.</li> </ul>	Contractor	Number of security personnel	500.000

Potential Impact	Mitigation measures	Responsibility	Monitoring Indicator	Cost (KES)
	<ul style="list-style-type: none"> <li>• Provide emergency rescue facilities such rescue buoys and throw bags and train workers on how to use them in case of an emergency</li> <li>• Provide adequate security lighting around the waste water treatment ponds</li> </ul>			
Impact of improperly treated waste water and sludge	<ul style="list-style-type: none"> <li>• Comply with effluent discharge quality standards as stipulated in EMCA Water Quality Regulations 2006.</li> <li>• Sludge intended for agricultural purposes must be properly tested and certified by accredited research institutions before being put into use</li> <li>• Farmers should be trained on how to safely use treated waste water for irrigation in their farms</li> </ul>	KICOWASCO PLC County public health	<ul style="list-style-type: none"> <li>• Evidence of waste water flowing through local drainage channels</li> </ul>	200,000
Total cost				1,230,000

## **8.4 Decommissioning phase Environmental Management Plan**

### **8.4.1 Overview**

Decommissioning is the final phase of a project life-cycle. It is the release of valuable assets such as machinery and sites for alternative use, recycling and reuse of materials and the restoration of environmental amenity. The decommissioning of one or all components of the proposed project will have some effect on the environmental status quo of the project site, either in a positive or in a negative way. It is therefore important that an Environmental and Social Management Plan be drawn before any decommissioning activities are allowed to commence. An ESMP for decommissioning protects the public, the environment and workers from the hazards associated with decommissioning activities

This sub section contains various environmental guidelines which will assist decision makers to take environmentally responsible and sustainable decisions during decommissioning. In this way, the positive aspects of decommissioning may be maximized and the negative aspects minimized or even avoided.

### **8.4.2 General guidelines for decommissioning Planning**

Before commencement of decommissioning activities, the proponent should develop a detailed master plan for decommissioning. Normally social issues are likely to arise during this phase and may include job losses and compensation among others. It is important therefore to appoint a committee, where affected parties can present their grievances and decision taken. A decommissioning master plan will guide on the various activities to ensure environmental protection, enhance safety and health of the public as well as their social interests. Such a plan should contain:

- i) Details of infrastructure, buildings and structures to be retained; alternative uses and further development proposals for retained infrastructure, and structures; infrastructure and structures to be dismantled, removed, sold for recycling and / or disposed of.
- ii) Environmental restoration plan. The dismantling of site facilities and transportation of material may expose the ground, leave open pits and disturb vegetation. Such sites can be restored by backfilling with soil and replanting of grass or trees on disturbed areas.
- iii) Waste Management Plan – A formal site waste management plan should be developed to ensure that both solid and liquid waste is managed in accordance to the existing applicable laws on waste handling and disposal.

- iv) Health & Safety plan that shall be implemented to safeguard the safety, health and welfare of workers and the public. Establish and operate an emergency evacuation procedure for casualties.
- v) Mechanisms for addressing project related social issues
- vi) Take note of any existing regional and national development plans that may be of relevance to the area.
- vii) Take note of any existing regional and national development plans that may be of relevance to the area.



### 8.5 Environmental and Social Management Monitoring Plan

The Environmental and Social Management Plan (ESMP) is designed to make sure that social and environmental risks and impacts that were identified during the ESIA process are successfully managed during the Project's development and operation.

The ESMP details the mitigation and management actions that the applicants and the Contractor are committed to taking, and it demonstrates how the Project will mobilize organizational resources and capacity to put these measures into action.

### 8.6 ESMP Implementation

The ESMP will be administered by the four (4) different institutions (i.e. TWWDA, KICOWASCO PLC, NEMA and the Contractor). The role of NEMA will be to conduct audit visits to ensure that the impacts envisaged under the ESMP are being managed effectively.

**Table 8-3 Roles and Responsibilities**

Party	Roles and Responsibilities
Tana Water works Development Agency (TWWDA)	<ul style="list-style-type: none"><li>• Drafting of comprehensive tender documents that include environmental specifications in the tender specifications</li><li>• Selection of qualified, environmentally conscious contractors</li><li>• Supervision to ensure that objectives of this ESMMP are met</li></ul>
Construction Consultant	<ul style="list-style-type: none"><li>• Ensure that the proposed ESMMP is up to date and is being used by the contractor</li><li>• Conduct periodic audits of the ESMMP to ensure that its performance is as expected</li></ul>
Construction Contractor	<ul style="list-style-type: none"><li>• Ensure compliance environmental specifications of the ESMMP</li><li>• Engage a competent Environment Safety Health and Safety Advisor/officer to advise them on the ESMP compliance;</li><li>• Undertake risk assessments and prepare project specific Construction ESMPs for review and approval.</li></ul>

NEMA	<ul style="list-style-type: none"> <li>• Exercise general supervision and co-ordination over all matters relating to the environment</li> <li>• Conduct periodic visits to ensure that the terms of the project license are being observed.</li> </ul>
Water Resources Authority	<ul style="list-style-type: none"> <li>• Give water permits</li> <li>• Protection of riparian zones</li> </ul>
County Government	<ul style="list-style-type: none"> <li>• The County Governments have powers to control or prohibit all businesses, factories and other activities including new projects which maybe or become a source of danger, discomfort or annoyance to the neighbourhood and to prescribe conditions subject to which such activities shall be carried.</li> </ul>
DOSH	<ul style="list-style-type: none"> <li>• Inspecting workplaces to ensure compliance with safety and health laws, including:</li> <li>• Examination and testing of regulated equipment;</li> <li>• Measurements of workplace pollutants for purposes of their control;</li> <li>• Investigation of occupational accidents and diseases with a view to preventing recurrence;</li> <li>• Medical examinations of workers;</li> <li>• Training on OSH, first aid and fire safety; and</li> <li>• Disseminating information on occupational safety and health to beneficiaries</li> <li>• Workplace registration</li> </ul>
KICOWASCO PLC	<ul style="list-style-type: none"> <li>• Oversee the mainstreaming environmental and social sustainability of the project.</li> <li>• Supervising ESMP implementation by the contractor and responsible for monitoring during project's operation.</li> </ul>

## **8.7 Objectives of Environmental and Social Monitoring**

The overall objective of environmental and social monitoring is to ensure that mitigation measures are implemented and that they are effective. Environmental and social monitoring will also enable response to new and developing issues of concern. The activities and indicators that have been recommended for monitoring are presented in the ESMP.

Environmental monitoring is also carried out to ensure that all construction and operation activities comply and adhere to environmental provisions and standard specifications, so that all mitigation measures are implemented. The contractor shall employ an officer responsible for implementation of social/environmental requirements. This person will maintain regular contact with the proponent's environmentalist and the respective County Environmental Officers. The contractor and proponent's environmentalist have responsibility to ensure that the proposed mitigation measures are properly implemented during the construction phase.

The environmental monitoring program will operate through the construction, and operation phases. It will consist of a number of activities, each with a specific purpose with key indicators and criteria for significance assessment.

Monitoring includes:

- Selection of environmental parameters;
- Visual observations; and
- Regular sampling and test measurements of these parameters.

Periodic on-going monitoring will be required during the life of the Project and the level can be determined once the Project is operational.

Monitoring will be done in three fronts:

- Physical monitoring;
- Biological monitoring; and
- Social monitoring.

## **8.8 Environmental Monitoring**

Environmental monitoring is essential in the project's life span as is conducted to establish if project implementation has complied with set environmental management standards in accordance with applicable legislation and regulations. In this Project, environmental monitoring will be

conducted to ensure that identified potential negative impacts are mitigated during the project's implementation, operation and decommissioning periods.

Environmental concerns, that will be monitored during the project's construction and maintenance period include: water quality, air quality, and occupational health and safety issues.

