Government of Kenya

Tana Water Works Development Agency

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

FOR

THE PROPOSED LAST MILE CONNECTIVITY(LMC) FOR CHOGORIA SANITATION PROJECT LOCATED IN MAARA SUB COUNTY IN THARAKA-NITHI COUNTY.

COMPREHENSIVE PROJECT REPORT (CPR)

Proponent:	Firm of Experts (Reg. No. 12508)
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24 APRIL 2024

FACT SHEET

Project name	Proposed Last Mile Connectivity (LMC) for Chogoria Sanitation Project
Assignment Name	Environmental and Social Impact Assessment (ESIA) - Comprehensive Project Report
Location	Maara Sub County in Tharaka-Nithi County. Tharaka-Nithi County
Project Description	Project infrastructure will involve the construction of HDPE (Double Walled Corrugated (DWC)) secondary sewer lines and associated manholes for Last Mile Connectivity (LMC) project for Chogoria Town is as summarized below. • Kabeche-Majira 1 – line (1.52km) with 28 manholes • Kabeche -Majira 2- line(1.200km) with 22 manholes • Kabeche -Kimuchia 1-line(0.710km) with 16 manholes • Banana 1-line(0.300km) with 8 manholes • Banana 2-line(0.160km) with 4 manholes • Kabeche-Kimuchia 2 Line(0.080km) with 4 manholes • KSS 1(0.815km) with 21 manholes • KSS1.1(0.945km) with 27 manholes • KSS1.1.1(0.160km) with 6 manholes • KSS1.3(0.100km) with 5 manholes • KSS2(0.700km) with 19 manholes • KSS3(0.215km) with 7 manholes • Kilifi road(0.550km) with 16 manholes
Project Cost	**One hundred and eighty-five million eight hundred and one thousand three hundred and twenty-nine shilling and eighty cents (Ksh. 185,801,329.80)**
Address of the Proponent	Tana Water Works Development Agency P.O. BOX 1292 – 10100 **NYERI KENYA** Tel: 061-2032282

CERTIFICATION

For and on behalf of:

TANA WATER WORKS DEVELOPMENT AGENCY

P.O. BOX 1292 – 10100 NYERI KENYA

This Environmental and Social Impact Assessment (ESIA) Comprehensive Project Report was prepared in accordance with the Environmental Management and Coordination Act (EMCA) 1999 and the Environmental Impact Assessment and Audit Regulations 2003 (revised 2015 & 2019) to meet the statutory requirements for the implementation of projects under schedule II. We, the undersigned, confirm that the contents of this report are a true representation of the ESIA process for ***Proposed Last Mile Connectivity (LMC) for Chogoria Sanitation Project in Maara Sub County in Tharaka-Nithi County.***

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Lead Expert: ..... Date: 24-04-2024

Signature

FOR PROPONENT

TANA WATER WORKS DEVELOPMENT AGENCY

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Signature: ..... **Date**: 24/04/2024

Disclaimer

This Environmental Impact Assessment Report is being submitted in accordance with the terms and conditions of contract in respect of provision of consultancy services. It has been carried out in full observance of the EIA regulations and in compliance with the Environmental.

EXECUTIVE SUMMARY

Project Overview

Background

The Government of Kenya through Tana Water Works Development Agency – TWWDA received a loan from the African Development Bank (AfDB) for the implementation of the Construction of the Chogoria Sanitation Project under the Kenya Towns Sustainable Water Supply and Sanitation Program (KTSWSSP). The goal of the program was to improve the health and quality of life and reduce poverty levels of the population of Kenya through the provision of water and sanitation services in a sustainable manner.

According to WASREB Impact Report No. 15 of 2023, The population served with sewerage services remained at 16% despite the number of people served increasing by 5.7%. This increase was equivalent to 231,779 people which is low compared to the 459,781 increases in service area population. The total sanitation coverage remained constant at 93%.

Tana Water Works Development Agency in its mandate of developing, maintaining, and managing National Public Water Works undertook the construction of the Chogoria Sanitation Project. The Project was planned to improve the Sanitation Services in Chogoria Towns and its environs within Tharaka Nithi County. Construction of the Chogoria Sanitation Project began in 2019 and was completed in 2023 and is yet to be officially commissioned. The project will see more than 6500 people of Chogoria and its environs benefit from access to sanitation services. The Chogoria Sewerage Project is currently not operational yet since there are no interconnections yet. To realize the potential of the sewerage infrastructure, there is a need to undertake connections from households or institutions to the new sewerage system.

Specific objectives

The Proposed Last Mile Connectivity for Chogoria Sewerage Project will improve the lives of residents of Chogoria town and further areas within Chogoria by.

- Providing a healthier and more appropriate way to manage liquid wastes thus improving the quality of life and the hygienic conditions in Chogoria Town
- Conserving the environment by reducing sewage waste discharged in septic tanks and cesspits, resulting in the pollution of the groundwater of the areas where such waste was discharged.
- Reduce the load and transport burden of exhaust tank services which discharge waste to far away areas such as Embu Sewerage Treatment Works which is about 60km away.
- Reduce the possibility of discharging waste generated directly to the environment such as Rivers or other water bodies.
- Providing connectivity of consumers to the Chogoria Sewerage Project.

- Fostering the capacity of NIWASCO under TWWDA's mandate of providing reserve capacity for purposes of providing water and sanitation services as per section 68 (c) of the Water Act 2016 by promoting individual connections to the sewerage infrastructure.
- Improving the overall health of the population by reducing infection of waterborne diseases or other related diseases and infections by creating an environment that is conducive to living away from pollution.

Project Components

This design report considered the following design criteria which was heavily dependent on the Ministry of water and Irrigation, Practice manual for sewerage and sanitation design manual in Kenya as well as world standards and codes referenced for the design of water supply infrastructure. Components that are covered on the design criteria chapter include.

- Population and water demand projection
- Design standards
- Planning horizons
- Velocities
- Peak factors

The structured designed for the proposed project include.

- Secondary (DWC) sewer lines of diameter 200 mm and total length of 7.455km
- 183 Nos manhole with varying areas depending on the depth of the manhole.
- Manhole benching designed at grades ranging between 1 in 5 and 1 in 25.
- Exhauster tanker discharge bay

Table 0-1: Summary of proposed wastewater lines

Secondary Sewer Lines	Length	Manhole numbers
Kabeche-Majira 1 – line	1.520	28
Kabeche -Majira 2- line	1.200	22
Kabeche -Kimuchia 1-line	0.710	16
Banana 1-line	0.300	8
Banana 2-line	0.160	4
Kabeche-Kimuchia 2 Line	0.080	4

KSS 1	0.815	21
KSS1.1	0.945	27
KSS1.1.1	0.160	6
KSS1.3	0.100	5
KSS2	0,700	19
KSS3	0.215	7
Kilifi road	0.550	16

Project Activities

The project will be implemented in two stages which include preconstruction and construction phase.

(i) Preconstruction phase

Project preconstruction activities are important in the lifecycle of the project. This phase sets the groundwork for successful project execution, ensuring that all necessary preparations are made before actual construction begins. The key activities involved in the preconstruction phase are:

- Project feasibility study and preliminary design
- Design, cost estimation and tender documents preparation
- Permitting and Approvals
- Procurements

(ii) Construction Phase

- Preparation and transportation of pipe and other equipment and facilities.
- Clearance of vegetation within pipeline Right of way.
- Pipeline installation through cut and fill trenching.
- Pipeline welding and finishing.
- Pre-commissioning and commissioning, including hydro-testing.
- Construction camps for pipeline workers; and Offices and other facilities.

Project Alternative Analysis

The analysis considers key aspects such as the project's location, pipeline routes, material sourcing, and disposal methods. It weighs the proposed project against the 'No Project' alternative, which involves maintaining the current status quo. While the 'No Project' option is favored from an extreme environmental perspective because it prevents new disturbances, it fails to resolve ongoing issues in Chogoria. Residents continue to face poor sewer system access, high water losses, lack of economic growth, and absent employment opportunities, all of which negatively impact their living standards and health due to the prevalence of waterborne diseases.

In terms of project components, the plan is to minimize disruptions by strategically placing water mains in areas with little utility congestion and low environmental clearance risks, thus reducing impacts on traffic and native ecosystems. Material selection for the project favors HDPE and concrete pipes for their durability, cost-effectiveness, and suitability under various conditions, with steel pipes reserved for specific applications like aerial river crossings. Manholes are proposed to be made from cast concrete with heavy-duty covers in trafficable areas to ensure durability and safety.

The project aims to align with local and national development goals, promising to enhance socio-economic benefits significantly. By improving access to sewer services, it supports broader objectives under Kenya's Vision 2030 and the Sustainable Development Goals, aiming to boost community health, economic growth, and environmental sustainability in the region. This analysis strives to balance the immediate execution of the project with sustainable development principles, addressing both immediate and long-term community needs.

Project Site Descriptions

Project Location

The proposed Last Mile Connectivity (LMC) for Chogoria Sanitation Project for the Chogoria is located in Maara Sub County in Tharaka-Nithi County. Tharaka-Nithi County is one of the forty-seven (47) counties in Kenya created by the Constitution of Kenya, 2010, and is located to the East of Mt Kenya **Figure 0.1**.

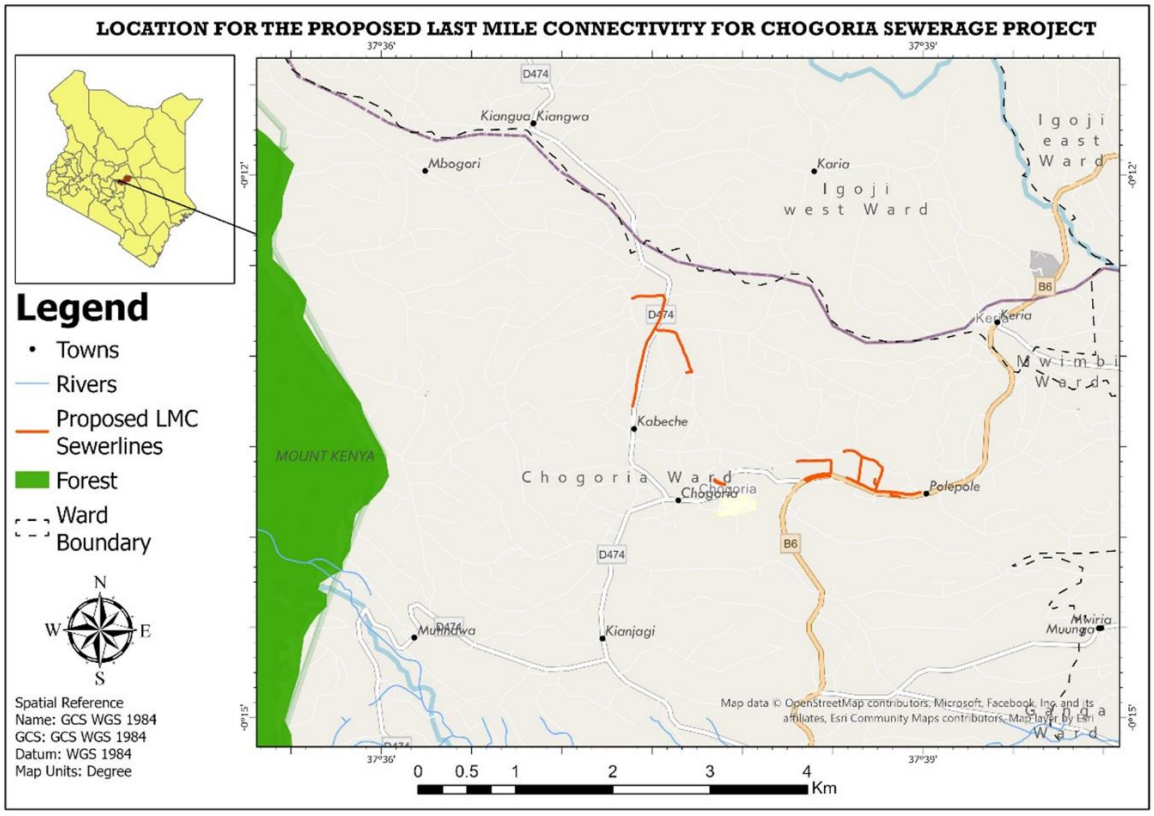

Figure 0.1: Proposed project location

Tharaka-Nithi County is one of the forty-seven (47) counties in Kenya created by the Constitution of Kenya, 2010, and is located to the East of Mt Kenya. The project areas is an agricultural hub with 80% of the population engaging in farming activities, focusing on crops such as tea, coffee, maize, beans, bananas, Sukuma wiki (kale), cowpeas, and cabbages, supported by micro-irrigation. The presence of multiple tea and coffee factories underscores the area's strong agricultural economy.

Baseline Environmental and Social Conditions

The temperatures in the highland areas range between 14°C to 30°C while those of the lowland area range between 22°C to 36°C. Some areas in the lower region experience temperatures of up to 40°C especially during the dry season. The county has a bi-modal rainfall pattern with the long rains falling during the months of April to June and the short rains in October to December. The short rains are more reliable than the long rains. The rainfall ranges from 2,200mm to 500mm with the high-altitude areas experiencing reliable rainfall, middle areas receiving moderate rainfall, while the lower areas receive low, unreliable and poorly distributed rainfall.

The geology of the project area is highlands which is characterized by well drained, extremely deep dusky red to dark reddish brown, friable clay with acid humic topsoils. In the lowlands away from Mt. Kenya, the soils are mixture of well drained, shallow to very deep dusky red to dark brown, friable, rock, boulder, and stony loam to clays.

The topography of the county is greatly influenced by the Mt. Kenya volcanic activity creating 'V' shaped valleys within which the main tributaries of River Tana originate and flow eastwards. These rivers include: Thuci, Mara, Nithi, Mutonga, Naka, Ruguti, Kathita and Kithinu. Other rivers originate from Nyambene Hills, including Thingithu, Thanantu, Thangatha, and Ura rivers among others. These rivers provide water for domestic use and small holder irrigation schemes across the county.

Institutional and legal framework

Project management Entities (PIE)

Table 0-2: Summary of PIE

Institution	Management Role
Tana Water Works Development Agency/Nithi Water and Sanitation Company	TWWDA in conjunction with NIWASCO the proponent, will be charged with the responsibility of ensuring that the proposed development has been put up in an environmentally sound manner. This can be achieved by inclusion of environmental specifications in the tender documents, selection of renowned environmentally conscious contractors and supervision to ensure that the objectives of this ESMMP are met.