#### **8.4.1 Monitoring of Occupational Health and Safety issues**

Project activities during the construction and operation phase involve a lot of risks and exposure to hazards. It is therefore important to regularly check and monitor the activities to find out the extent to which the impacts are mitigated and emerging problems are addressed. Table 8-1 presents a monitoring plan of the key issues key and verifiable indicators which will be used to monitor the impacts are presented below.

**Table 9-4: Monitoring of Occupational Health and Safety Issues**

<b>Monitoring Parameters</b>	<b>Responsibility</b>	<b>Monitoring Location(s)</b>	<b>Time/Frequency</b>	<b>Indicators</b>
Condition of machinery and equipment	Contractor, KICOWASCO PLC	At work stations	Weekly	Service, maintenance, repair or replacement records of faulty machines
Accidents, incidents, injuries etc.	Contractor, KICOWASCO PLC	At work stations	Daily	Mitigation/prevention measures in place, PPEs, Records of incidents or accidents, Medical records, Training, First Aid kits; Fire extinguishers
Dust and exhaust emissions	Contractor, KICOWASCO PLC	At work stations	Daily	Health safety measures in place
Noise emissions	Contractor	At work stations	Daily	Noise monitoring records
Sanitation and welfare facilities	Contractor, KICOWASCO PLC	Workers camps, construction sites and site offices	Weekly	Presence of sanitation & welfare facilities

Oil spills and leakages	Contractor	Workers camps and construction sites	Daily	Records of daily inspections
Solid Wastes	Contractor, KICOWASCO PLC	Workers camps, construction sites and site offices	Daily/weekly	Inspection and waste disposal records

### 8.8.2 Waste Water monitoring

Every local authority or person operating a sewage system or operator of any industrial undertaking is required to monitor discharge into the environment as set out in the Fourth Schedule to Water Quality Regulations 2006. Discharge of improperly treated waste water may lead to pollution of ground and surface water. To avoid such occurrences, effluent from waste water treatment plants (WWTP) should be constantly monitored, along with the water quality in the receiving water bodies. Sampling points should be established at the point of effluent discharge from the WWTP and downstream and upstream of the receiving stream.

Waste water monitoring and discharge to the environment should strictly follow guidelines and standards stipulated in the fourth schedule of the Environmental Management and Co-ordination (Water Quality) Regulations 2006.

**Table 9-5: Waste Water Monitoring Plan**

Monitoring Parameters	Responsibility	Monitoring Location(s)	Time/Frequency	Indicators
BOD, Temperature, Total Suspended Solids (TSS), COD, ammonia nitrogen (NH <sub>3</sub> -N), PH and fecal coliform counts	KICOWASCO PLC	Treated water at discharge point from WWTP  Sampling points at Murubara stream	Daily, weekly as required	Quality of water downstream

Industrial effluent (Temperature, COD, BOD5, oils & grease, suspended solids, N, P, pH, sulphates, chlorates, Fe, Cu, Cr, Zn, Ni).	KICOWASCO PLC	Industrial effluent discharge points	Quarterly	Conformity to effluent discharge standards
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#### 8.4.4 Sludge monitoring

Sampling and analysis of sludge content is essential before sludge is put into agricultural use or disposed of. The operator should therefore draft a sampling and analysis plan and identify acceptable and certified laboratories to conduct the analysis. Sludge should be tested for toxicity in order to demonstrate that the sludge or sludge products are not hazardous and that it is suitable for land-based applications. Table 21 shows the monitoring parameters for monitoring and analysis.

**Table 9-6: Sludge Monitoring and Analysis**

Monitoring Parameters	Responsibility	Monitoring Location(s)	Time/Frequency	Indicators
PH, NH <sub>4</sub> , P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O, CaO, MgO, Fe, Mn, Mo, Cd, Cr, Cu, Hg, Ni, NH <sub>4</sub> -N, B, Pb, Zn, PCB	KICOWASCO PLC	At the WWTP	To be determined by the operator	Sludge quality depending on its intended use

#### 8.8.5 Air quality monitoring

Odor emissions from waste water treatment plants are generally of much concern to local communities residing in the vicinity of the project site. Odor development is a process that begins at the point of wastewater discharge from homes and industries. It continues with collection and movement of wastewater in gravity sewers and ends with the actual wastewater treatment, solids handling and disposal at the plant or disposal site.

Careful sampling and analysis of gases to identify and characterize the odors is of necessity towards the control of offensive odors. Odors can be quantified by direct sensory measurement of their concentration and intensity, using the human olfactory sense as the odor detector. Alternatively, chemical analysis of odor constituents could be performed. Portable gas monitoring devices are also available and can be used in monitoring of odors. The main monitoring parameters are hydrogen sulphide and ammonia (Table 22)

**Table 9-7: Air Quality Monitoring**

<b>Monitoring Parameters</b>	<b>Responsibility</b>	<b>Monitoring Location(s)</b>	<b>Time/Frequency</b>	<b>Indicators</b>
Hydrogen Sulphide, Methane, Sulphur dioxide,	KICOWASCO PLC	At the WWTP site	Yearly, or as need arises	Ambient air quality around the WWTP

## 8.9 ESMP Audit

TWWDAs and the contractor shall conduct regular audits to the ESMP to ensure that the system for implementation of the ESMP is operating effectively. The audit shall check that a procedure is in place to ensure that:

- The ESMP being used is the up to date version;
- Variations to the ESMP and non-compliance and corrective action are documented;
- Appropriate environmental training of personnel is undertaken;
- Emergency procedures are in place and effectively communicated to personnel;
- A register of major incidents (spills, injuries, complaints) is in place and other documentation related to the ESMP; and
- Ensure that appropriate corrective and preventive action is taken by the Contractor once instructions have been issued.

## **CHAPTER 9: CONCLUSION AND RECOMMENDATION**

### **9.1 Conclusion**

The assessment and evaluation of the environmental and social impacts of the proposed Kerugoya –Kutus Sewer LMC project by TWWDA has revealed that the project will bring a net environmental, social, health and economic benefits to all living within the Project area and its environs. Additionally, the project has also been found to have adverse impacts that need to be mitigated to make the project environmentally, socially and economically viable throughout its lifespan. Based on the assessment of impacts, the following conclusions can be made;

- i). The proposed project is long overdue considering the increasing population and rising demand for water within the project areas
- ii). The County Government and the communities living within the project area have fully embraced the project.
- iii). The EMSP has allocated the responsibility for costs to offset the negative impacts and enhance the positive impacts of the project on the social and environmental condition of the project area.

### **9.2 Recommendations**

For the negative environmental impacts identified, adequate mitigation measures have been proposed in order to alleviate the expected negative impacts and to make the project environmentally and socially acceptable. An ESMP has been prepared, and it includes: the mitigation plan; the monitoring and enforcement requirements; and the responsible persons/organizations.

All the recommendations/ mitigations mentioned in the study should be financed and incorporated in the construction and supervision contracts as applicable. Strict controls and Supervision of the Contractor will ensure compliance with required mitigation measures.

It is therefore recommended that:

- The Kerugoya-Kutus sewer LMC project design has optimised use of public road reserves as feasible, but where private land or property is affected, a Resettlement Action Plan is recommended to ensure that any project affected person is compensated for the associated loss;



- A monitoring programme should be adhered to during both construction and operation phases. This ESMP has been based on the Kerugoya-Kutus Sewer LMC having been updated from the Kirinyaga County Bulk Water Supply and Sewerage ESIA done in 2017.
- Apply standard best practice site sediment control procedures to minimise sediment in site drainage waters returning to the river;
- Conduct quarterly monitoring of the effluent to ensure compliance with the water quality standards;
- There is need to undertake capacity building for the local communities so as to enable them to competitively exploit opportunities that arise from construction of the project (employment, supplies, etc.) as well as utilization of their resources. Public sensitization on matters of environmental conservation, public health and economic activities will also help improve the living standards of the communities.
- The proponent, construction consultant and the contractor should work together to ensure full implementation of the ESMP for proper enhancement and mitigation of impacts emanating from the project.