National Environment Management Authority (NEMA)	NEMA's responsibility is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government of Kenya in the implementation of all policies relating to the environment.
The Contractor	The persons/firms contracted to construct the proposed Last Mile Connectivity (LMC) for Chogoria Sanitation Project will be required to comply with the requirements of the ESMMP within this report. To ensure strict compliance environmental specifications of this ESMMP should form part of the contract documents
Consultant	The sourced consultant will have to ensure that the proposed ESMMP is up to date and is being used by the contractor. Periodic audits of the ESMMP will have to be done to ensure that its performance is as expected.
Tharaka Nithi County Government	The relevant departmental officers in Tharaka Nithi local authorities should be called upon where necessary during Project implementation to provide the necessary permits and advisory services to the Project implementers.

Policy, Legal and Regulatory Framework

The Kenya Government policy on all new projects or activities requires that an environmental impact assessment be carried out at the planning stages of the proposed undertaking to ensure that significant environmental and social impacts are taken into consideration during the planning/design, construction, operation and decommissioning of the facility. The project underwent screening process which identified the proposed Project as High-Risk Project as per the 2nd schedule of Environmental Management and Coordination Act (EMCA Cap 387) – amendment via legal notice no. 31 – April 2019. Additionally, the project also falls under **moderate risk (category 2**) of the Africa Development Bank Environmental and Social Safeguards Policies as defined in the Bank's Operational Safeguards (OSs). The project does not lead to displacement of Project Affected Persons (PAPs). This report has been prepared for submission pursuant to Regulation 7 (4) of the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019 of the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019.

Other legal requirements for the proposed project include.

• Constitution of Kenya 2010 • Environment Management and Coordination (EMCA 2015)	• County Government Act No. 17 of 2012 • Physical Planning Act 1996 (286) • Urban Areas and Cities Act 2011 • Occupational Health and Safety Act (OSHA 2007)

• Environmental Impact Assessment and Audit) Regulations, 2003 • Environmental Management & Coordination (Water Quality) Regulations, 2006 • Waste Management Regulations, 2006 • Noise and Excessive Vibration Pollution (Control) Regulations, 2009 • Environmental Management and Coordination (Air Quality Regulations 2014 • Land Act 2012 • Water Act 2016 • Energy Act, 2006	• Public Health Act (Cap.242) • HIV and AIDS Prevention and Control Act 2011 • Sexual Offences Act 2006 • Child Rights Act (Amendment Bill) 2014 • Labour Relations Act 2012 • National Gender and Equality Commission Act 2011 • Public participation bill of 2016 • County Government Act, 2012 • The Penal Code CAP 63 • Permits and Licenses

The African Development Bank (AfDB) Integrated Safeguards System (ISS)

The African Development Bank (AfDB) Integrated Safeguards System (ISS) are designed to promote the sustainability of project outcomes by protecting the environment and people from the potentially adverse impacts of projects. ***Table 0-3*** presents the applicable AfDB Integrated Safeguard System and their relevance to the proposed project.

Table 0-3: Applicable AfDB Integrated Safeguard System and their relevance

Policy	Relevance
OS 1: Environmental and Social Assessment	The Project components will trigger OS 1, the assessment identified that According to OS 1 screening provisions, Chogoria sewer Infrastructure is a Category 2, the project is likely to have detrimental site-specific environmental and/or social impacts that are less adverse and largely reversible, and readily minimized by applying appropriate management and mitigation measures. Mitigation measures for impacts identified are detailed in chapter 6 of this report.
OS 2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation	The policy aims to avoid involuntary resettlement where feasible, or minimize resettlement impacts where involuntary resettlement is deemed unavoidable after all alternative project designs have been explored. For Chogoria sewer Infrastructure, displacement not triggered as pipelines are designed to follow road Right of Way (RoW) and River Riparian- However, impact crops/trees / structures/fences will be identified along the easement to be used by water pipelines.

Policy	Relevance
OS 3: Biodiversity, Renewable Resources and Ecosystem Services	The safeguard aims to conserve biological diversity and ecosystem integrity by avoiding or, if avoidance is not possible, reducing and mitigating any adverse environment and social risks., For proposed project works might result in loss of vegetation diversity which provide habitat to wildlife and other related ecosystems benefits. However, the impacts to biodiversity by the above-described works will be less significant as detailed in Chapter 7 of this report.
OS 4: Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency	The Project shall utilize raw materials both during construction and operation phase that could result to pollution of biophysical environment if not handled appropriately. Appropriate mitigation measures for likely waste to be generated by the Project are detailed in Chapter 7 of this report. Project activities shall not result to significant amount of greenhouse gases, EMSP prepared for operation phase provides for measures to be adopted to ensure efficient function of the Plant consequently reducing emission of methane and hydrogen sulphide gases. Also, the Project design has ensured that sewer flows through by gravity hence reducing the need for pumping.
OS 5: Labor Conditions, Health and Safety	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 that health, safety and working conditions of both works and community is safeguards. The Labor Relations Act 201 will be applied by labor force on site in addressing disputes related to working conditions.

Stakeholder Consultations

Stakeholder consultations and public participation were conducted during the ESIA study with the following objectives:

- Disseminate and inform the public and stakeholders about the project with special reference to its key components and description.
- Create awareness among the public on the need for the ESIA for the proposed project.
- Gather comments, suggestions, and concerns of the interested and affected parties.
- Incorporate the information collected in the ESIA.
- Build community consensus and acceptance of the proposed project.

Public participation was conducted through the public consultative meetings and admission of questionnaires to allow for systematic understanding and interaction of the project beneficiaries, neighbors, local community

members/ surrounding enterprises and any other would be affected/ interested parties. Overall, the stakeholders' views are summarized in **Table 0-4**. The minutes of public participation meetings and lists of attendance have been attached in *Appendix 1 and 2* of this report.

Table 0-4: Details of the meetings held.

Number of meetings held	2			
Venue	Chogoria chief camp		Kairuni chief's office	
Date	14th February 2024		15th February 2024	
Participants	Males -7	Females -1	Males -33	Females - 6

Overall, the stakeholders expressed their support for the proposed Chogoria LMC Sewer Project as they felt its implementation would result to improved access to safe drinking water, improved sanitation, job creation among other benefits. The ESIA team responded to various stakeholders' concerns particularly on the anticipated negative impacts particularly during the construction phase which would be managed using appropriate mitigation measures. The minutes of public participation meetings and lists of attendance have been attached in Appendix 1 and 2 of this report.

Environmental and social impacts

Positive Impacts

Positive impacts identified by stakeholders include the following:

- **Reduction in Water Pollution**: Sewer systems collect wastewater from homes, businesses, and industries, treating it before releasing it back into water bodies. This process significantly reduces the levels of pollutants such as pathogens, chemicals, and heavy metals in natural water sources, thereby protecting aquatic ecosystems and biodiversity.
- **Protection of Groundwater**: Proper sewer connectivity prevents the contamination of groundwater by untreated sewage, which is especially important in areas where groundwater serves as a critical source of drinking water. This helps maintain the purity and safety of underground water reserves.
- **Reduction in Soil Contamination**: By diverting wastewater to treatment facilities, sewer systems prevent the leaching of contaminants into the soil, thereby preserving soil health and fertility. This is crucial for agriculture and landscaping in urban and peri-urban areas.
- **Improved Public Health**: Sewer connectivity eliminates exposure to untreated sewage, significantly reducing the incidence of waterborne diseases such as cholera, dysentery, and typhoid fever. This leads to healthier communities and reduces the burden on healthcare systems.

- **Enhanced Living Conditions**: Access to proper sewage disposal and water treatment is a fundamental aspect of urban infrastructure that improves the overall quality of life. It eliminates unsanitary conditions, reduces foul odors, and prevents the proliferation of disease vectors such as mosquitoes.
- **Economic Benefits**: Investments in sewer infrastructure generate employment during construction, operation, and maintenance phases. Moreover, a healthy population and a clean environment boost productivity and attract business investments, fostering economic growth.
- **Social Equity and Inclusion**: Extending sewer connectivity to underserved communities can bridge the gap in sanitation access, promoting social equity. It ensures that all residents, regardless of their socio-economic status, benefit from basic sanitation services.
- **Education and Awareness**: The development of sewer systems is often accompanied by educational programs on hygiene and environmental protection, raising awareness among the population and encouraging sustainable practices.

Negative impacts and proposed mitigation measures

Although there are a number of justifications of why the project should be developed in the area, there are various negative impacts raised that affect the environment and social well-being and therefore the proposed mitigation measures will reduce the adverse impacts. This will assist the contractor and proponent to check impact verses the proposed mitigation measures in the various levels/phases of the proposed project. The following **Table 0-5** summarizes these Impacts and the mitigation measures.

Table 0-5: Impacts and proposed mitigation measures

Associated Impact	Proposed Management Actions
Preconstruction phase	
Poor siting of the facilities or non-adherence to the guidelines and specifications on the design of the infrastructure.	• Liaising with the relevant Technical Government department in development of the designs. • Proper siting of the distribution pipeline to avoid destruction of properties and existing infrastructure. • Ensure all the legally required permits such as getting the designs approved, acquiring the ESIA License prior to undertaking the construction activities. • The contractor bidding documents should contain clauses on Environmental Social Health and Safety (ESHS) requirements to guide the contractor on the key requirements; and

Associated Impact	Proposed Management Actions
	• Project Management Team (PMT) specifically the Environmental and Social Expert should ensure the design requirements are adhered too in the planning stage.
Resettlement Impacts	• Prepare a Resettlement Action Plan (RAP) for purposes of compensation of likely assets and sources of livelihood for Project Affected Persons.
Construction phase	
Vegetation Clearing, Soil Erosion and Siltation	• Re-plant the indigenous vegetation as much as practical once work is completed. • Limit vegetation clearance unless where unavoidable circumstances appear. • Contain excavated soils so that they will not find their way into nearby water sources. • Cement mixing should be done in a designated area away at a safe distance from storm water drains. • Spilled cement or concrete should be collected and disposed away from natural water ways or storm water drainage. • Sensitize workers and enable them to properly handle concrete spillages or waste cement.
Air Pollution Impacts	• Maintain construction equipment at high operational conditions such as to control emissions into the air. • Earth moving be done under dump conditions as much as possible to prevent emission of dust into the air. • Similarly, piled materials (sand and aggregate) should be maintained dump to prevent dust emissions. • It will be necessary to notify the immediate neighborhoods on the potential odors during the excavations. The period should, however, be kept as short as possible (odour generation may not be fully eliminated during the period) • Use of sprinklers to regularly water construction site, this suppresses the dust menace at construction sites. • People working in the sites with dust emissions to use dust masks to prevent respiratory infections.
Noise Pollution	• Avoid nighttime construction when noise is loudest. • Conduct periodic noise measuring and monitoring to determine levels and extent of harmful noise. • Clearly label the high noise areas.

Associated Impact	Proposed Management Actions
	• Provide PPE personal protective equipment (PPE) including masks, goggles, scarfs, boots and overalls among other protective clothing to persons operating within or visit identified high noise areas. • To meet noise level requirements, the equipment should be equipped with standard noise attenuation features. Machines that exceed acceptable noise limits should be equipped with silencers or lagging materials or specially designed acoustic enclosures. • Inform residents when construction activities are likely to generate excessive noise in order to minimize disruption to local residents. • Sensitize truck drivers to avoid hooting especially when passing through sensitive areas such as churches, residential areas, and hospitals.
Water Resources Pollution	• Isolate solid wastes disrupted from the works during excavations for safe disposal. The wastes should be collected and disposed in approved sites. • Earth moving and excavations for the construction are carried out considering safety of the river and surface drainage. Control siltation of rivers and other surface drains • Ensure spilt oil does not discharge into water sources. Provide oil spill containment including concrete platform for servicing of construction equipment and holding of scrap oil drums.
Drainage and Hydrology Disruptions	• Excavated channels to follow contours to avoid interference with surface drains. • Where the drainage system and pavements might be interfered with, restoration to be done after construction activities are completed. • Whenever necessary, drains along the construction line are directed towards existing drainage systems to cater for storm water during the rains. However, construction should be carried out during a dry season and should take the shortest period possible. • Utilize excavated soil to level excavated ground where necessary and cover the water and sewer lines that will have been laid in the ground. • Construction materials and other debris (lime, cement, and fresh concrete.) should be handled carefully to prevent them from finding their way into the nearby water sources.

Associated Impact	Proposed Management Actions
	• Ensure compliance with environmental laws.
Interruption of Existing Infrastructure	• Roads both main roads and feeder roads in the towns and estates • Underground utilities e.g., water lines and communication lines • Fences and temporal structures along the main roads
Waste Generation Impacts (Liquid and Solid)	**(i) Solid Wastes** • The contractor shall develop a comprehensive waste management plan prior to commencement of works. • Properly labelled and strategically placed waste disposal containers shall be provided at all places of work. • Recycling of construction material shall be practiced where feasible e.g., containers and cartons. **(ii) Liquids Wastes** • Water containing pollutants such as concrete or chemicals should be directed to a conservancy tank for removal from the site where applicable. • Potential pollutants of any kind and form shall be kept, stored, and used in such a manner that any escape can be contained. • Wash areas shall be placed and constructed in such a manner to ensure that the surrounding areas including groundwater are not polluted. • No grey water runoff or uncontrolled discharges from the site or working areas to any. **(iii) Hazardous Wastes** • Ensure proper handling of lubricants, fuels and solvents while maintaining the equipment. • Any chemical or fuel spills shall be cleaned up immediately. The spilt liquid and clean- up material shall be removed, treated, and transported to an appropriate site licensed for its disposal. • A safety and emergency response plan will need to be developed for all operations with emphasis on the protection of the environment prior to start up.
Loss of livelihoods	• Prepare a comprehensive Resettlement Action Plan (RAP) for purposes of compensation for land, assets and crops for the Project Affected Persons (PAPs)

Associated Impact	Proposed Management Actions
	• Prepare a Grievance Redress Mechanism (GRM) to guide all grievances and complaints emanating from compensation issues. • Providing fair and timely compensation to displaced persons, including compensation for lost land, property, and livelihoods. • Offering support services such as vocational training, employment opportunities, and access to alternative land for agricultural purposes. • Engaging with affected communities in the decision-making process and ensuring their participation in project planning and implementation. • Implementing transparent and accountable grievance redress mechanism to address concerns and disputes related to displacement effectively
Social Risks	**(i) Labor Influx Effects** • Effective community engagement and strong grievance mechanisms on matters related to labor. • Effective contractual obligations for the contractor to adhere to the mitigation of risks against labor influx, the contractor should engage a local community liaison person as provided for in Chapter 6 • Proper records of labor force on site while avoiding child and forced labor. • Comply to provisions of WIBA 2007 • Develop and implement a children Protection Strategy, this strategy will ensure that no child under the legal age of 18 years in employed to the Project. **(ii) Human Right and Gender Inclusivity** • Mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 Gender Rule. • The existing community structures headed by location chiefs should be involved in local labor hire, emphasize the requirement of hiring women, youth, and people with disability. • Protecting Human Risk Areas Associated with, Disadvantaged Groups, Interfering with Participation Rights and interfering with Labor Rights **(iii) Child Protection** • Develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project. • All staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behavior.