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## **APPENDICES**

### **Appendix 1: List of participants**

## **Appendix 2: Minutes of Public Consultations**

### **Appendix 3: Questionnaires**



AFRICAN DEVELOPMENT BANK GROUP

RESETTLEMENT ACTION PLAN (RAP) KEY INFORMANT INTERVIEW  
QUESTIONNAIRE

PROJECT NAME: KERUWOTA-KUTUS LAST SMILE  
WATER CONNECTIVITY.

1. Details of the Respondent

NAME	EDWARD KIMOTHO HJENJA			
POSITION/ORGANISATION	ASSISTANT CHIEF KIAHA			
TELEPHONE NO.	022 880743			
LOCALITY	Village	Location	Sub-County	County
	KIAHA	KAMUKUJI	KICUMU	KIRURU

ASST/CHIEF  
KIANJIGE SUB-LOCATION  
Date: 28/12/2011  
Sign: [Signature]

2. What are your institutional roles in the proposed project area?

Selecting and mobilizing the public  
on importance of the project.

3. Does the organization have existing water supply systems and/or sewer system in the area? If Yes specify

H.O

4. What are the land use practices in the area?

Subsistence farming as there is  
no water for horticulture.

5. Are there challenges faced in the area in regard to water supply? If Yes Specify

Yes. There are no permanent rivers as the streams in the area sometimes dry up.

6. Which River is ideal and sustainable for location of an intake/effluent discharge for the proposed project?

River Thabe

7. a) In your perception/opinion is the project good for the area? YES ☒ NO ☐  
b) If YES, please tick one or many of the following: (positive impacts)

S/No.	Positive Impacts	Tick
1)	Create employment	<input checked="" type="checkbox"/>
2)	It will create access to clean water for consumption	<input checked="" type="checkbox"/>
3)	It will improve livelihood in the area	<input checked="" type="checkbox"/>
4)	Provide market for construction materials	<input checked="" type="checkbox"/>
5)	Reduce water borne diseases	<input checked="" type="checkbox"/>
6)	Any other that is not mentioned above; - - -	

- 7) In your opinion, which Negative Impacts will possibly arise from the proposed project and suggest possible mitigation measures

During its initiation we may have some shelters destroyed or even trees cut which might be on the line.



- 8) Do you foresee any conflict with the proposed project and other community projects in the area ? If Yes recommend methods for conflict resolution

yes public participation is not done especially where people have encroached on the road.

- 9) In your opinion/perfection will there be willingness by the community to pay water company for one time connection?

yes if the water will be there.

- 10) Is the one time connection fee paid to water company manageable to the users?

yes.

- 11) Are there any culturally sensitive sites within the proposed project area? If yes specify

No.

- 12) Are there any environmentally sensitive sites within the proposed project area? If yes specify

No.

- 13) Do you have any other comment about the proposed project?

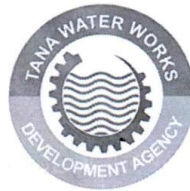
- 14) Do you have any objection on the proposed project? YES ☐ NO ☒

Thank you for your cooperation

Signature: 

Date: 21/2/2024.

ASST/CHIEF  
KIANJEGE SUB-LOCATION  
Date:   
Sign: 



AFRICAN DEVELOPMENT BANK GROUP

## RESETTLEMENT ACTION PLAN (RAP) KEY INFORMANT INTERVIEW QUESTIONNAIRE

**PROJECT NAME:** \_\_\_\_\_

### 1. Details of the Respondent

NAME	CATHERINE W. NGARI			
POSITION/ORGANISATION	INTERIOR			
TELEPHONE NO.	0724232010			
LOCALITY	Village	Location	Sub-County	County
	KUTUS NJINI	KUTUS	MWAAEAST	KIRINYAGA

### 2. What are your institutional roles in the proposed project area?

..... *Monitoring* .....

.....

.....

### 3. Does the organization have existing water supply systems and/or sewer system in the area? If Yes specify

..... *No* .....

.....

.....

.....

### 4. What are the land use practices in the area?

..... *Farming* .....

.....

.....

8) Do you foresee any conflict with the proposed project and other community projects in the area ? If Yes recommend methods for conflict resolution

.....  
no  
.....  
.....

9) In your opinion/perfection will there be willingness by the community to pay water company for one time connection?

.....  
YES  
.....  
.....

10) Is the one time connection fee paid to water company manageable to the users?

.....  
YES  
.....  
.....

11) Are there any culturally sensitive sites within the proposed project area? If yes specify

.....  
N/A  
.....  
.....

12) Are there any environmentally sensitive sites within the proposed project area? If yes specify

.....  
N/A  
.....  
.....

13) Do you have any other comment about the proposed project?

.....  
Highly accepted by the community.  
.....  
.....

14) Do you have any objection on the proposed project? YES ☒ NO ☐

Thank you for your cooperation

Signature.....

Date..... 23/02/2024





AFRICAN DEVELOPMENT BANK GROUP

RESETTLEMENT ACTION PLAN (RAP) KEY INFORMANT INTERVIEW  
QUESTIONNAIRE

PROJECT NAME: KERUGOYA LAKE MILE CONNECTIVITY PROJECT

1. Details of the Respondent

NAME	JOSEPH M KIHARI			
POSITION/ORGANISATION	OFFICER IN CHARGE KERUGOYA DAM			
TELEPHONE NO.	0720832487			
LOCALITY	Village	Location	Sub-County	County
	KAMANDO	KOROMA	KEBINYAKA CENTRAL	KEBINYAKA

2. What are your institutional roles in the proposed project area?

REHABILITATION & SAFE CUSTODY OF PRISONERS

3. Does the organization have existing water supply systems and/or sewer system in the area? If Yes specify YES

- Water supply by KIWANCO  
- Using institutional septic tanks

4. What are the land use practices in the area?

Physical infrastructure & Farming

- 8) Do you foresee any conflict with the proposed project and other community projects in the area? If Yes recommend methods for conflict resolution Yes

For damage of existing system, there is a need for engagement and compensation or relocation.

- 9) In your opinion/perfection will there be willingness by the community to pay water company for one time connection?

Yes

- 10) Is the one time connection fee paid to water company manageable to the users?

Yes

- 11) Are there any culturally sensitive sites within the proposed project area? If yes specify

NIL

- 12) Are there any environmentally sensitive sites within the proposed project area? If yes specify

NA

- 13) Do you have any other comment about the proposed project?

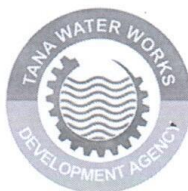
There is an urgent for proper engagement with the organization before any undertaking.

- 14) Do you have any objection on the proposed project? YES €NO €

Thank you for your cooperation

Signature: [Signature]

Date: 23/2/2024



AFRICAN DEVELOPMENT BANK GROUP

RESETTLEMENT ACTION PLAN (RAP) KEY INFORMANT INTERVIEW  
QUESTIONNAIRE

PROJECT NAME: KERUBOGA BUTUS - LAST MILE CONNECTIVITY

1. Details of the Respondent

NAME	KERUBOGA BOYS HEATH SCHOOL			
POSITION/ORGANISATION	Public School			
TELEPHONE NO.	0739362317			
LOCALITY	Village	Location	Sub-County	County
	KATITERA B	KATITERA	KATITERA	KURIA

2. What are your institutional roles in the proposed project area?

Education

3. Does the organization have existing water supply systems and/or sewer system in the area? If Yes specify

Yes - KATITERA WATER SCHEM has its own septic systems

4. What are the land use practices in the area?

Farming, Forestry, School



5. Are there challenges faced in the area in regard to water supply? If Yes Specify

.....

.....

.....

6. Which River is ideal and sustainable for location of an **intake/effluent** discharge for the proposed project?

..... *Hamouda* .....

.....

7. a) In your perception/opinion is the project good for the area? YES ☒ NO ☐  
b) ) If YES, please tick one or many of the following: (positive impacts)

S/No.	Positive Impacts	Tick
1)	Create employment	<input checked="" type="checkbox"/>
2)	It will create access to clean water for consumption	<input checked="" type="checkbox"/>
3)	It will improve livelihood in the area	<input checked="" type="checkbox"/>
4)	Provide market for construction materials	<input checked="" type="checkbox"/>
5)	Reduce water borne diseases	<input checked="" type="checkbox"/>
6)	Any other that is not mentioned above; - positive impact to the - environment -	

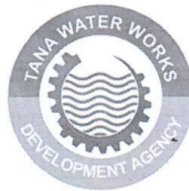
- 7) In your opinion, which **Negative Impacts** will possibly arise from the proposed project and suggest possible mitigation measures

..... *Noise interference, challenges in possible* .....

..... *interference with school fence leads to insecurity.* .....

..... *Trees cutting, interference with other school* .....

..... *systems eg water and electric lines exists.* .....



AFRICAN DEVELOPMENT BANK GROUP

## RESETTLEMENT ACTION PLAN (RAP) KEY INFORMANT INTERVIEW QUESTIONNAIRE

PROJECT NAME: \_\_\_\_\_

### 1. Details of the Respondent

NAME	PAUL KIROKO SAMSON			
POSITION/ORGANISATION	All Saints protestant chapel (newyapson)			
TELEPHONE NO.	0726086597			
LOCALITY	Village	Location	Sub-County	County
	Kamato	Karoma	Kirinyaga Central	Kirinyaga

### 2. What are your institutional roles in the proposed project area?

offering spiritual/religious services to the prison  
reality and community as well.

### 3. Does the organization have existing water supply systems and/or sewer system in the area? If Yes specify

Yes, by Kirinyaga water and sewerage and  
sanitation

### 4. What are the land use practices in the area?

church structure buildings





AFRICAN DEVELOPMENT BANK GROUP

RESETTLEMENT ACTION PLAN (RAP) KEY INFORMANT INTERVIEW  
QUESTIONNAIRE

PROJECT NAME: KERUGOYA-KUTUK LAST MILE CONNECTIVITY PROJECT

1. Details of the Respondent

NAME	JESSE MUTINDI MUTANGI			
POSITION/ORGANISATION	PRINCIPAL - KERUGOYA SCHOOL FOR THE DEAF			
TELEPHONE NO.	0720 825081			
LOCALITY	Village	Location	Sub-County	County
	KIMURI	KERUGOYA	KIRINYAGA CENTRAL	KIRINYAGA

2. What are your institutional roles in the proposed project area?

Learning Institution - Boarding School

3. Does the organization have existing water supply systems and/or sewer system in the area? If Yes specify

Yes - Bore hole water and piped water (Project-Kigango)

4. What are the land use practices in the area?

Learning Activities

- 8) Do you foresee any conflict with the proposed project and other community projects in the area? If Yes recommend methods for conflict resolution

Yes- If the members of the locality are explained about the impact of the project clearly, they will embrace it instead of opposing it

- 9) In your opinion/perfection will there be willingness by the community to pay water company for one time connection?

If well explained there will be no problem

- 10) Is the one time connection fee paid to water company manageable to the users?

- 11) Are there any culturally sensitive sites within the proposed project area? If yes specify

Nil

- 12) Are there any environmentally sensitive sites within the proposed project area? If yes specify

No

- 13) Do you have any other comment about the proposed project?

Visit the area/places where the project will impact or affect and do sensitization to the occupants/members

- 14) Do you have any objection on the proposed project? YES ☒ NO ☒

Thank you for your cooperation

Signature. 

Date. 23/02/2024



AFRICAN DEVELOPMENT BANK GROUP

## RESETTLEMENT ACTION PLAN (RAP) KEY INFORMANT INTERVIEW QUESTIONNAIRE

PROJECT NAME: \_\_\_\_\_

### 1. Details of the Respondent

NAME	JUSTUS MBOANI MBOANI			
POSITION/ORGANISATION	NGAO			
TELEPHONE NO.	0710 191428			
LOCALITY	Village	Location	Sub-County	County
	KIMATHA	KERUGOJA	KIRINYAGA CENTRAL	KIRINYAGA

### 2. What are your institutional roles in the proposed project area?

- Coordinating the people in the affected  
way leave area.
- Uniting the community and the Government for the  
welfare of the project.

### 3. Does the organization have existing water supply systems and/or sewer system in the area? If Yes specify

Yes. First phase was done CIO for  
the sewer system. And the community was  
Co-operative

### 4. What are the land use practices in the area?

- Commercial buildings.
- Agricultural land.



5. Are there challenges faced in the area in regard to water supply? If Yes Specify

NO

6. Which River is ideal and sustainable for location of an intake/effluent discharge for the proposed project?

Muhungu Stream to Rutu River.

7. a) In your perception/opinion is the project good for the area? YES NO €  
b) ) If YES, please tick one or many of the following: (positive impacts)

S/No.	Positive Impacts	Tick
1)	Create employment	✓
2)	It will create access to clean water for consumption	
3)	It will improve livelihood in the area	
4)	Provide market for construction materials	
5)	Reduce water borne diseases	✓
6)	Any other that is not mentioned above; - Improve the Sanitary of the town. - -	

- 7) In your opinion, which Negative Impacts will possibly arise from the proposed project and suggest possible mitigation measures

→ Destruction of roads (footpaths) where the project passes through.

- 8) Do you foresee any conflict with the proposed project and other community projects in the area? If Yes recommend methods for conflict resolution

NO

- 9) In your opinion/perfection will there be willingness by the community to pay water company for one time connection?

Yes

- 10) Is the one time connection fee paid to water company manageable to the users?

Yes

- 11) Are there any culturally sensitive sites within the proposed project area? If yes specify

NO

- 12) Are there any environmentally sensitive sites within the proposed project area? If yes specify

NO

- 13) Do you have any other comment about the proposed project?

→ To Bureau the Project and make it operational for the purpose of Sanitary of our village town which has no sewer system.

- 14) Do you have any objection on the proposed project? YES ☒ NO ☐



Thank you for your cooperation

Signature: 

Date: 23/02/2024



## Appendix 4: Experts License

 FORM 7  EAE 23061899  
(r.15(2))

**NATIONAL ENVIRONMENT MANAGEMENT  
AUTHORITY (NEMA)**  
**THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT**  
**ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING  
LICENSE**

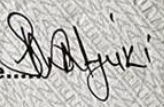
License No : NEMA/EIA/ERPL/20841  
Application Reference No: NEMA/EIA/EL/26813

M/S **WAMUYU GATHINJI**  
(individual or firm) of address  
P.O. Box 468 Nyeri


is licensed to practice in the  
capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**  
**General**  
registration number **3007**

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

Issued Date: 2/12/2024      Expiry Date: 12/31/2024

Signature..... 

(Seal)  
f **Director General**  
**The National Environment Management Authority**

P.T.O.  
  
ISO 9001 : 2015 Certified



**nema**  
mazingira yetu | uhai wetu | wajibu wetu

FORM 7

(r.15(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/19665

Application Reference No: NEMA/EIA/EL/25094

M/S **ANNE WANJIKU NJAGI**  
(individual or firm) of address  
P.O. Box 3267 - 00200 NAIROBI

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

registration number **3036**

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

Issued Date: 5/19/2023

Expiry Date: 12/31/2023

Signature.....

(Seal)

**Director General**  
**The National Environment Management Authority**

P.T.O.