Associated Impact	Proposed Management Actions
	• Children under the age of 18years should be hired on site as provided by Child Rights Act (Amendment Bill) 2014. **(iv) Prevalence of Communicable Diseases** • HIV/AIDS Awareness Program and other communicable diseases to be instituted and implemented as part of the Contractor's Health and Safety Management Plan to be enforced by the Supervising Engineer. • This will involve periodic HIV/AIDS and other communicable diseases Awareness Workshops for Contractor's Staff. • Access to Contractor's Workforce Camps by outsiders to be controlled. • Contractor to provide standard quality condoms to personnel on site.
Operation Phase	
Public Health and Safety	• Educate community against interfering with sewer infrastructure for example pipes and water valves. • Conduct continuous monitoring to curb vandalism; monitoring can also be done through use of online electronic monitoring gadgets to enable curb vandalism on time. • Ensure that, sewerage connection infrastructure is tested for integrity prior to commencing work.
Odour and Air Pollution:	• Regular maintenance and cleaning of the sewer lines, • Installation of odour control systems such as activated carbon filters or biofilters, can help mitigate odour and air pollution issues.
Potential Contamination of Water Sources:	• Implementing regular monitoring programs to detect leaks • Promptly repairing any damaged or leaking sewer lines can help prevent contamination of water sources. • Ensuring that sewage treatment plants are operating effectively can reduce the risk of contamination.
Infrastructure Damage and Disruptions:	• Proper planning of maintenance activities to minimize disruptions to traffic flow, • Timely repairs of any damages caused to roads or infrastructure, can help mitigate this impact. • Implementing traffic management plans and providing advance notice to residents about planned maintenance activities can help minimize inconveniences.

Associated Impact	Proposed Management Actions
Vandalism	• The county government through NIWASCO shall educate the community about the importance of sewer infrastructure and the negative impacts of vandalism on public health, the environment, and community well-being. • NIWASCO shall foster a sense of ownership and pride in the sewer system by involving local residents in its protection and maintenance. • NIWASCO shall install clear signage indicating that the sewer infrastructure is protected by law and that vandalism will be prosecuted. • The project proponent Consider situating infrastructure in areas with high visibility and natural surveillance to discourage vandalism. • NIWASCO shall employ security personnel and community patrol appointees to monitor sewer infrastructure and respond promptly to any suspicious activities. • NIWASCO shall collaborate with local law enforcement agencies and community organizations to establish neighborhood watch programs aimed at preventing vandalism and promoting community safety. • The NIWASCO technical team shall ensure prompt repair of any damage to sewer infrastructure to minimize service disruptions and prevent further deterioration.
Social Disruptions:	• Engaging with the community through effective communication channels, providing timely updates on maintenance schedules, and addressing any concerns or complaints promptly can help minimize social disruptions. • Involving local community members in the planning and decision-making processes related to sewerage system operation can foster a sense of ownership and cooperation.
Decommissioning phase	
Loss of livelihood	• Establish social safety net programs, including unemployment benefits, job retraining grants, and financial assistance, to support affected workers and their families during the transition period. • Implement community development projects aimed at creating employment opportunities, improving infrastructure, and enhancing local amenities to stimulate economic growth and mitigate the negative impacts of job losses. • Notify the employees in advance on the Project closure date and adequately compensate them. • Dismissal procedures to be compliant with Employment Act, 2007.

Associated Impact	Proposed Management Actions
	• Provide counselling & alternative skills for alternative activities. • Employer should find alternative means of livelihood for the staff who were employed at the sewerage project where possible.
Air Pollution	• Provide appropriate Personal Protective Equipment (PPE) for workers involved in decommissioning. • Apply water on exposed areas and access roads to suppress dust emissions. • Transportation trucks carrying debris and scrap materials should be well covered.
Solid Waste Generation	• Execute careful demolition to maximize material reusability. • Sell or donate reusable/recyclable materials to minimize waste. • Adhere to an approved Decommissioning plan by the National Environmental Management Authority (NEMA) for proper site rehabilitation and waste management.
Water Pollution	• Implement a comprehensive waste management plan to handle, store, and dispose of materials and waste properly. • Minimize the use of harmful chemicals or substances during decommissioning. • Develop spill prevention and response protocols to handle any accidental releases of pollutants.
Noise and Vibration	• Schedule demolition activities during daytime hours when noise impact is expected to be lower. • Choose demolition equipment designed to minimize noise emissions. • Conduct regular maintenance of equipment to prevent excessive noise
Occupational Health and Safety Concerns	• Supply proper Personal Protective Equipment (PPE) and provide safety training to workers. • Establish designated pathways for machinery and personnel movement. • Develop incident reporting mechanisms to address any safety concerns promptly.
Disruption of Ecosystems	• Restore the land to its original state by revegetating the surrounding. • Development of a decommissioning plan to take care of the native ecosystem. • Conduct biodiversity assessment before decommissioning • Unnecessary cutting down of trees should be avoided.

Project Specific EOHS clauses

When drafting clauses for Environment, Occupational Health, and Safety (EOHS) in works contracts, it's crucial to be specific and comprehensive to ensure compliance with both local laws and international best practices:

(i) General Rules of Hygiene, Health, and Safety (HHS) on Construction Sites:

The Contractor must adhere to and enforce strict hygiene, health, and safety standards as per the Occupational Safety and Health Act (OSHA), 2007, and other applicable laws. This includes regular safety drills, the provision of personal protective equipment (PPE) to all workers and ensuring that all machinery and equipment are maintained to statutory standards.

(ii) STD - HIV Awareness:

The Contractor shall implement an ongoing STD and HIV awareness and prevention program, which includes providing educational workshops, access to voluntary testing and counseling services, and distributing informational materials to all employees in accordance with the HIV and AIDs Prevention and Control Act 2006.

(iii) Management of Relationships Between Employees and Local Communities:

In line with the provisions of Child Rights Act (Amendment Bill) 2014, Sexual Offences Act 2006 and Labour Relations Act 2012, The Contractor shall establish and enforce policies to manage interactions between employees and local community members, emphasizing the protection of minors and other vulnerable groups. This includes conducting background checks on employees, training on ethical behavior, and setting up a grievance mechanism for community complaints.

(iv) Consideration of Gender Equity and Prevention of Gender-Based Violence (GBV):

The Contractor must actively promote gender equity and take measures to prevent and address any incidents of gender-based violence and sexual exploitation and abuse. This includes providing gender sensitivity training to all employees, enforcing a strict non-discrimination policy, and establishing a safe and confidential reporting and response system for GBV cases.

(v) **Management of 'Chance Finds':**

In the event of a chance find (discovery of any archaeological or cultural artifacts during construction), the Contractor must immediately halt construction activities at the site and notify the National Museums of Kenya. The Contractor shall comply with all directives from relevant authorities concerning the preservation, documentation, or removal of such finds.

Capacity-Building.

Capacity building for the Proposed Last Mile Connectivity (LMC) for Chogoria Sanitation Project is a critical component that ensures the project's success and sustainability. Areas of consideration in planning and implementing capacity building strategies include:

(i) **Stakeholder Engagement**: Engage local communities, government bodies, and potential users of the sewer systems from the onset. This includes conducting workshops, public consultations, and information sessions to gather input and build ownership among the community.

(ii) **Training and Development**: Develop a comprehensive training program for local staff and management teams on the operation, maintenance, and administration of the sewerage system. This could include technical training on system mechanics, as well as administrative training on billing, customer service, and regulatory compliance.

(iii) **Technical Assistance**: Provide ongoing technical support to the local operators of the water system. This might involve periodic visits from experts, access to troubleshooting support, and updates on new technologies or methods that could enhance system efficiency.

(iv) **Institutional Strengthening**: Help local institutions develop the capabilities to manage sewer systems effectively. This might include assistance in policy formulation, regulatory frameworks, and improving interagency coordination.

(v) **Community Participation**: Encourage community participation in the maintenance and monitoring of the sewer systems. Initiatives could include forming user groups or committees responsible for minor maintenance tasks or monitoring water quality and supply issues.

(vi) **Sustainability Practices**: Train stakeholders in sustainable practices such as water conservation techniques and the integration of renewable energy sources (if applicable) to power the sewer systems.

(vii) **Monitoring and Evaluation**: Implement a robust monitoring and evaluation framework to assess the effectiveness of capacity-building activities. This should include metrics to evaluate the improvement in skills, efficiency of the sewer systems, and satisfaction levels among the community.

(viii) **Adaptability and Resilience**: Prepare local teams to adapt to changing conditions, such as population growth or climate change impacts, which could affect sewer systems needs or system operations.

Resettlement action plan's (RAP)

The assessment conducted on the Proposed Last Mile Connectivity (LMC) for Chogoria Sanitation Project in the context of the African Development Bank's Integrated Safeguards System (ISS), 2013, on involuntary resettlement: land acquisition, population displacement and compensation. Has revealed promising outcomes regarding the potential impacts on People Affected by the Project (PAPs). With no identified PAPs necessitating the establishment of a compensation framework. The identified issues shall be addressed under

the Environmental and Social management Plan (ESMP) as proposed in the Environmental and Social Impact Assessment report.

Table 0-6: Proposed interventions to facilitate businesses during construction period.

Issue	Remedial Action
Impacts on hawkers	Contractor to ensure hawkers are safely guided on safe areas to continue with their businesses
Impacts on temporary businesses along project wayleave	Businesspersons to be encouraged to temporarily move to spaces not impacted by project
Temporary disturbances to businesses and pavements at key urban centres	• Excavations and pipe laying to be conducted off business hours. • Temporary crossing points to be established along the excavated channels to facilitate customer crossings. • Continuous engagement with business owners to ensure their continuous involvement in project decisions. • Restored to the greatest extent possible all pavements impacted on by their construction works in accordance with the ESMP. • Implementation of the project SEP

The project shall make statutory payments to the various road agencies as stipulated under the law to facilitate the use of road corridors and crossings as illustrated in below:

Table 0-7: Estimated statutory payments to various road agencies.

Institution	Length (km)	Estimated statutory compensation level (KES)
Kenya National Highways Authority (KeNHA)	2.17	250,000.00
Kenya Urban Roads Authority (KURA)	2.6	50,000.00
Kenya Rural Roads Authority (KeRRA)	7.2	100,000.00
Sub-total		**400,000.00**

Conclusion and Recommendation

The following are some of the recommendations made to minimize or mitigate for the adverse environmental and social impacts from the proposed project:

(i) There is need for rigorous implementation of the Environmental Management and Monitoring Plan which will facilitate the mitigation and/or prevention of potentially adverse environmental impacts.

(ii) The proposed ESMMP should be followed fully by the contractor with the supervision from the proponent. A report on the findings from the monitoring of the ESM&MP right from implementation all through to decommissioning phase submitted quarterly.

(iii) The mitigation measures proposed should be followed by the proponent as it is highlighted in this ESIA report.

(iv) The design, construction and operation should be carried out in accordance with the specific report for the proposed project.

(v) All contractor's employees and any other person visiting the site should be provided with appropriate PPE and trained on their proper use.

(vi) On completion of the Civil Works, NIWASCO to commission an Independent Consultant to undertake an initial Environment, Social, Health and Safety Audit as required by Environment Impact Assessment and Audit Regulations of 2003. The audit will identify non-conformities which the Contractor together with NIWASCO will address through the defect's liability period of the Project. This audit will also form basis of annual Project self-audits by NIWASCO.

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LIST OF ACRONYMS AND ABBREVIATIONS

AfDB	African Development Bank
BETA	Bottom-Up Economic Transformation Agenda
ECDE	Early Childhood Development Education
EIA	Environmental impact assessment
EMCA	Environmental Management and Coordination Act
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental Social Management and Monitoring Plan
ESMP	Environmental and Social Management Plan
HIV/AIDS	Human immunodeficiency virus/ Acquired immunodeficiency syndrome
KeNHA	Kenya National Highways Authority
KeRRA	Kenya Rural Roads Authority
KFS	Kenya Forest Services
KNBS -	Kenya National Bureau of Statistics
KTSWSSP	Kenya Towns Sustainable Water Supply and Sanitation Program
KURA	Kenya Urban Roads Authority
LM	Lower Midland
LMC	Last Mile Connectivity
MDG	Millennium Development Goal (
MTP	Medium-Term Plan ()
NEMA	National Environmental Management Authority (),
NIWASCO	Nithi Water and Sanitation Company
OP	Operational Procedures (
OS	Operational Safeguards
OSHA	Occupational Safety and Health Administration
PAPs	Project Affected Persons
PCEA	Presbyterian Church of East Africa

RE	Resident Engineer
RoW	Right of Way (
SDG	Sustainable Development Goal
TWWDA	Tana Water Works Development Agency
VMGs	Vulnerable and Marginalized Groups
WIBA	WORK INJURY BENEFITS ACT
WRA	Water Resources Authority
WSP	Water Service Provider

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

1. INTRODUCTION

1.1. Project Background

The Government of Kenya through Tana Water Works Development Agency – TWWDA received a loan from the African Development Bank (AfDB) for the implementation of the Construction of the Chogoria Sanitation Project under the Kenya Towns Sustainable Water Supply and Sanitation Program (KTSWSSP). The goal of the program was to improve the health and quality of life and reduce poverty levels of the population of Kenya through the provision of water and sanitation services in a sustainable manner.

According to WASREB Impact Report No. 15 of 2023, The population served with sewerage services remained at 16% despite the number of people served increasing by 5.7%. This increase was equivalent to 231,779 people which is low compared to the 459,781 increases in service area population. The total sanitation coverage remained constant at 93%.