ISO 9001:2015 Certified





FORM 7



EAE 23061997  
(r.15(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/20960

Application Reference No: NEMA/EIA/EL/28135

**M/S Martin Muthukia Maina**  
(individual or firm) of address  
P.O. BOX 13989-00100

is licensed to practice in the  
capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Associate Expert**  
registration number **13007**

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

Issued Date: 2/21/2024

Expiry Date: 12/31/2024

Signature.....

(Seal)  
f **Director General**  
**The National Environment Management Authority**

P.T.O.



ISO 9001 : 2015 Certified





**Appendix5: Pictorial Evidence During Public Consultation and Participation**  
**plate 0-1photos during Public Participation**



Meeting with the chiefs and other stakeholders at the DCC office Kerugoya



KICOWASCO Officer at Kerugoya Town meeting



Public participation meeting at Kutus Catholic Church




Participants filling the questionnaires at Kerugoya Town





Consultant assisting the participants to fill the Questionnaires






**Appendix 1: List of participants**  
**Venue: Kerugoya Chiefs Office**

	<b>ATTENDANCE REGISTER</b>	Page 1 of 8
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<b>SUBJECT: ENVIRONMENTAL &amp; SOCIAL IMPACT ASSESSMENT (ESIA) AND RESETTLEMENT ACTION PLAN(RAP)</b>									
PROJECT NAME:									
VENUE:									
DATE:									

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35 ✓	35-70 ✓	Above 70 ✓	
1.	BERNARD MITHAMU	KARARE WEST Loc.	11170352	0721578566	M	—		✓		
2.	CATHERINE NGARI	KITHURATI Sub location	000391638	072432220	F	NO		✓		
3.	LUKE N. KITHURATI	A/CHIEF KITHURATI	22309287	0723201415	M	M		✓		
4.	KENNETH N. NDAMBI	A/CHIEF Kerugoya	22600298	0721704057	M			✓		
5.	SHADRACK N. OBE	A/CHIEF	21929443	0724867278	M			✓		

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## ATTENDANCE REGISTER

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**SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)**

PROJECT NAME:

VENUE:

DATE:

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35	35-70	Above 70	
	DENNIS M. KARANJA	M. KARANJA	23012676	07/412866	Male	✓ NO	✓	✓	70 ✓	M. KARANJA
6.	CHRISTIAN N. KITHIRI	GITHIRI	32377626	071249284	Male	NO	✓			CHRISTIAN
7.	EDWARD M. KITHIRI	KITHIRI	3218677	0723388779	Male	NO	✓			EDWARD
8.	BEATRICE N. KITHIRI	KITHIRI	4694414	0757462373	F	NO		✓		BEATRICE
9.	SIMON N. KITHIRI	KITHIRI	2406061	0723228469	M	NO	✓			SIMON
10.	WINNIE WAKIO	KITHIRI	0756158	072000840	F	NO		✓		WAKIO

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SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)

PROJECT NAME:

VENUE:

DATE:

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35	35-70	Above 70	
11	Elijah Macharia	Kutus	3133377	07761765	M	No	✓	✓	70 ✓	
12	DAVID GICU	Kutus	9678683	0723760187	M	No		✓		
13	John Kinyua	Kutus	5753706	0701330294	M	Yes		✓		SOHA
14	Sammy Kiege	Kutus	312197	09205986	M	No			-	
15	Mueni Mepheka	Kutus	2053342	072373508	F	No		✓		Mueni

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# ATTENDANCE REGISTER

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**SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)**

**PROJECT NAME:**

**VENUE:**

**DATE:**

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35	35-70	Above 70	
16	LAWRENCE MIGU	KITHIERI	24217226	0719417239	MALE	NO	✓	✓	70 ✓	
17	ROS WAMJIRU	LABARE	4951506	0721539385	F	NO		✓		
18	LUCY NJERI	KUTUS	37891098	0745909791	F	NO	✓			
19	IBRAHIM MUYATI	KUTUS	32961839	0745405550	MALE	NO	✓			
20	BERNARD MAINA	KUTUS	24415627	0746885869	MALE	NO	✓			

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## ATTENDANCE REGISTER

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SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)

PROJECT NAME:

VENUE:

DATE:

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35	35-70	Above 70	
21	ESTHER KANJIKU GATHUTWA	Kutus	5753212	0713245579	F	NO	✓	✓		Wangechi
22	Faith Makena Gitonga.	Kutus	33609497	0111247946	F	NO	✓			Faith.
23	Edward Mpingi Karauja	Kutus	10750744	074457776	M	N/A		✓		Edward
24	DAUGLAS GICORI NDAMBAI	Kutus	13696030	0727328505	M	NO	✓	✓		Chau
25	LYDIAH WAMBUI WANGECHI	Kutus	10888961	0714988835	F	NO		✓		Lydiah

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SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)

PROJECT NAME:

VENUE:

DATE:

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35	35-70	Above 70	
							✓	✓	70 ✓	
26	AGNES MICHELLE	KUTUS	27983554	0711182931	F	NO	✓			
27	JOSPHAT WASHIRA	KUTUS	23626123	0723890701	M	NO		✓		
28	CELAN WSWERYU	KUTUS	mjini		M	NO			✓	
29	Wilson Karuki	Kutus	6091322	0720430827	M	Yes		✓		
30	JANE WAKURU	Kutus	21495458	071706488	F	NO		✓		

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## ATTENDANCE REGISTER

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**SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)****PROJECT NAME:****VENUE:****DATE:**

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35 ✓	35-70 ✓	Above 70 ✓	
31	JOSEPHINE MURANGO MUGWI	KITHIRATI	12977227	0726475883	F	NO		✓		
32	Chang Muchira	Karurua (Kutus)	8797030	0720110063	F	NO		✓		
33	Dominic K. Maitava	Kutus (Kithirati)	5528729	072114109	M	NO		✓		
34	Emilio Kema	Kutus	11599535	0721169127	M	YES		✓		
35	JACKSON CARDIL	KITUS	10953509	0728212352	M	NO		✓		

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## **Appendix 1: List of participants**

**Venue:** Kirimunge MCA s Office



## ATTENDANCE REGISTER

Page 1 of 8

SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)

PROJECT NAME: KERUGOYA KUTALS LAST MILE CONNECTIVITY

VENUE: KIRIMUNGU MCA'S OFFICE

DATE: 23/02/2023

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35 ✓	35-70 ✓	Above 70 ✓	
1.	JOSEPH M. WIMBA	KIMURU	12946825	0720832487	M	N/A NO		✓		
2.	BENSON G. CHOTO	KIMURU	11548338	072628889	M	NO		✓		
3.	Paul Kioko	Kimuru	22400062	0726686597	M	NO		✓		
4.	Alvise N. MACHINDU	NBIMI	2905168	0723374882	M	NO		✓		
5.	Dominic Mubene	NBIMI	1899905	07247977	M	NO		✓		

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**SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)**

**PROJECT NAME:**

**VENUE:**

**DATE:**

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35	35-70	Above 70	
6.	ST JEMINIAH MWANGI		22171764	0721991193	FEMALE		✓	✓		<i>[Signature]</i>
7.	ND ELO MUKIIRI		2225215	0722612017	MALE			✓		<i>[Signature]</i>
8.	SOALY MUKIIRI		0754179	0711722291	MALE			✓		<i>[Signature]</i>
9.	ANTONY MUNGA MWARIRE		51663355	0719226502	MALE		✓	✓		<i>[Signature]</i>
10.	JOHNISON MURUGA MURUGA	Kiunga	1072165	0725972266	MALE	N/D		✓		<i>[Signature]</i>

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**SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)**

**PROJECT NAME:**

**VENUE:**

**DATE:**

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35 ✓	35-70 ✓	Above 70 ✓	
11	Bernard MURAGE	KIAGA	0809606	0726473946	M	YES			✓	
12	PREDEN KAROKI	KIAGA	(2978497	0721959313	M	YES		✓		
13	Mary Muthoni	Diaga	3691159	0705300466 0705300466	F	YES		✓		
14	ANNE WAMJIKU	KATHARC	0754363	0710567786	F	YES		✓		
15	Rose Wanjiku	KATHARC	35294635	0759098086	F	YES		✓		

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SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)

PROJECT NAME:

VENUE:

DATE:

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35	35-70	Above 70	
21	AMOS MUNENE	KATHARE	30567929	0704402088	M	NO	✓			
22	Reice Madinga	KATHARE	0254944	0712 566404	M.	NO			✓	
23	MILKA MAINA	KUAGA	3691997	0791305517	F	NO		✓		
24	THABITUA KAMAU	KATHARE	11651946	0748 619730	F	NO		✓		
25	Eunice Wanjira	Kraga	2897179	0712 725805	F	NO		✓		

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**SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)**

**PROJECT NAME:**

**VENUE:**

**DATE:**

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35 ✓	35-70 ✓	Above 70 ✓	
26	PERNIAH W. MUTUW	KIAGA	39553424	-	F	NO		✓		P.w.
27	LOYCE MULEBE	KIAGA	3680013	-	F	NO		✓		L.M.
28	MARIHA WAMBUI	KATHARE	7237474	0708851224	F	NO		✓		Mariha
29	LIGIENE WAKUTHI	KIAGA	0671746	0727105150	F	YES		✓		Ligiene
30	RUSE WAKUTHI	KATHARE	3128596	0705124275	F	YES		✓		R.w

Revision

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# ATTENDANCE REGISTER

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**SUBJECT: ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)  
AND RESETTLEMENT ACTION PLAN(RAP)**

**PROJECT NAME:**

**VENUE:**

**DATE:**

S/N O	NAME	SUB- LOC.	ID NO.	TEL CONTACT	GENDER M/F	PWD YES/NO	AGE -Tick one			SIGNATURE
							18-35	35-70	Above 70	
	GABRIEL GABRIEL	KIAGA	1254407	04380768	MALE		✓	✓	70 ✓	
31	Peter GIKURU NJOYA	Kathare	0755347	04358262	Male					
32	JUSTUS NYAMA	KIAGA	3128841	0720707696	MALE					
33	Solomon WANJOHI	Kathare	0752733	0721277433	Male					
34	JOSEPH MWANGI	Kathare	1499222	071362248	Male					
35	Stanley Mutuku	Kathare	2599763	0723129210	Male					

Revision

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# **MINUTES OF THE PUBLIC MEETING ON ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT PLAN FOR THE CONSTRUCTION OF KERUGOYA KUTUS SEWERAGE LAST MILE CONNECTIVITY PROJECT**

**Date:** 23<sup>rd</sup> February ,2024

**Time:** 9:00 AM

**Venue:** Kerugoya Chiefs Office

Attendance as attached list

## **Agenda:**

1. Team introduction and Project Background
2. Comments, Question and Answer
3. Filling of questionnaires
4. Closing Remarks

### **Min 1/02/2024: Team introduction and Project Background**

The meeting was called to order by area Chief at 9:15 AM with a word of prayer from one of the attendants. The TWWDA Representative then welcomed all the attendants and thanked them for creating time to attend the meeting. She further asked her team to introduce themselves briefly and asked the participants to contribute freely towards the discussions noting that their views and comments will go a long way towards the success of project.

The TWWDA representative briefed the participants about Kerugoya –Kutus Water and Sewerage supply project and a representative of KICOWASCO PLC elaborated on the project areas. The meeting was informed that the project will be funded by Africa Development Bank (AfDB) through the TWWDA. She explained that as part of the study, public consultation was key and that the meeting was organized for the community to give their views on the project. She then welcomed the attendants to give their views, comments and suggestions on the project

### **Min 2//02/2024: Comments, Questions and Answers**

Mr Justus Mwai Question – He noted that some of the residents far away from the main sewer line may not be connected to the sewer line and especially where the connection of their premises to the main sewer line involved pipeline traversing through private land.

A – The TWWDA representative informed the meeting that the aim of the Last Mile Connectivity Project was to establish secondary lines from the main sewer trunk to estates in such a way as to enable direct connections to the users. In situations where is far away from the secondary line, then KICOWASCO PLC will liaise with the customer and guide accordingly.

Mr. Abraham Mwai. Q –He was concerned about the limited space on some of the roads reserves and wondered how in such situation the pipeline will be installed. He also expressed fears of water shortage during construction.

A – It was clarified that with the help of the road Agencies, road demarcation will be done and incase there of encroachment of the road by land owners, then an amicable solution will be arrived at with the involvement of the local administration. During construction, the Contractor will ensure minimum interference with the existing water pipeline and will work closely with KICOWASCO PLC to promptly restore water supply.

Ms Jane Gachoki Q – she enquired on where compensation related complaints will be channeled in case someone was dissatisfied with the compensation matters.

A-The participants were informed that grievance forms will be available at the chief's office or at KICOWASCO PLC, and members of the public would be free to fill the forms in case of any grievance. It was also clarified that frequent public Baraza's shall be conducted during project implementation period where such complaints will be addressed.

Mr Justus Mugo Q – he enquired whether there shall be compensation for structures erected along the road reserve.

A-the participants were informed that compensation for livelihood losses will be done in accordance to AfDB guidelines.

### **Min 3//02/2024: Filling of Questionnaires**

The ESIA consultant informed the participants the importance of public participant in Kenya laws and guided the participants through the questionnaire filling.

**Min 4//02/2024: Closing Remarks**

The Consultant's team thanked the attendants for their active participation in the meeting and reminded them that their views and comments will be incorporated in the ESIA and RAP report. The participants were then asked by the consultant to sign the attendance sheet and requested to share all they have learned about the project with other residents.

There being no other business the public consultation meeting ended at 10:30 am.

Confirmation of Minutes

These minutes were confirmed as a true reflection of the deliberations that were relayed on the meeting by the undersigned as:

NAME:.....FRANCIS KARANJA KINSAU.....

OFFICE OF THE CHIEF  
KERUGOYA LOCAL GOVT  
DATE:.....

POSITION:.....AG. CHIEF, KERUGOYA.....

OFFICE OF THE CHIEF  
KERUGOYA LOCAL GOVT  
DATE:.....

INSTITUTION:.....N.G.A.O.....

OFFICE OF THE CHIEF  
KERUGOYA LOCAL GOVT  
DATE:.....

NAME:.....WAMUKU GATHINJI.....

AQUAGREEN ENTERPRISES  
LIMITED  
P.O. Box 468-10100,  
NYERI

POSITION:.....CONSULTANT - AQUA GREEN ENTERPRISES LTD.....

INSTITUTION:.....AQUA GREEN ENTERPRISES LTD.....

NAME:.....Eng. David W Ndegwa.....

POSITION:.....PEWSI.....

INSTITUTION:.....TANA WATER WORKS DEVELOPMENT AGENCY.....

# **MINUTES OF THE PUBLIC MEETING ON ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT PLAN FOR THE CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE LAST MILE CONNECTIVITY PROJECT**

**Date:** 23<sup>rd</sup> February ,2024

**Time:** 11:00 AM

**Venue:** Kirimunge MCAs Office Premises

Attendance as attached list

## **Agenda:**

1. Team introduction and Project Background
2. Concerns and Issues
3. Filling of questionnaires
4. Closing Remarks

### **Min 1/02/2024: Team introduction and Project Background**

The meeting was called to order by area Chief at 11:05 AM who had mobilized the members for the meeting. He then invited a volunteer to officially open the meeting with a word of prayer.

The area MP representative was excited about the project and expressed that the development was welcome to the area.

The Consultant representative introduced her team and then welcomed all the attendants and thanked them for finding time to attend the meeting. She asked the participants to contribute freely towards the discussions noting that their views and comments will go a long way towards the success of project. The surveyor KIRIWASCO briefed the meeting about Kerugoya –Kutus Water and Sewerage supply project and described the project coverage.