Tana Water Works Development Agency in its mandate of developing, maintaining, and managing National Public Water Works undertook the construction of the Chogoria Sanitation Project. The Project was planned to improve the Sanitation Services in Chogoria Towns and its environs within Tharaka Nithi County. Construction of the Chogoria Sanitation Project began in 2019 and was completed in 2023 and is yet to be officially commissioned. The project will see more than 6500 people of Chogoria and its environs benefit from access to sanitation services. The Chogoria Sewerage Project is currently not operational yet since there are no interconnections yet. To realize the potential of the sewerage infrastructure, there is a need to undertake connections from households or institutions to the new sewerage system.

This report therefore presents a ESIA study for the proposed implementation of Last Mile Connectivity sanitation project for Chogoria.

1.2. Project Justification and Rational

TWWDA has developed a strategic plan for the period 2023 – 2027 with the aim of improving access to water and sanitation services by increasing sewage and sanitation coverage from 8.1% to 30% over the planning period. The Project is among the initiatives of the Board towards achieving the strategic goal above. The Project addresses improved sewage and sanitation coverage, in small towns and surrounding rural areas that underpins the Kenyan economic and social developments (Vision 2030) and its associated Medium-Term Plan (MTP) IV, Bottom-Up Economic Transformation Agenda (BETA), Sustainable Development Goal (6) which is the new 2030 agenda and expands Millennium Development Goal (MDG) as guided by resolutions of Rio+20 conference. The goal focuses more on investment in adequate infrastructure in Water, Sanitation, Hygiene, Water Quality, Wastewater Management, Water Scarcity and use Efficiency, Integrated Water Resource Management and Protection of Water related Ecosystems.

According to WASREB Impact Report No. 15 of 2023, The population served with sewerage services remained at 16% despite the number of people served increasing by 5.7%. This increase was equivalent to 231,779 people which is low compared to the 459,781 increases in service area population. The total sanitation coverage remained constant at 93%.

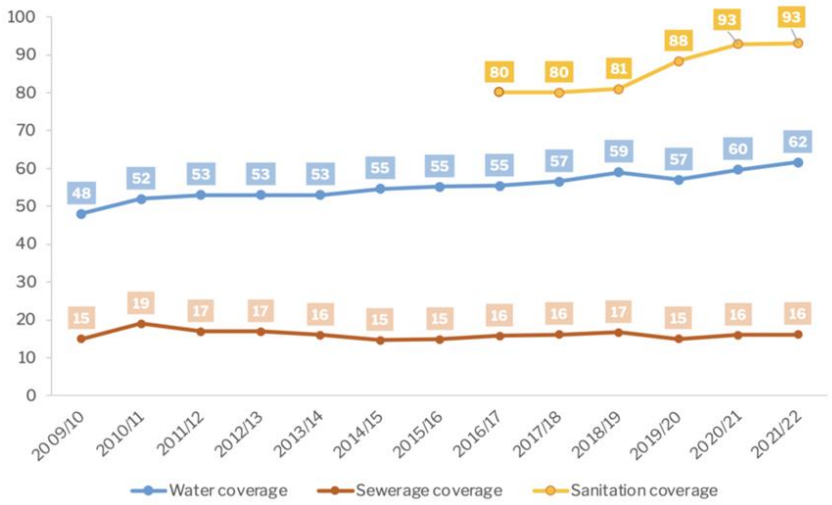


Figure 1.1: Trends in water and sewerage coverage (Source: WASREB Impact Report No.15 of 2023)

1.3. The Rationale for the ESIA

The Kenya government policy on projects or activities such as the proposed last mile connectivity (LMC) for Chogoria Sanitation Project requires that an Environmental Impact Assessment (EIA) be carried out at the planning stages of the proposed undertaking to ensure that significant impacts on the environment are taken into consideration during the design, construction, operation, and decommissioning of the project. The "Integrated Environmental Assessments," which is a more holistic approach to the evaluation of the proposed project, was used to undertake an environmental impact assessment and develop a comprehensive report for the proposed project.

1.4. Objectives of the ESIA

The principal objective is to highlight the possible positive and negative environmental and social impacts expected during the establishment and operation of the proposed project, with the aim of proposing the possible mitigation measures to the negative impacts. This is in line with ensuring that such a development does not negatively impact the environment in terms of social, health, economic and physical (soil, water, plant, and animals) state of the area. The CPR identified the possible environmental impacts during the construction, implementation, and operational phases of the project. The exercise was carried out in accordance with the National Environmental Management Authority (NEMA), Environmental Impact Assessment and Audit Regulations and guidelines.

In brief, the specific objectives of the study were to:

(i) Describe the proposed project including the technology to be used.

(ii) Collect, collate, and present baseline information (Physical environment, biological environment, and Socio-economic and cultural environment)

(iii) Identify impacts, both positive and negative, the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated; and identify possible mitigation measures.

(iv) Carry out stakeholders' participation and consultations to collect the concerns, expectations, and opinions of affected, concerned, and interested stakeholders.

(v) Prepare a comprehensive Environmental and Social Management Plan (ESMP)

(vi) To present results of the ESIA in such a way that they can guide in informed decision-making.

1.5. Study Approach and Methodology

At the start of the project, the consultant performed screening and scoping exercises to eliminate unnecessary data collection. The data gathering process involved a variety of methods including questionnaires, observations, photography, site visits, desktop environmental studies, and, where needed, scientific tests. These methods adhered to the criteria and manner outlined in sections 31-41 of Part V of the Environmental (Impact Assessment and Audit) Regulations, 2003.

The project's report adopted an inter alia approach, which covered environmental, social, cultural, economic, safety, and health impacts. This comprehensive review ensured that all potential negative effects were identified, and measures proposed to mitigate them adequately. Given the significance and scale of the Proposed project, a detailed environmental impact assessment report was deemed necessary. This approach was chosen to guarantee a thorough and complete assessment, following the methodology outlined:

1.5.1. Environmental Screening

This is the first stage when the proposed project was evaluated guided by EMCA cap 387 In screening, we checked whether or not a particular project falls within a category that requires an ESIA before commencement. According to schedule 2 of EMCA, Cap 387 and in legal notice no. 31 of April 30, 2019 (2; 3c), proposed last mile connectivity (LMC) for Chogoria Sanitation Project is categorized as High-Risk Projects under "Waste disposal works, including" among projects requiring an ESIA.

Additionally, the project also falls under **moderate risk (category 2**) of the Africa Development Bank Environmental and Social Safeguards Policies as defined in the Bank's Operational Safeguards (OSs). The project does not lead to displacement of Project Affected Persons (PAPs). This report has been prepared for submission pursuant to Regulation 7 (4) of the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019 of the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019.

In addition, screening was done in accordance with the NEMA regulations on environmental and social safeguards which informed the ESIA process. Some considerations during the screening process included physical site location, environmental sensitivity of the areas surrounding the proposed site, nature of community and social activities in the project area.

1.5.2. Desk Study

Documentation review provided an understanding of the terms of reference, environmental and social status, demographic trends, land-use practices, development strategies and plans as well as the policy and legal documents.

1.5.3. Physical Inspection of the Site and Surrounding

In February 2024, a physical inspection of the proposed site, including field investigations of the site and its surrounding areas, was conducted. These investigations aimed to examine the physical characteristics of the site and the environmental condition of the nearby areas with the purpose of identifying the expected impacts of the project on these elements.

1.5.4. Public Participation

During the Environmental and Social Impact Assessment (ESIA) process for the proposed last mile connectivity (LMC) for Chogoria Sanitation Project, significant emphasis was placed on public participation. This was achieved through public meetings, questionnaires, and interviews with key stakeholders and informants. Questionnaires were distributed to project stakeholders and beneficiaries to gather a wide range of insights and concerns. The information collected was synthesized and included in the comprehensive ESIA Project Report.

To ensure broad community engagement and feedback, a major public meeting was conducted, which saw participation from various community members and representatives of project stakeholders. The attendance list and minutes of this public consultation meeting were documented in appendices VI and V, respectively. This meeting aimed to gather the community's concerns and views directly, ensuring their perspectives were considered in the project planning.

Additionally, key informant interviews and consultations were carried out, as detailed in chapter 5 of the report, to gather in-depth insights from stakeholders with specific knowledge or interest in the project. These efforts underscored the project's commitment to incorporating the views and addressing the concerns of all those potentially affected by the proposed project.

1.5.5. Structure of the Report

The Environmental and Social Impact Assessment (ESIA) report was compiled based on the findings from the assessment process, adhering strictly to the Environmental Impact Assessment (EIA) guidelines provided by

the National Environment Management Authority (NEMA) for a Comprehensive Project Report. Throughout the assessment, the consultants maintained open and consistent communication with the project proponent, ensuring they were well-informed at every stage.

The culmination of this exercise was the creation of the Comprehensive Project Report. This report is structured to guarantee that the proposed development aligns with the Environmental Management and Coordination Act (EMCA, Cap 387), emphasizing compliance with environmental regulations and sustainable development principles. The report is in 9 chapters, each presumably covering different aspects of the assessment and findings to provide a detailed overview of the project's environmental and social impacts:

- Chapter 1: Introduction: Gives Background Information to the Study Describing the Objectives and the Terms of Reference.
- Chapter 2: Nature of the project: Description of Project Site.
- Chapter 3: Baseline Information: Outlines the Baseline Information of the Study Area.
- Chapter 4: National Policy, Legal and Institutional Framework: Description of pertinent legislative and regulatory considerations.
- Chapter 5: Public Participation and Stakeholder Consultation: Summarizes the outcome of the Stakeholder Engagement and Public Consultations process.
- Chapter 6: Analysis of Proposed Project Alternatives: Gives the analysis of the project alternatives.
- Chapter 7: Potential Impacts and Mitigation Measures: Evaluation of project alternatives (Design, location, materials, and technology).
- Chapter 8: Environmental and Social Management & Monitoring Plan (ESMMP)
- Chapter 9: Conclusion and Recommendation: Concludes the findings and recaps the main recommendations.
- Chapter 10: References
- Chapter 11: Appendices

2. BASELINE, ENVIRONMENTAL AND SOCIAL CONDITIONS

2.1. Project Location

The proposed Last Mile Connectivity (LMC) for Chogoria Sanitation Project for the Chogoria is located in Maara Sub County in Tharaka-Nithi County Error! Reference source not found.. Tharaka-Nithi County is one of the forty-seven (47) counties in Kenya created by the Constitution of Kenya, 2010, and is located to the East of Mt Kenya.

The county is divided into five sub-counties namely, Maara, Igambang'ombe, Meru South (Chuka), Tharaka North, and Tharaka South Sub Counties. These Sub-Counties are subdivided further into 15 wards, 53 locations, and 134 sub-locations.

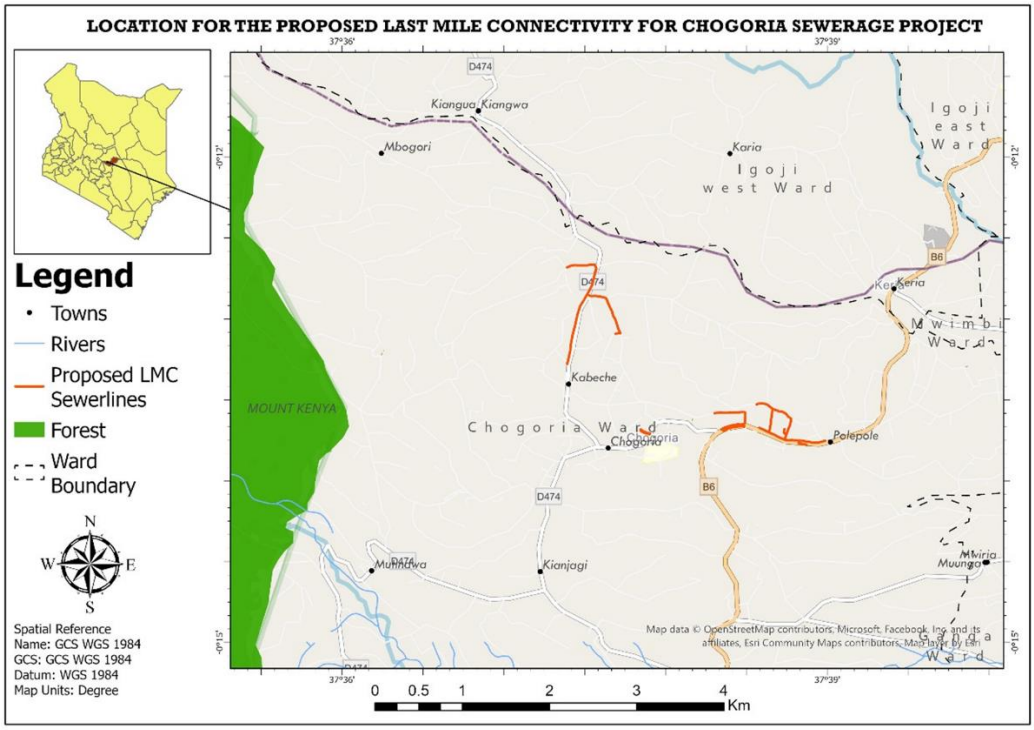


Figure 2.1: Proposed project location

The project area is located about 185 km from Nairobi City on the Nairobi – Meru Highway.

2.2. Social Setting

2.2.1. Population

The Project area had a total population of 114,894 people and an average population density of 431 people per Km2 in the year 2019 according to KNBS 2009 Population and Housing Census. The population comprises of 57,689 males, 57,205 females.

2.2.2. Education

The Project area's educational institutions consist of Nursery schools Early Childhood Development Education Centers (ECD), Primary Schools, Secondary Schools and tertiary institutions such as Youth Polytechnics, other Training Institutions and Universities Colleges. As of the year 2013, the Project area had about 64 Primary, 43 Secondary Schools, 11 Youth Polytechnics, 5 other training institutions all spread across the administrative Wards in Mwimbi.

According to Maara sub-County Education office, education institutions enroll children from EDCE centers at an average of four years. The number of girls enrolled is higher than that of boys with dropout rate of boys being higher than girls. The transition from primary to secondary school is 70%. Some of the leading secondary schools include Chogoria Boys and Girls High Schools. There is also a proposed University College at Nturiri. Photographs of some learning institutions within the project area are given below.

Plate 2.1: Kabui High School

Plate 2.2: PCEA Chogoria Girls

2.2.3. Health Facilities

Maara Sub County has a significant network of health facilities, these facilities are run by the government, religious organizations, community-based organizations and private individuals. The health facilities include one Hospitals, Health Centres, Dispensaries, Medical Clinics and other private facilities. The biggest hospital is PCEA Chogoria Hospital in Chogoria urban centre. Table 3.4 and photographs below show the number and type of health facility in each sub-county.