The consultant representative then welcomed the attendants to give their views, comments and concerns on the project

### **Min 2//02/2024: Concerns and Issues**

During the discussions the participants raised the following issues:

- The participants wanted the projects areas reviewed to cover other areas that has water challenges.
- Some members were concerned that pipelines installation works will affect and interfere with their farms and other assets such as fences.
- Some members were concerned that for them to be connected to the project, several road crossings need to be established.
- Participants requested that employment of locals be prioritized during project implementation.

#### Responses

- The proponent was to prepare Resettlement Action Plan for all those affected for proper compensation
- The surveyor KIRIWASCO PLC explained that major road crossings had been included in the design to connect the secondary line to the mainlines and that the users shall be connected to the secondary lines and therefore only a few road crossings will be required and not individual customer crossings. KIRIWASCO PLC will guide and will be involved at the point of customer connection.
- The Contractor will recruit locals for employment but can source for skilled labour if not available locally.

#### **Min 3//02/2024: Filling of Questionnaires**

The ESIA consultant informed the participants the importance of public participant in Kenya laws and guided the participants through the questionnaire filling. Most of the participants were not affected by the proposed pipeline so just a few filled the questionnaires.

#### **Min 4//02/2024: Closing Remarks**

The consultant's team thanked the attendants for their active engagement in the meeting and reminded them that their views and comments will be incorporated in the ESIA and RAP report.

There being no other business the public consultation meeting ended at 1:25 pm.



NAME: GILBERT KARIMI MURUTHI

POSITION: CHIEF

OFFICE OF THE CHIEF  
KANYEKINI LOCATION  
P.O. Box 1-10300, KERUGOYA  
Date: 31/2024 Tel: \_\_\_\_\_

INSTITUTION: HGAO

NAME: Wanjiku GATHINJI

AQUAGREEN ENTERPRISES  
LIMITED  
P.O. Box 468-10100,  
NYERI

POSITION: CONSULTANT LEAD EXPERT

INSTITUTION: AQUAGREEN ENTERPRISES LTD

NAME: Eng. David W Ndegwa

POSITION: PEWSI

INSTITUTION: TANA WATER WORKS DEVELOPMENT AGENCY

# **MINUTES OF THE PUBLIC MEETING ON ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT PLAN FOR THE CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE LAST MILE CONNECTIVITY PROJECT**

**Date:** 23 February ,2024

**Time:** 11:00 AM

**Venue:** Ngaru Chiefs Office

Attendance as attached list

## **Agenda:**

1. Team introduction and Project Background
2. Concerns and Issues
3. Filling of questionnaires
4. Closing Remarks

### **Min 1/02/2024: Team introduction and Project Background**

The meeting was called to order by area Chief at 11:05 AM who had mobilised the members for the meeting he then invited a volunteer to officially open the meeting with a word of prayer.

The TWWDA Representative introduced her team and then welcomed all the attendants and thanked them for finding time to attend the meeting. She asked the participants to contribute freely towards the discussions noting that their views and comments will go a long way towards the success of project. The KIRIWASCO member briefed the meeting about Kerugoya –Kutus Water and Sewerage supply project and elaborated on the project areas especially water component.

The consultant representative then welcomed the attendants to give their views, comments and concerns on the project

### **Min 2//02/2024: Concerns and Issues**

During the discussions the following points were noted:

- The participants wanted to know the project areas coverage
- Interference with the existing water systems in the area
- Some members felt that pipelines may affect their farms, fences etc
- Members requested that water charges be friendly

- Members requested that water charges be friendly

#### Responses

- The design was explained in details
- The existing water system will be consulted before construction works commence
- The proponent was to prepare Resettlement Action Plan for all those affected for proper compensation
- The participants were promised that the charges will be necessary for operation and maintenance of the project

#### Min 3//02/2024: Filling of Questionnaires

The ESIA consultant informed the participants the importance of public participant in Kenya laws and guided the participants through the questionnaire filling. Various issues were raised and addressed by the team.

#### Min 4//02/2024: Closing Remarks

The TWWD team thanked the attendants for their active engagement in the meeting and reminded them that their views and comments will be incorporated in the ESIA and RAP report.

The cut off date off date was agreed upon as 31<sup>st</sup> March 2024

There being no other business the public consultation meeting ended at 1:00 pm.

#### Confirmation of Minutes

These minutes were confirmed as a true reflection of the deliberations that were relayed on the meeting by the undersigned as:

NAME: BETH ROSE QACONDE

POSITION: CHIEF

**CHIEF**  
**NGARU LOCATION**  
Date: 26/2/24  
Sign: [Signature]

INSTITUTION:..... DANGER LOCATION

NAME:..... WAKUTHU GATHINJI

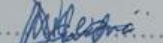
AQUAGREEN ENTERPRISES  
LIMITED  
P. O. Box 468-10100,  
NYERI

POSITION:..... CONSULTANT - LEAD EXPERT

INSTITUTION:..... AQUA GREEN ENTERPRISES LTD

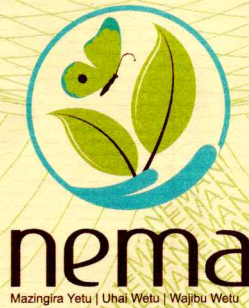
NAME:..... Eng. David W Ndegwa

POSITION:..... PEWSI

INSTITUTION:.....  TANA WATER WORKS DEVELOPMENT AGENCY







EIA 23062828

**NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)  
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT  
CERTIFICATE OF VARIATION OF ENVIRONMENTAL IMPACT ASSESSMENT LICENSE**

Certificate No: **NEMA/EIA/VC/2196**

Application Reference No: **NEMA/EIA/VEIA/3537**

This is to certify that the Environmental Impact Assessment License No

**NEMA/EIA/PSL/24588** issued on **3/15/2023**

to **Tana Water Works Development Agency.**  
of

**P.O.Box 1292- 10100, Nyeri.**

regarding

**Proposed Construction of Kerugoya/Kutus Waste Water Treatment Plant.**

whose objective is

**Construction of Kerugoya/Kutus waste water treatment plant comprising reticulation sewerage network, a new wastewater treatment plant, 2No. anaerobic ponds, sludge, drying beds, 2No. facultative ponds, 2No. maturation ponds and associated works.**

located at

**Kerugoya/Kutus, Kirinyaga County.**

has been varied to

**Amend the project objective to include the last mile connectivity phase comprising approximately 6.9km of sewer network and associated works, subject to conditions on EIA License No. NEMA/EIA/PSL/24588.**

with effect from **15 May, 2024**

in accordance with the provisions of the Act.

Date: **15 May, 2024**

Signature

(Seal)

 **Director-General  
The National Environment Management  
Authority.**

P.T.O.



ISO 9001 : 2015 Certified







**nema**

mazingira yetu | uhai wetu | wajibu wetu

**NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)  
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT  
ENVIRONMENTAL IMPACT ASSESSMENT LICENSE**

License No: **NEMA/EIA/PSL/24588**

Application Reference No: **NEMA/EIA/SR/1712**

This is to certify that the Environmental Impact Assessment Study Report received from

**Tana Water Works Development Agency.**

**P.O Box 1292-10100, Nyeri.**

submitted to the National Environment Management Authority in accordance with the Environmental Impact Assessment & Audit Regulations, 2003 regarding the:

**Proposed construction of Kerugoya/Kutus Waste Water Treatment Plant.**

whose objective is to carry on

**Construction of Kerugoya/Kutus waste water treatment plant comprising reticulation sewerage network, a new wastewater treatment plant, 2No. anaerobic ponds, sludge drying beds, 2No. facultative ponds, 2No. maturation ponds and associated works.**

located at

**Kerugoya/Kutus, Kirinyaga County.**

has been reviewed and a license is hereby issued for the implementation of the project, subject to attached conditions.

Issue Date: **15 March, 2023**

Signature

(Seal)

Director-General

**The National Environment  
Management Authority.**

P.T.O.



ISO 9001:2015 Certified



## **1.0 General Conditions**

- 1.1 This project is for the construction of Kerugoya/Kutus wastewater treatment plant comprising reticulation sewerage network, a new wastewater treatment plant, 2No. anaerobic ponds, sludge drying beds, 2No. facultative ponds, 2No. maturation ponds and associated works Kirinyaga County.
- 1.2 The license shall be valid for 24 months (time within which the project shall commence) from the date hereof.
- 1.3 The Director General shall be notified of any transfer, variation or surrender of this license.
- 1.4 Without prejudice to the other conditions of this license, the proponent shall implement and maintain an environmental management system, organizational structure and allocate resources that are sufficient to achieve compliance with the requirements and conditions of this license.
- 1.5 The Authority shall take appropriate action against the proponent in the event of breach of any of the conditions stated herein or any contravention to the Environmental Management and Co-Ordination Act, 1999 and regulations there-under.
- 1.6 This license shall not be taken as statutory defense against charges of pollution in respect of any manner of pollution not specified herein.
- 1.7 The proponent shall ensure that records on conditions of licenses/approval and project monitoring and evaluation shall be kept on the project site for inspection by NEMA's Environmental Inspectors.
- 1.8 The proponent shall submit an Environmental Audit Report in the first year of occupation/operation/commissioning to confirm the efficacy and adequacy of the Environmental Management Plan.
- 1.9 The proponent shall comply with NEMA's improvement orders throughout the project cycle

## **2.0 Construction Conditions**

- 2.1 The proponent shall obtain the requisite approvals from the County Government of Kirinyaga and all other relevant Authorities prior to commencement of works.
- 2.2 Since the sewer trunk is along River Thiba riparian reserve, the proponent, pursuant to Regulation 6 (c) of the Water Quality Regulations 2006, shall protect the riparian reserve by ensuring that the trunk is aligned to a maximum of six (6) meters from the river bank and the highest and the highest recorded flood levels.
- 2.3 The proponent shall require authorization from Kenya Forest Service for the trunk section within Mt. Kenya Forest.
- 2.4 The proponent shall ensure the trunk sewer is built to standards to prevent sewer seepage/leakage and overflows that may contaminate the recipient environment.
- 2.5 The proponent shall ensure that the construction is done as per the approved designs in adherence to the Building code 1968, and the provisions of the National Construction Act, 2011.
- 2.6 The proponent shall ensure relocation, compensation and restoration of livelihoods, utility and service infrastructure for any Project Affected Persons (PAPs), proprietors and develop a consultative plan for emerging issues and grievance redress mechanisms (GRM) as shall be prescribed in the Resettlement Action Plan (RAP).
- 2.7 The proponent shall ensure all deep excavations are hoarded and properly marked for safety. All excavations shall be backfilled and restored.
- 2.8 The proponent shall ensure no open-cut excavations for roads and highways.

Man

- 2.9 The proponent shall design and implement a concise traffic management plan duly approved by the County Engineer and other relevant Authorities before commencement of works.
- 2.10 The proponent shall ensure that the storm drainage channels do not directly discharge of untreated waste water and any other debris into the nearby stream.
- 2.11 The proponent shall put up a project signboard as per the Ministry of Transport and Infrastructure Standards indicating the NEMA licence number among other information.
- 2.12 The proponent shall ensure air pollution control measures are put in place to mitigate against dust during the construction phase.
- 2.13 The proponent shall ensure that all excavated material and debris is collected, re-used and where need be disposed of as per the Environmental Management Coordination Management (Waste Management) Regulation 2006.
- 2.14 The proponent shall ensure strict adherence to the provisions of the Environmental Management and Coordination (Noise and Excessive Vibrations Pollution Control) Regulations of 2009.
- 2.15 The proponent shall ensure strict adherence to the Occupational Safety and Health Act (OSHA), 2007.
- 2.16 The proponent shall ensure strict adherence to the provisions of the Environmental Management and Coordination (Air Quality) Regulations of 2014.
- 2.17 The proponent shall ensure that construction workers are provided with adequate personal protection equipment (PPE), sanitary facilities as well as adequate training.
- 2.18 The proponent shall ensure that construction activities are undertaken during the day (and not at night) between 0800 hrs and 1800 hrs and on Saturdays between 0800hrs and on Saturdays between 0800hrs and 1300hrs and shall ensure that transportation of construction material to and from the site are undertaken during weekdays and Saturdays only during the hours specified herein.
- 2.19 The proponent shall ensure the project will not encroach on any way-leave and road reserves.
- 2.20 The proponent shall ensure that the cooling systems employed are suitable alternatives with zero ozone depleting potential as per Environmental Management and Coordination (Controlled Substances) Regulations, 2007.
- 2.21 The proponent shall ensure that the development adheres to zoning specification issued for the development of such a project within the jurisdiction of the Kirinyaga County Government with emphasis on the approved land use for the area.
- 2.22 The proponent shall ensure strict adherence to the Environmental Management Plan developed throughout the project cycle.

### **3. Operational Conditions**

- 3.1 The proponent shall ensure that all waste water is disposed of as per the standards set out in the Environmental Management and Coordination (Water Quality) Regulations, 2006.
- 3.2 The proponent shall all solid waste screenings, sludge, coarse and grit materials during operation and maintenance are treated to standards and disposed of as per the Waste Management Regulations, 2006.
- 3.3 The proponent shall obtain an effluent discharge licence from NEMA for the proposed leachate treatment plant within first year of operation.





- 3.4 The proponent shall ensure that all drainage facilities are fitted with adequate functional oil water separators and silt traps.
- 3.5 The proponent shall ensure that appropriate and functional efficient air pollution control mechanisms are installed in the facility to control all air emissions.
- 3.6 The proponent shall ensure compliance with the provisions of the Energy (Solar Water Heating) Regulations, 2012.
- 3.7 The proponent shall ensure that all equipments used are well maintained in accordance with the Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009.
- 3.8 The proponent shall ensure that all solid waste is handled in accordance with the Environmental Management and Coordination (Waste Management) Regulations, 2006.
- 3.9 The proponent shall comply with the relevant principal laws, by-laws and guidelines issued for development of such a project within the jurisdiction of the Kirinyaga County Government, Ministry of Lands, Housing and Urban Development, Ministry of Health, Kenya Urban Roads Authority, National Construction Authority, Directorate of Occupational Health and Safety Services, Water Resources Authority, Nairobi Water and Sewerage Company and other relevant Authorities.
- 3.10 The proponent shall ensure that environmental protection facilities or measures to prevent pollution and ecological deterioration such as functional landscaping and tree-planting, dust control measures, traffic management plan, functional storm drainage system, solid waste management plan, waste water management plan, fire control plan, a material recovery plan, security management plan, soil erosion control and noise abatement mechanisms are designed, constructed and employed simultaneously with the proposed project.

4. **Notification Conditions**

- 4.1 The proponent shall seek written approval from the Authority for any operational changes under this license.
- 4.2 The proponent shall ensure that the Authority is notified of any malfunction of any system within 12 hours on the NEMA hotline No. **0741101100/0736101100** and mitigation measures put in place.
- 4.3 The proponent shall keep records of all pollution incidences and notify the Authority within 24 hours.
- 4.4 The proponent shall notify the Authority of its intent to decommission three months in advance in writing.

5. **Decommissioning Conditions**

- 5.1 The proponent shall ensure that a decommissioning plan is submitted to the Authority for approval at least three (3) months prior to decommissioning.
- 5.2 The proponent shall ensure that all pollutants and polluted material is contained and adequate mitigation measures provided during the phase.

The above conditions will ensure environmentally sustainable development and must be complied with.