Table 2-1: Health Facilities (Source: eHealth-Kenya facilities)

Sub County	Hospital	Health Centre	Dispensary
Chogoria	1	2	3
Maara		2	3

Murugi		1	3
Kiera		1	2
Ganga		1	3
Total	1	7	14

2.2.4. Transport and Communication

The communication infrastructure is satisfactory; the Project area is accessible through the Nairobi – Embu – Meru Town's main highway. Most of the other roads are graveled and make most of the Project areas accessible. However, some of the roads are not graveled and may be difficult to use during the rainy seasons.

The Project area generally has good mobile phone coverage with Safaricom and Airtel networks available. The areas on the lower remote areas of the Project have poor mobile network coverage because of the hilly terrain. It is estimated that over 70% of the population own mobile phones. Internet connectivity is mainly available in urban centers. There are Post Offices in Chogoria urban centre and Marima market. **Plate 2.3** and **Plate 2.4** show some of the existing transport infrastructure within the area.

Plate 2.3: Images of Chogoria Town

Plate 2.4: Chogoria Meru Highway

2.2.5. Economic Activities

Chogoria urban centre is the major Town in Maara sub-County. It is situated near the main Nairobi–Meru highway. It is endowed with developed infrastructure in terms of transport, and other social amenities like Hospitals, Schools, and Banking Facilities. However, its status has changed after being made the Maara sub-County Headquarters. The County and National Governments Offices situated within the Town have changed its outlook and businesses.

Chogoria Town is served by several prominent Banks among them, Kenya Commercial Bank, Co-operative Bank and Equity Bank. Agency banking has been gaining popularity with the introduction of KCB Mtaani,

Equity Banking Agents and Co-op Kwa Jirani Facilities. Mobile Money Transfer Services especially Mpesa are accessible to many people who have no access to formal Banking Services. There are a few Light Industries in the Project area. Most of these are located in the high agricultural potential areas of Maara and Chogoria, where they mostly undertake the processing of agricultural products especially tea and coffee.

Agriculture is the main economic activity for the Project area. The cash crops of tea and coffee and also horticultural crops are grown in the upper and middle zones of the Project area. This is because the high altitude favours this kind of farming. On the other hand, the low altitude areas which are extensively dry are known for livestock husbandry such as cattle, goats, sheep keeping and honey production. Millet, sorghum and cassava do well in the lowland areas as they are better adapted to the arid climatic conditions. However, subsistence farming forms a large percentage of agricultural activities in this area. Other crops grown in the Project area include maize, beans, cowpeas, tomatoes, onions, potatoes among other crops. **Figure 2.2** illustrates the main land use areas within the Project area. **Plate 2.5** Tea Farming within the Project area are given below.

Plate 2.5: Tea farming in the project area

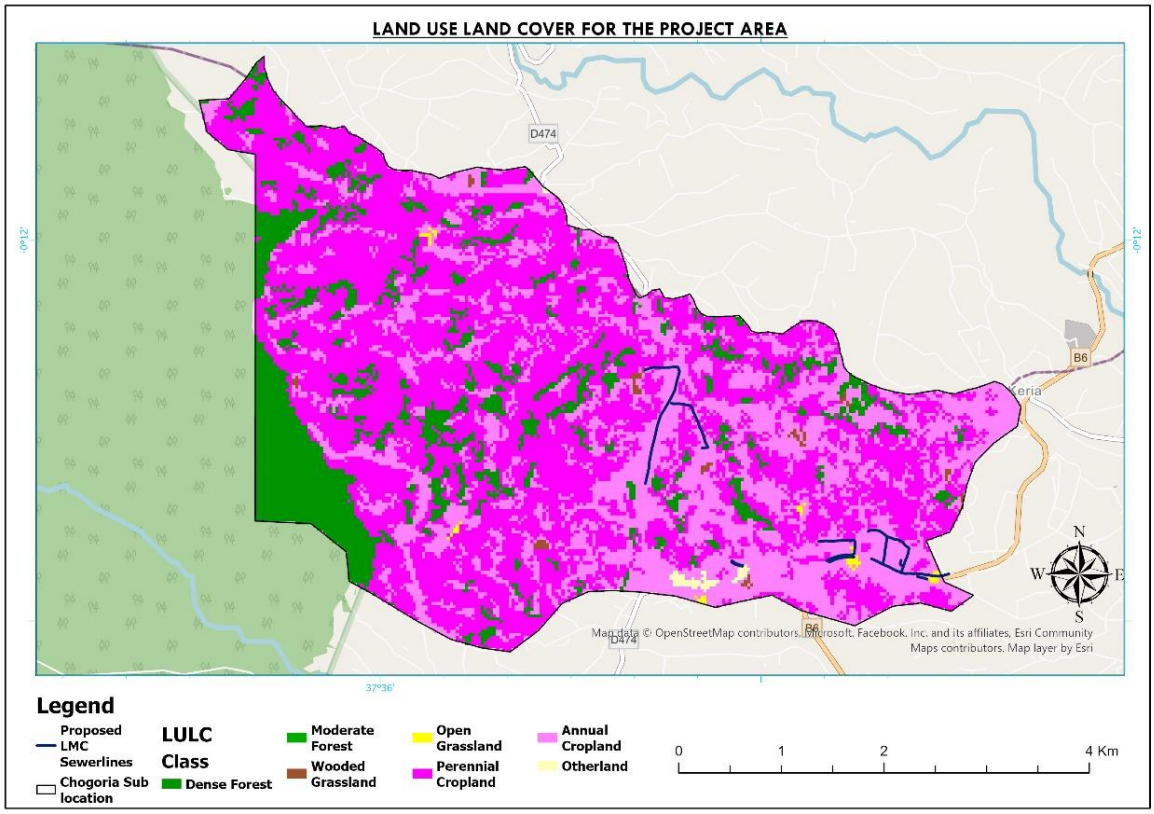


Figure 2.2: Land Use Patterns

2.2.6. Connection to a Water Service Provider

Among the respondent, 51% of respondents are connected to a Water Service Provider, majority being served by Community Water Service Providers who supply raw water **Figure 2.3**.

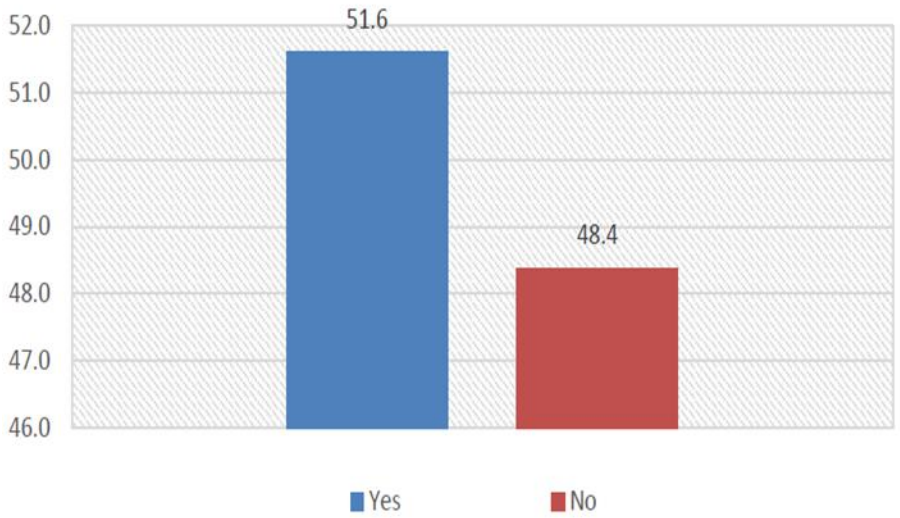


Figure 2.3: Connection to Water Service Provider

2.2.7. Alternative Sources of Water Supply

The respondents who are connected to the Water Service Provider in Chogoria address the unreliable water supply by getting water from street vendors (43.8%), Kiosks (18.8%) and Wells/Boreholes (12.5%) as seen in **Figure 2.4**.

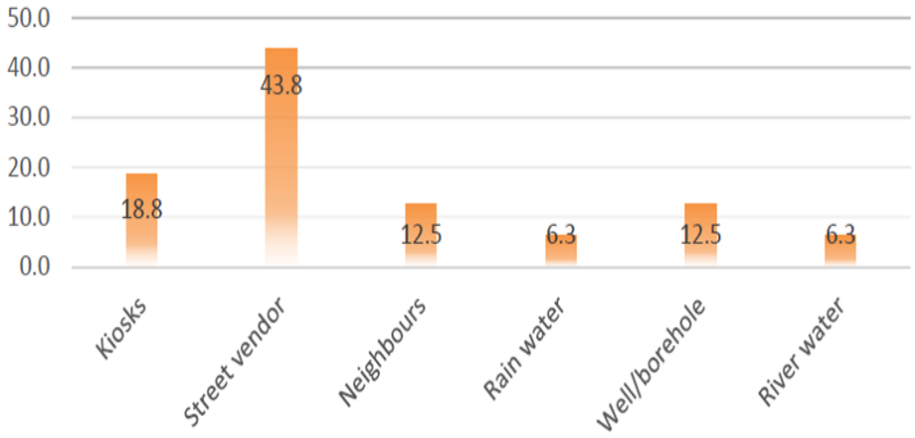


Figure 2.4: Alternative Water Supply

2.2.8. Sanitation Excretion Disposal

The survey established that 70% of respondents in Chogoria Town use pit latrines located behind shops for the case of urban centre while only 12% use septic tanks which are emptied regularity by private exhauster vendors, the entire Town do not have any formal sanitation infrastructure.

2.2.9. Energy Access

The main sources of energy in the project area are firewood, paraffin and charcoal. There is an increase in usage of solar energy especially by health and education institutions that do not have access to electricity lines. The rural electrification program by the National Government has been implemented extensively within the subcounty. Investment in alternative renewable energy sources will enhance reliability of power supply in the county, especially Hydro-electric power generation, solar and wind, biogas energy.

Household energy use in the project area is summarized in **Figure 2.5**.

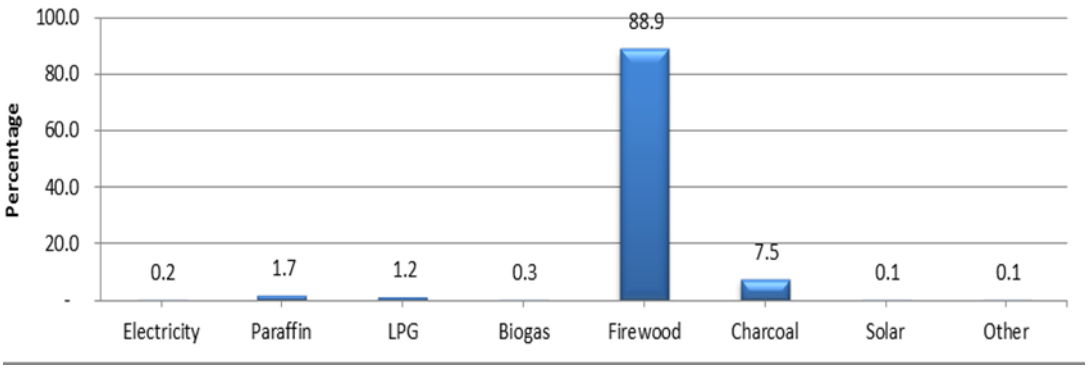


Figure 2.5:Percentage distribution of Household fuel use (source Kenya National Bureau of Statistics (KNBS) and Society for International Development (SID))

2.3. Physical Environment

2.3.1. Topographic Features

The topography of Maara Sub County is greatly influenced by the Mt Kenya volcanic activity creating 'V' shaped valleys within which the main tributaries of Tana River flow originating from Mt Kenya Forest. The highest point has topography of 1775m a.s.l within the Mt Kenya Forest and the lowest point being 1217m.a.s.l as illustrated in **Figure 2.6** below.

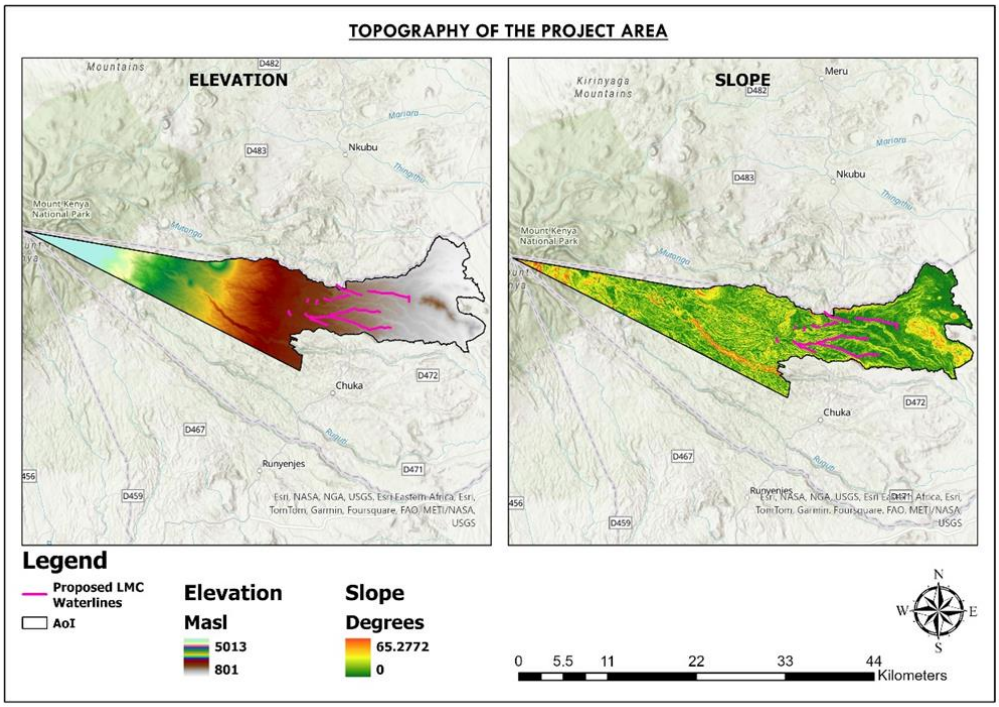


Figure 2.6: Topography

2.3.2. Biological Environment

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, napier grass, avocado, banana, yams (mainly in the river flood plains), cassava, sugar cane, pineapple, arrowroots, and coffee).**Figure 2.2** shows the general vegetation cover and density of proposed project area.

Fauna

Human habitation and agricultural activities have significantly interfered with both terrestrial and aquatic habitats in the Project areas. There is no terrestrial wildlife observed in the Project area 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, freshwater 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).

2.3.3. Climatic Condition

The climate of the Project area is heavily influenced by its geographical location and altitude relative to Mt. Kenya and the equator. The climate in the Project area changes with altitude, becoming semi-arid towards the lower ridges in Maara region. Rainfall is bimodal, with the long rains occurring from March to May, with a maximum in April, and the short rains from October to December. Depending on the altitude, the annual rainfall ranges from between 1,250-2,500mm in the Project area.

Table 2-2 represent the average climate condition in the proposed area. The temperature increases from the highlands to the lowlands; the lowest temperature are experienced in the period from June to July. Average temperature ranges between 16°c to 22°c, but daily temperature is much higher especially in the lower reaches. Monthly evaporation ranges between 1.8 mm in July to 8.3 mm in February, humidity ranges between 36 % in March to 72 % in July.

Table 2-2; Mean Monthly Climatic Conditions Rainfall

	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Avg. Temp°C	18.6	19.5	19.9	19.3	18.6	17.6	16.9	17.2	18.2	18.7	18	18.1

	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Min. Temp °C	14	14.4	15.3	16	15.4	14.1	13.3	13.5	13.9	14.9	15	14.3
Max. Temp°C	23.7	24.8	24.8	23.5	22.7	21.7	21.2	21.7	23.3	23.5	21.8	22.3
Rainfall mm (in)	37	26	56	133	75	25	19	21	18	77	134	53
Humidity (%)	69	64	67	77	76	73	71	70	66	71	82	77
avg. Sun hours (hours)	9.9	10.1	9.5	8.7	8.4	7.5	6.8	7.3	8.8	8.8	7.8	9.

2.3.4. Geology

The upper zone of the Project area is characteristic by loose red volcanic soils with small traces of sandy clays in some areas. The middle zone also has fertile well drained sandy clay soils and has good agricultural potential. The soils of the lower zone are predominantly sandy loams and course gravel patches, they have poor water holding capacity and most of rainwater infiltrates immediately into the ground after rainfall. The basement system in this area is also porous, a situation that has led to the poor moisture content of soils in this area. The photographs below show soils within the Project area.

Plate 2.6: Red Volcanic Soils within the Project area

Plate 2.7: Rock structure within the Project area

2.4. Hydrology

2.4.1. Surface Water Resource

The Rivers in the Project area originate from the Mt. Kenya Forest. These Rivers are in drainage area No. 4 of the Tana Water Catchment System categorization. This drainage Basin is divided into sub-basins namely are

4FA, 4FB 4EA and 4EB. The Project area is within 4EB which includes North Maara, South Maara and Kamara Rivers. These Rivers flow in a south-easterly direction on the eastern slopes of Mt. Kenya. They originate from high in the mountain. They are perennial and have adequate flows all the year round. **Plate 2.8** of River Kamaara which is among the major Rivers in the Project area are given below.

Plate 2.8: River Kamaara

2.4.2. Ground Water Resources

Largely due to the proximity of the region to Mt. Kenya, the source of all surface water draining the catchment originated from Mt. Kenya. 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. Figure 3.4 below indicates the general hydrology flow of the area.

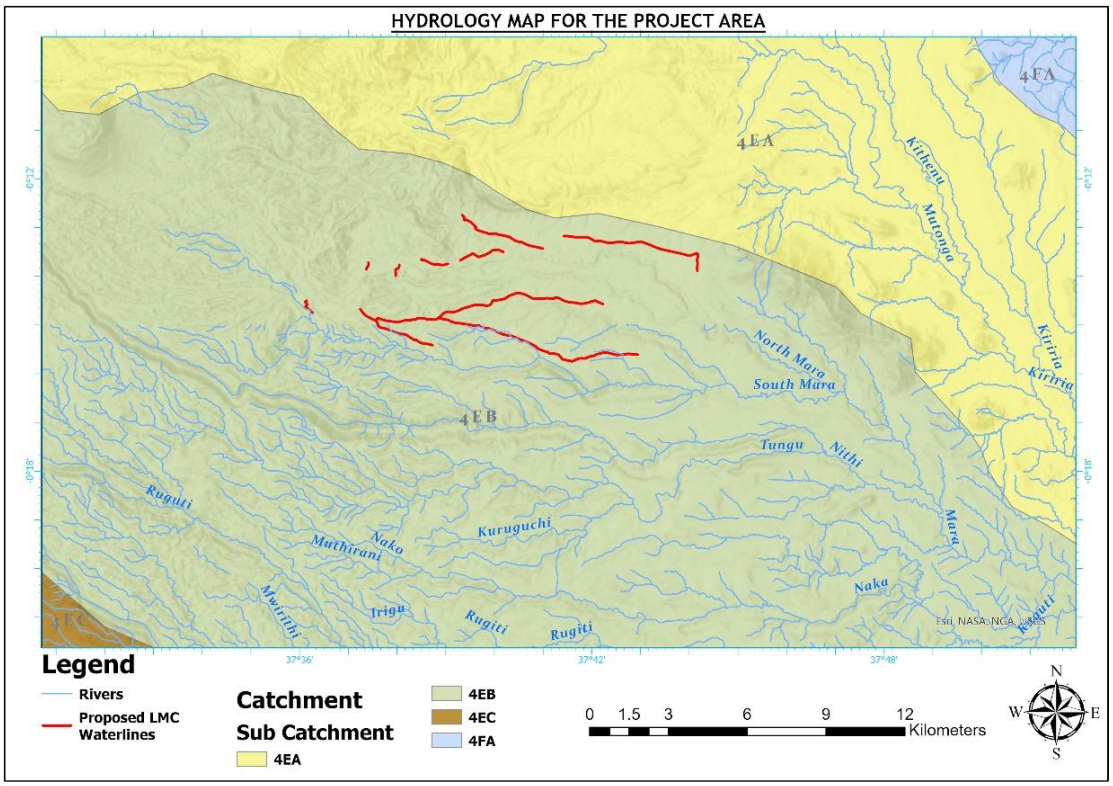


Figure 2.7: Hydrology

3. PROJECT DESCRIPTION

3.1. Existing Wastewater Infrastructure

Nithi Water and Sanitation Company (NIWASCO) is the only Licensed Water Service Provider (WSP) in Tharaka Nithi County incorporated on 6th April,2006 under the Companies Act, Cap 486 and as well as operate as an agent of County government of Tharaka Nithi as per water Act 2016 (Section 77a).

Currently the company is licensed by WASREB as per Water Act 2016 (Section 72(1)) unlike previous Service Provision Agreement (SPA) of November 2012. NIWASCO being an agent of Tharaka Nithi County is mandated to provide water and sanitation services to residents of Chuka-Igambang'ombe, Maara, Tharaka South, Tharaka North and Chiakariga Sub-counties. NITHIWASCO area covers the following administrative sub-counties in Tharaka Nithi County namely Chuka, Igambang'ombe, Tharaka North, Tharaka South, Chiakariga and parts of Maara sub counties.

Before construction of Chogoria Sewerage Project, Chogoria Town had no sewerage infrastructure. The use of on-plot sanitation systems such as pit latrines and septic tanks for wastewater disposal was predominant. For some time, discharge of septage from septic tanks has been managed by use of exhaust vacuum tankers then it's discharged at Embu Sewerage Treatment Works which is approximately 60km away or directly to the environment.

Executive Order No.1 of 2016 vested the functions of Water and Sewerage Services Management Policy, Wastewater Treatment and Disposal Policy and Sanitation Management on the Ministry of Water and Irrigation, all 9. No Water Works Development Agencies, Kenya Water Institute (KeWI), Water Sector Trust Fund and Water Resource Authority (WRA). This was in line with the global goal of Sustainable Development and more specific to **SDG No.6 - To ensure availability and sustainable management of water and sanitation for all:**

Goal 6.2 - Achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

Goal 6.3 - Improve water quality by reducing pollution, eliminating dumping, and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

The Ministry of Water and Sanitation has therefore recognized:

- The need to achieve universal and sustainable access to safely managed sanitation for all as a constitutional obligation, policy commitment and priority.

- The need for assured and sustainable sanitation investment and financing to implement an inclusive sanitation strategy.

Through TWWDA, the Ministry of Water and Sanitation was able to implement the construction of Chogoria Sewerage Project. This goes a long way to show the commitment and effort the Government of Kenya has made to ensure there is equal and worthy investments for sewerage infrastructure and not only on water projects. However, Chogoria Sewerage Project calls for implementation of last mile connectivity project in Chogoria Town in order to realise the full benefits of the sanitation infrastructure which is complete and ready for operations and later commissioning.

3.1.1. Waste Stabilization Ponds (STPs)

Wastewater stabilization ponds was adopted as the most suitable treatment technology for Chogoria Sewage Treatment Works. With a capacity of 1,100m^3 /day, the Waste Stabilization Ponds have been designed to serve the sanitation needs of Chogoria Town up to the ultimate design horizon of Year 2037. The Wastewater Treatment Works is located in Kibura about 10km from Chogoria Town, this distance is significant and flush manholes have been placed along the sewer line route for periodic cleaning.

(a) Inlet Structure

The wastewater then passes through a grit chamber to eliminate grit, preventing accumulation at the pond's base. Twin channels, used alternately, allow for manual sediment removal. Following primary treatment, sewage flows to WSPs via a sullage channel with a Parshall flume for flow measurement, utilizing an ultrasonic device for accurate flow data. Given the small volume of waste, screenings and grit are manually removed and disposed of onsite, ensuring efficient, low-tech maintenance.

Figure 3.1: Inlet Structure

(b) Splitter Box

A splitter box has been constructed to distribute the influent wastewater to the two anaerobic ponds. The distribution chamber has been designed for a detention time of 30 sec.

Figure 3.2: Splitter Box

(c) Anaerobic Ponds

2No Anaerobic ponds have been constructed and are designed on the basis of volumetric organic loading. The acceptable range of loadings is between 100 g/m^{3}d and 300 g/m^{3}d, the former to maintain anaerobic conditions and the latter to avoid odour problems.

Figure 3.3: Anaerobic Pond

(d) Facultative ponds

The ponds have a deep enough to allow for a build-up of sludge over a period of years. Depths are usually within 1.2 m and 2.0 m, with a commonly chosen depth of 1.5 metres, resulting in a retention time of 13 days for the proposed organic surface loading criteria.

Figure 3.4: Facultative Ponds

(e) Maturation Ponds

Maturation ponds are usually constructed as a series of ponds, the size and number of ponds to be provided being governed mainly by the required bacteriological quality of the final effluent. The normal design retention time for maturations ponds is five days. Using the foregoing design values, the faecal coliform concentration in the effluent from a series of maturation ponds can be calculated and the number of ponds chosen to match the effluent quality requirements.

Figure 3.5: Maturation Ponds

2No Sludge drying beds to receive sludge from the ponds.

Figure 3.6: Sludge Drying Beds

Outfall

Figure 3.7: Outfall

Administration building

Figure 3.8:Administration building and guard house.

Staff Houses which consists of.

- 1 No water superintendent unit (Type B)
- 1 No. water operator units (Type C)

Ancillary works that consist of an access road within the treatment works and general landscaping within the facility.

Figure 3.9: General landscaping

Discharge Bay

Figure 3.10: Discharge Bay

3.2. Sewer Trunk Mains

Wastewater from Chogoria Town is conveyed to the new Kibura for treatment. The alignment of all sewers follows existing and/or existing road reserves.

The following sewer lines exist to serve the project area.

Table 3-1: Summary of the treated mains for the sanitation infrastructure

Sewer lines	Line lengths in M	No. of Manholes
Existing Truck Sewer lines		
TS 1	13,770.75	283
TS 1-1	1,642.69	48
Total	**15,413.44**	**331**
Existing Secondary Sewer lines		
TS1. 245	814.03	19
TS1. 246	194.04	4
TS1. 247	658.29	15
TS1. 248	1,160	27
TS1. 249	718.98	19
TS1. 250	593.89	13
TS1. 251	107.61	3
TS1. 257. 8	340.35	9
TS1. 257.9	88.13	2
TS1. 257	453.41	12
TS1. 258. 3	318.05	9
TS1. 258	437.74	11
TS1. 267	130.72	5
TS1. 279	446.68	10
TS1. 281	501.38	13
TS1. 282A	614.64	14
TS1.1.13	533.45	16
TS 1.267A.14	790	19
TS 1.109	340	6
Total Length	**9,241.39**	**226**

3.3. Proposed Last Mile Connectivity Sewer Project

3.3.1. Wastewater generation

Existing practices relates generated wastewater to the per capita water consumption. The amount of wastewater generation is estimated as a factor of water consumption. The total water demand was established in **Table 3-2** below:

Table 3-2: Summary of the Water Demand Requirement

Category	2017	2022	2027	2032	2037
Domestic	423.28	461.66	503.67	561.73	617.03
Education	243.87	266.92	292.25	327.84	365.56
Health	111.61	122.35	136.16	153.30	172.85
Commercial	191.55	211.33	233.16	263.58	295.50
Industrial	134.71	147.56	161.67	181.23	202.00
Total Demand	**1,105.02**	**1,209.81**	**1,326.92**	**1,487.68**	**1,652.94**

Apart from water supplied by Water Service Providers (WSPs) that will be converted to wastewater, the following quantities were also considered while estimating the sewage quantity:

(i) Industrial Effluent

Industrial effluent generation varies from industry to industry and therefore, each individual factory on a Sewerage System must be considered separately. However, for areas designated for future industries whose type is not known, **MWI practice manual for sewerage and sanitation recommends a rate of 20,000 l/ha/day.**

(ii) Infiltration and Inflow

The rate of infiltration into sewer pipes depends generally on the depth of the water table, the sub-soil conditions, the workmanship during construction, the age and condition of the pipes, and the frequency of occurrence of improper connections. Another significant factor is the condition and depth of manholes; where covers are damaged or missing, or where the ground surface level is above cover level, then surface water runoff enter the sewer as inflow. This study adopts the recommendation of **Nairobi City Council manual of infiltration rate of 0.25 to 0.5 l/s/ha within the design coverage area.**

The manual also recommends a "Splash Allowance" of between 5% to 30% of the domestic wastewater depending upon the predominant housing types.

(iii) Subtraction due to water losses

The water loss, through leakage in water distribution system and house connections, does not reach consumers and hence, not appear as sewage. Water Practice Manual in Kenya provides for 20% as the unaccounted-for water in the systems.

(iv) Subtraction due to water not entering the sewerage system.

Certain amount of water is used for such purposes, which may not generate sewage, e.g., boiler feed water, water sprinkled over the roads, streets, lawns, and gardens, water consumed in industrial product, water used in air coolers, etc. the Design of Wastewater Treatments ignores water not entering the sewerage system because water which may not generate sewage is negligible. On this basis, the sewage generation is obtained as: -

- Net quantity of sewage is therefore estimated as

80% (Total water demand + 15% additional due to infiltration)

- Peak Flow Factor and Sewer Capacity

3.3.2. Delineation of Drainage Areas

The Sewerage System for Chogoria Town has been developed based on drainage areas. A drainage area refers to a natural boundary within which the topography permits convergence of surface water flow to a single point at a lower elevation. Flow from all Drainage Areas is collected in a gravity sewerage system to a common treatment works site at Kibura.

A total of four (4) drainage areas have been formulated in Chogoria Town as shown on

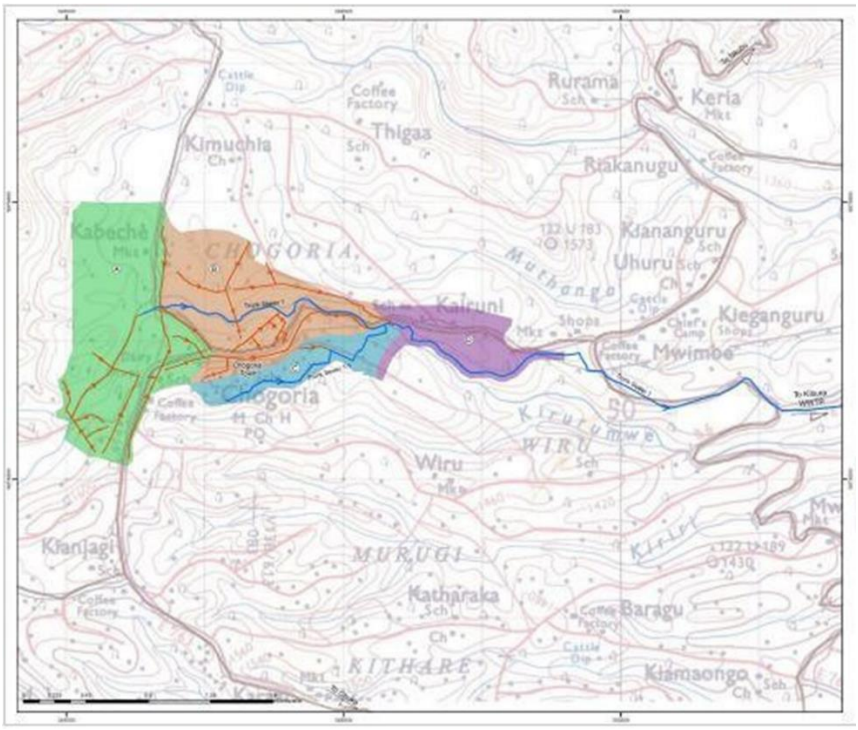


Figure 3.11: Drainage area

3.3.3. Proposed Secondary Sewer Lines

The sewers have been designed for the ultimate year (2037) design flows. Diameter of 200 mm diameter for the secondary sewers of Outfall sewer was adopted.

Considering performance, cost and availability, HDPE and concrete pipes are the most appropriate pipes for use in large diameter sewer construction in Kenya. For smaller diameters, uPVC sewer pipes are more cost effective. Steel pipes are inevitable for aerial river crossings, pumping mains, high impact resistance and bridging ability; either spun iron or mild steel pipes can be used.

The Gravity Sewers for Manyatta "A" Informal Settlement will consist of uPVC pipes and HDPE (Double Walled Corrugated (DWC)) pipes. Shallow sewer sections or those laid on road crossings shall consist of DWC protected with reinforced concrete raft slab.

Concrete and uPVC pipes have been proposed for use in this project and due allowance or protection to the inside of the pipe barrel should be made, in order to counter the effect of sulphuric acid attack.

The lifespan of the sewer pipe considered is supposed to be 50 years.

Table 3-3: Summary of proposed water lines

Secondary Sewer Lines	**Length**	**Pipe Material**	**Manhole numbers**	**Pipe Diameter**
Kabeche-Majira 1 – line	1.520	DWC	28	200
Kabeche -Majira 2- line	1.200	DWC	22	200
Kabeche -Kimuchia 1-line	0.710	DWC	16	200
Banana 1-line	0.300	DWC	8	200
Banana 2-line	0.160	DWC	4	200
Kabeche-Kimuchia 2 Line	0.080	DWC	4	200
KSS 1	0.815	DWC	21	200
KSS1.1	0.945	DWC	27	200
KSS1.1.1	0.160	DWC	6	200
KSS1.3	0.100	DWC	5	200
KSS2	0,700	DWC	19	200
KSS3	0.215	DWC	7	200
Kilifi road	0.550	DWC	16	200
Total Length in (Km)	**7.455km**			

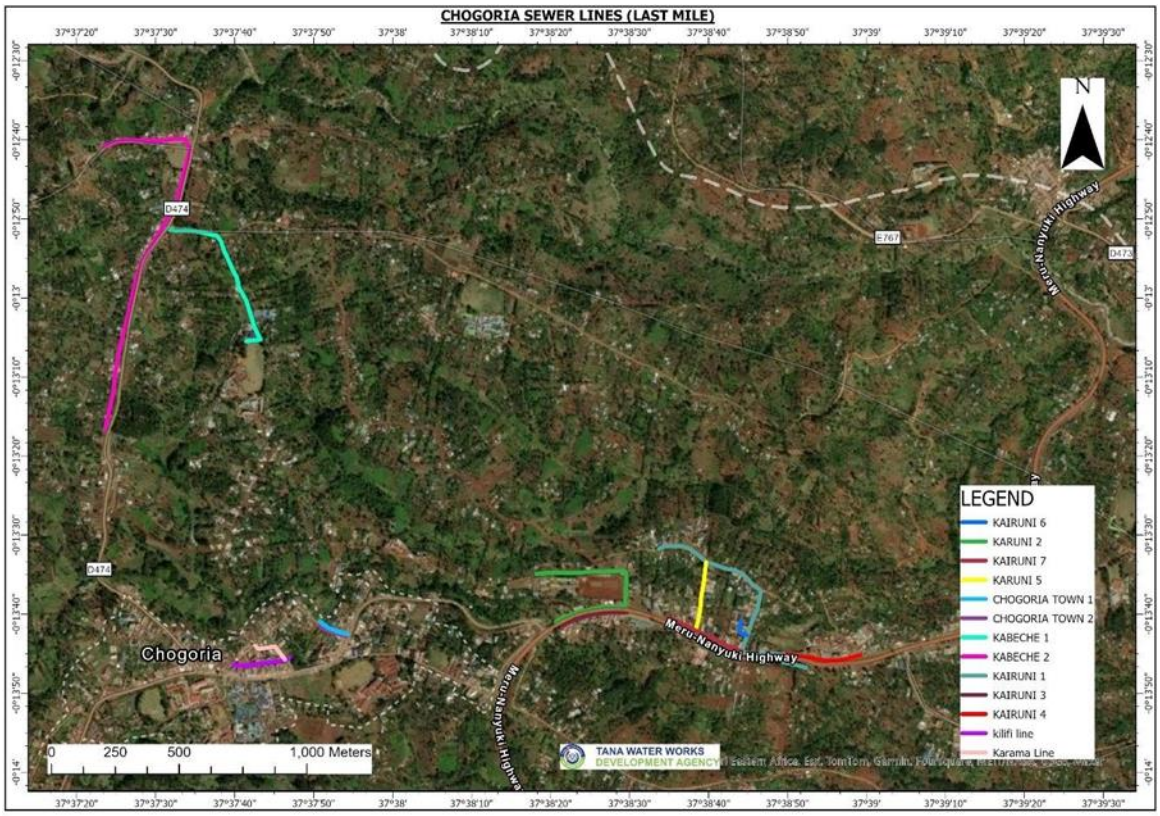


Figure 3.12: Proposed Chogoria last mile Sewer layout

3.3.4. Manholes

Cast in situ or precast concrete manholes have been proposed for use in the project. Heavy-duty cast-iron manhole covers have been proposed for use in trafficable areas, while medium duty manhole covers and frames or equivalent have been proposed where vehicle access is limited. Manhole covers on the road are to be imbedded in road bitumen after final inspection if required. Heavy Duty PVC covers have been proposed in selected areas.

Manholes have been placed at all junctions and, at the top of shallow drops and at all changes of grade and/or direction. The maximum distance between manholes on straight alignment has been proposed to be 60 metres to enable use of hand-operated rodding equipment. Spacing for manholes on the laterals/collector pipes will be maintained at 45m. Manholes to be constructed within areas anticipated to be inundated by a flood of 50 years recurrence interval have been raised so that the covers are above this flood level. The following minimum internal dimensions of manhole have been adopted for the design:

Table 3-4: Minimum internal dimensions of manhole

Depth of manhole (mm)	Rectangular (mm)	Circular (mm)
Less than 750	600 x 500	750
750 – 2000	900 x 600	1000
Greater than 2000	1200 x 800	1250

The minimum height from the soffit of the main through pipe to the underside of the roof slab of a manhole chamber before any reduction in size permitted has been proposed to be 2 metres.

3.3.5. Benching

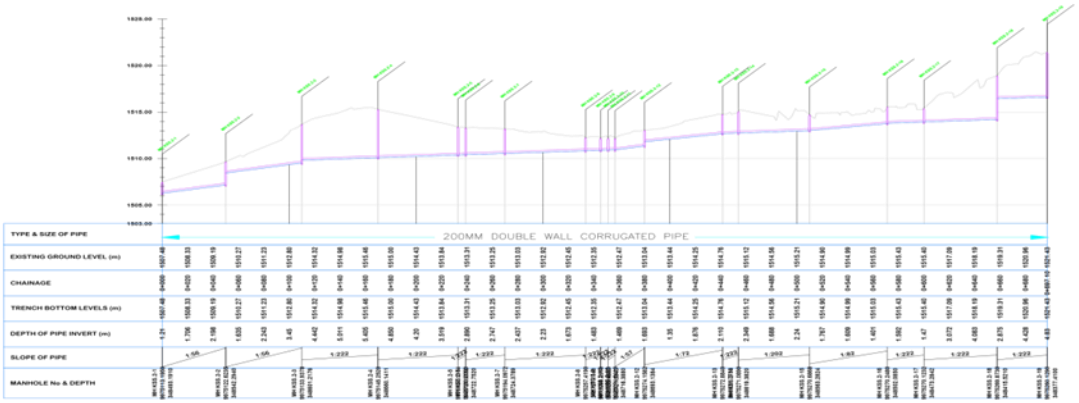
The area of benching in each manhole that would permit a man to stand easily, comfortably and without danger to him, on such benching while working in the manhole has been provided.

Manholes benching have been designed at grades ranging between 1 in 5 and 1 in 25 and will be battered back equally from each-side of the manhole channels such that the opening at the level of the soffit of the pipes will have a width of 1.2 d where d is the nominal pipe diameter.

3.3.6. Estimated Project Implementation Cost

The estimated cost of the project is approximately **One hundred and eighty-five million eight hundred and one thousand three hundred and twenty-nine shilling and eighty cents (Ksh. 185,801,329.80)**

SECONDARY SEWER KSS.2- PLAN



LONGITUDINAL SECTION OF SECONDARY SEWER KSS.2

NOTES
1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
2. GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
3. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 0.8m. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE.

LEGEND:
- PROPOSED PIPELINE
- EXISTING GROUND PROFILE
- TARMAC ROADS
- FENCE
- K.P.L.C POWER LINE
- DN – NOMINAL DIAMETER
- PN – NOMINAL PRESSURE
- SEWER MANHOLE – PLAN VIEW
- BUILDINGS
- COFFEE TREES
- K.P.L.C POWER POST
- GATE
- CULVERTS
- SEWER MANHOLE – PROFILE VIEW
- SEWER PIPE

REVISIONS

REV	DESCRIPTION	DESIGNATION	DATE	CHECKED BY	APPROVED BY

CLIENT:

TANA WATER WORKS DEVELOPMENT AGENCY
MAJI HOUSE, BADEN POWELL ROAD
P.O.Box 1292 - 10100
NYERI, KENYA

PROPOSED PROJECT:
CHOGORIA SANITATION PROJECT - LAST MILE CONNECTIVITY

CIVIL/ STRUCTURAL ENGINEERS:

TANA WATER WORKS DEVELOPMENT AGENCY
MAJI HOUSE, BADEN POWELL ROAD
P.O.Box 1292 - 10100
NYERI, KENYA

DRG No. TWWDA/CG/SA/LMC/KA/01
SHEET No. SHEET 1 OF 1
FROM CHAINAGE. 0+000.00-0+700.00

DRAWING TITLE:
PLAN AND PROFILE LAYOUT
KAIRUNI SECONDARY SEWERS

Designed by:	G.M.G	Drawn by:	G.M.G
Checked by:	J.M.M	Approved by:	D.N.M
Scale:	1 : 3500	Date:	DECEMBER 2023

Figure 3.13: Sample of the profile drawing

3.4. Project Activities

3.4.1. Permits and Approvals

A range of permits and approvals will be required to support pipeline construction. These are summarized below.

Table 3-5: Requisite permits and approvals for the proposed sewer Project

Necessary permit/ approval	Responsible Agency	Current Status
Project EIA License	National Environmental Management Authority, NEMA	Pending
Permit to utilize road reserve and enable needed road crossings	KERRA, KENHA, KURA	Ongoing
Construction and registration of workplaces	DOSHS	Pending
Solid Waste Disposal	NEMA	Pending

3.4.2. Project activities to be undertaken during the construction phase.

The project is anticipated to take approximately 18 months to construct from the award of an Engineering, Procurement and Construction (EPC) contract. Once the decision to proceed with the Project has been taken and an EPC contract awarded, it will take approximately 3 months before construction mobilization commences. The average rate of pipeline laying is estimated around 800m per day, with slower progress in more challenging areas, such as the road crossings. The construction schedule will also take account of weather constraints, particularly during the peak rainy season.

3.4.3. Machinery and equipment

For a sewer system, that involves significant infrastructure development like water mains and distribution networks, a variety of machinery and equipment are required to ensure efficient construction, operation, and maintenance. Some of these machinery and equipment include:

- Dozer
- Poker vibrator
- Concrete mixer
- Excavator
- Backhoes
- Truck/Tipper
- Plain Roller
- Modern Survey Equipment

- Fusion Machines for HDPE Pipes
- Welding Machines

3.4.4. Waste Management

Waste materials will be generated by the construction and, to a much lesser extent, operation of the Project. This will include both non-hazardous and hazardous wastes. A preliminary review of existing waste management facilities has been undertaken to determine the ability of existing waste management facilities to handle waste generated by the Project. This information will be updated and developed in more detail as part of the Engineering Procurement and Construction (EPC) process.

1. Construction Waste

Construction waste will be generated from a range of activities including:

- Preparation and transportation of pipe and other equipment and facilities.
- Clearance of vegetation within pipeline Right of way.
- Pipeline installation through cut and fill trenching.
- Pipeline welding and finishing.
- Pre-commissioning and commissioning, including hydro-testing.
- Construction camps for pipeline workers; and Offices and other facilities.

2. Earthworks Waste

Over most of the length of the pipeline, 100% of the excavated material will be returned to the trench. Padders will be used on the construction spreads which will allow the excavated material to be used as backfill material, around the pipe and cables, by separating out larger stones from the excavated material.

There is only a small amount of residual spoil (per linear metre) when the trench is completely backfilled and this can be spread across the Right of way when completing the reinstatement and restoration, without any impact. There is no need to remove spoil from site for disposal elsewhere.

In rocky areas, there may be insufficient fine material for backfill and material will need to be imported. This will result in some wasted excavated material; however, volumes are still likely to be relatively small. In rock, the excavation depth and cover to the top of the pipe will be reduced to as low as 0.6 m and the trench sides will be vertical.

In a trench with vertical sides, the volume of backfill required is minimised. The volume of backfill and hence the volume of residual spoil for a vertical trench is approximately 0.8 m^3 per linear metre of trench, whilst for a battered trench, the volume is more than double. Pipeline trenches with battered sides will be required in

some areas, however the overall percentage will be very low, and any additional material will be mixed and spread across the Right of way following the same method as above.

3. Metal Waste

For pipeline waste, it has been assumed that 0.3% - 0.5% of the pipeline will be metal waste (from off-cuts, damaged sections etc.). In addition, there will be welding rod (electrode) waste of approximately 10% - 20% of the weight of each rod. . All metal waste will be stored at the main construction camps, weighed and accounted for prior to disposal. This waste (scrap) will attract a market value and all receipts reconciled at the end of construction.

4. General Solid Waste

This comprises waste generated by accommodation camps, offices, and storage facilities, and includes paper, plastics, non-recyclable materials, food waste and other non-hazardous waste materials. General construction waste volumes will be generated from field joint coating materials and packaging, line pipe end caps/bevel protectors, cable drums and pallets. Some of the materials generated, such as waste epoxy and waste PUF, will need to be segregated and handled separately. Some of the packaging materials will also be contaminated and need to be managed as hazardous waste. It should be noted that items such as the cable drums and pallets could be reused by local communities for firewood or building materials. An assessment of such opportunities will be undertaken during detailed design.

5. Wastewater

Accommodation camp wastewater volumes can be calculated for sanitary wastewater based on 100 ltr/person/day for sewage and 200 ltr/person/day for grey water. Hydrotest water will be used to test the integrity of the pipeline for leaks. Inlet water from the intake will be used for hydrotesting. Wastewater settlement ponds are planned to be constructed at the downstream end of the hydrotest section. All hydrotest water will be passed through a break tank and filtration system before entering settlement ponds. Precise details on the design and location of these ponds will be developed during the EPC process and water abstraction and discharge will be permitted in line with applicable Kenyan regulations.

6. Hazardous Waste

Hazardous waste will include waste oils and filters from mobile plants and equipment and generators, oily rags, waste solvents, used chemical drums, used lubricants, paint waste and hot insulation waste (both used for tanks, vessels and piping at stations). The main process that generates waste apart from welding during the construction phase is the field joint coating.

All hazardous wastes will be stored at the worksite in segregated areas with an impermeable base and roofing to prevent contamination of run-off. Hazardous wastes will be collected regularly and taken for disposal to an appropriately licenced waste management facility.

7. Operational Waste

During operations, little or no wastes will be generated as the pipeline will be buried and water will flow under gravity for the majority of its length.

3.4.5. Waste Management Strategy

The Project Waste Management Strategy is based on the waste management hierarchy which outlines a preferred order from waste management i.e. prevention, re-use, recycling and recovery and disposal as a last resort. This approach aims at promoting environmentally friendly practices, efficient resource use and reduced pollution and negative impacts to the environment.

The anticipated waste streams have been evaluated against the requirements of the Environmental Management and Coordination (Waste Management) Regulations 2006 and the disposal methods and options have been identified in this ESIA Report. Where a waste disposal facility/landfill is not present within proximity of significant waste generator locations (e.g., main accommodation camps), or of sufficient size to handle to additional quantity, waste will be transported and managed within the WSP waste management facilities. The potential impacts associated with waste management have been described and appropriate mitigation approaches defined in section 6.5 of this report.

3.4.6. Construction & Operations Workforce

Indicative workforce projections have been estimated from the FEED process. The EPC Contractor will prepare more detailed workforce numbers and workforce management plans based on the commitments set out in this ESIA report.

1. Construction Workforce

The construction workforce will comprise approximately 200 personnel. Construction jobs will comprise:

- Management – Site Resident Engineer, Supervisor, Foreman, Site Planner.
- Skilled – Quantity Surveyor, Safety Health and Environment Consultant, Welder, Site Operators
- Semi-Skilled – Electrician, Mechanic, First Aider
- Unskilled – General Labourer, Guards, Drivers

2. Temporary Construction Campsite

The implementation of this project shall also have contractors' campsite during construction Phase of the project. The Campsite is a place with temporally structures from which the contractor operates from during

implementation of the project. The site may comprise structures such as office buildings, dining, stores and warehouses, worker's accommodation building, vehicle maintenance garage, metal and electrical workshop, crushed quarry stone and sand piles, other fixed equipment such as cement batch plant, fuel storage facility, quarry stone piles among others.

Depending on the activities at campsites, and materials stored at the place, the campsite might have low, medium to high impacts on social and natural environment of the area that needs proper assessment and mitigation measure put in place. The campsites will be decommissioned after construction phase of the project is completed.

3.4.7. Operations Workforce

The operations workforce will comprise approximately 10 workers. A detailed workforce projections and plans will be developed by the project area Water Service Provider (WSP), NIWASCO during the operation phase of the project. The overall approach for recruitment of workers shall be guided by the relevant qualifications and experience required for the performance of the relevant work.

3.4.8. Construction Logistics

All necessary construction materials will be transported by road and will be sourced locally.

3.4.9. Hydrostatic Testing and Commissioning

Commissioning of the pipeline will be undertaken to prepare the pipeline for handover from the EPC contractor to TWWDA and for the commencement of operational water flow through the pipeline. Hydrostatic testing will be undertaken to assess the strength and integrity of the pipeline system. The water for hydrostatic testing will be sourced from phase 1 of the project. Water quality testing will be undertaken before hydrostatic testing to ascertain its quality which must meet the minimum requirements for drinking water. The carbon steel pipeline will be tested in sections to the limit of elevation changes, allowing the test pressure to be maintained between the minimum required test pressure and maximum pressure which the pipeline will safely withstand.

3.4.10. Pre-Commissioning and Line fill

Given the use of carbon steel materials, drying will not be required as part of the pre-commissioning process after dewatering. Line fill shall then be undertaken from the low to the high ends of the pipeline.

3.4.11. Commissioning

When all system commissioning, start-up activities and tests are complete, a System Completion Notice (SCN) will be issued upon which the ownership of the system transfer from the Design Team to the Operations Team.

3.4.12. Pipeline Operations

The pipeline laying operations shall be guided by the project ESMP.

3.4.13. Decommissioning

The Project has been designed to operate effectively for over 20years. Before commencement of decommissioning activities, the proponent shall develop a Decommissioning Plan. The plan will guide on the various activities which will include the following:

- 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-off.
- 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 back-filling with soil and replanting of grass or trees on disturbed areas.
- 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.
- 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.
- Mechanisms for addressing project related social issues.

4. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

4.1. Introduction

The importance of environmental care is paramount for the survival of human beings, prompting legal interventions to ensure responsible interactions with our surroundings. In Kenya, environmental governance is structured around key legislations, including the Constitution of Kenya, 2010, the Environmental Management and Coordination Act (EMCA) Cap 387, its subsidiary legislations, and various national and international environmental laws. EMCA Cap 387 plays a central role in harmonizing and coordinating environmental management in Kenya. It establishes a comprehensive legal and institutional framework, with the National Environment Management Authority (NEMA) at its core, to oversee environmental management across all aspects. The Act aims to ensure sustainability in environmental practices. In cases of legal discrepancies, EMCA Cap 387 takes precedence, ensuring a unified approach towards environmental sustainability.

4.2. Policy Provision

The proposed investments will be implemented within provisions of various government Policies as summarized in

Table 4-1: Policy Frameworks

Policy	Policy Applicability
Kenya Vision 2030 (2010)	Kenya Vision 2030 is a national long-term development blueprint to create a globally competitive and prosperous nation with a high quality of life by 2030. The vision is anchored on three key pillars: economic, social, and political governance. It aims to transform Kenya into a newly industrializing, middle high-income country and to provide a high quality of life to all its citizens by 2030 in a clean and secure environment.
Sustainable Development Goals (SDGs)	The concept of the SDGs was born at the United Nations Conference on Sustainable Development, Rio+20, in 2012. The objective was to produce a set of universally applicable goals that balances the three dimensions of sustainable development: environmental, social and economic. The Investments will therefore contribute towards achieving this goal through the proposed sanitation Projects.
National Environment Policy (2013)	The National Environment Policy aims to ensure a high quality of life for current and future generations by implementing sustainable practices in managing the environment and natural resources. Its main objectives are to establish an integrated framework for environmental planning and management, enhance the legal and institutional arrangements for better coordination, support sustainable management practices for environmental conservation, and

Policy	Policy Applicability
	encourage collaboration and cooperation in environmental protection and sustainable management efforts. *The project is situated in ecological zones V and VI, which are known for their sensitive ecosystems that can be adversely affected by activities not aligned with their natural character. To mitigate the potential negative impacts on these ecosystems during both the construction and operation phases of the project, it is crucial to implement the Environmental and Social Management and Monitoring Plan (ESMMP)developed. This implementation will help to ensure that the project activities do not destabilize the ecosystems within these zones.*
National Climate Change Response Strategy, 2010	The strategy paper recognizes that Kenya is a water scarce Country and offers a variety of strategies for ensuring that the resource is utilized in ways that recognize that it is a finite resource. The paper also argues that interventions in the water sector should take a participatory approach involving different water users including gender groups, socioeconomic groups, planners and policy makers in water resource management (Kenya, 2010: 53). These principles will also apply to the sanitation initiatives discussed in this ESIA.
National Land Policy (2012)	The National Land Policy aims to guide the country towards efficient, sustainable and equitable use of land for prosperity and provides a legal, administrative, institutional and technological framework for optimal utilization and productivity of land-related resources in a sustainable and desirable manner at national, County and community levels. It addresses critical issues of land administration, access to land, land use planning, restitution of historical injustices, environmental degradation, conflicts, the unplanned proliferation of informal urban settlements outdated legal framework, institutional framework and information management. This policy addresses the following topics: • Constitutional issues, such as compulsory acquisition and development control as well as tenure. It recognizes the need for security of tenure for all Kenyans (all socioeconomic groups, women, pastoral communities, informal settlement residents and other marginalized groups). • This policy recognizes and protects private land rights and provides for derivative rights from all categories of land rights-holding. • Through the Policy the government will ensure that all land is put into productive use on a sustainable basis by facilitating the implementation of key principles on land use, productivity targets and guidelines as well as conservation; and

Policy	Policy Applicability
	• The Policy promotes Environmental Management and Audit as land management tools and encourages public participation in the process.
National Land Use Policy (2017)	The overall goal of the national land use policy is to provide legal, administrative, institutional, and technological framework for optimal utilization and productivity of land related resources in a sustainable and desirable manner at national, county and community levels. The Policy is premised on the philosophy of economic productivity, social responsibility, environmental sustainability, and cultural conservation. Key principles informing it include efficiency, access to land use information, equity, elimination of discrimination and public benefit sharing. The Policy is cognizant of numerous factors that affect land use in Kenya which include geographic and ecological features, population distribution, social, historical, cultural, and economic factors.
National Water Policy (2012)	The National Water Policy includes details of the national government's policies and plans for the mobilization, enhancement, and deployment of financial, administrative, and technical resources for the management and use of water resources. Currently there is a new National Water Policy 2021 that was approved for tabling in the 12th Parliament on 4th August 2021.
Wildlife Policy (2012)	The Wildlife Policy makes provision for an overarching framework for the prudent and sustainable conservation, protection and management of wildlife and wildlife resources in Kenya, with the incidental provision on access and the fair and equitable distribution of benefits accruing therefrom, and its alignment with other sector-specific laws and the environment policy. The wildlife policy is aimed at promoting the protection and conservation of wildlife in Kenya, both in protected and non-protected areas.
National Forestry Policy (2014)	The Policy provides a framework for improved forest governance; resource allocation, partnerships, and collaboration with the state and non-state actors to enable the sector to contribute to meeting the country's growth and poverty alleviation goals within a sustainable environment. The goal of the policy is to increase the area under forest cover to 10% of the total land area in the country.
Wetlands Policy (2013)	The Wetland Policy aims to provide an effective and efficient institutional and legal framework for the management and conservation of wetlands and mitigating the diverse challenges that affect wetlands conservation and use in Kenya. This policy also fulfils Kenya's obligations under the Ramsar Convention.

Policy	Policy Applicability
Kenya National Youth Policy 2006	This Policy aims at ensuring that the youth play their role, alongside adults in the development of the Country. The National Youth Policy visualizes a society where youth have an equal opportunity as other citizens to realize their fullest potential. Proposed Sanitation Projects will provide direct employment to the youth as required by the Policy.
National Environmental Sanitation and Hygiene Policy-July 2007	The Policy is devoted to environmental sanitation and hygiene in Kenya as a major contribution to the dignity, health, welfare, social well-being, and prosperity of all Kenyan residents. The Policy recognizes that healthy and hygienic behavior and practices begin with the individual. The implementation of the Policy will greatly increase the demand for sanitation, hygiene, food safety, improved housing, use of safe drinking water, waste management, and vector control at the household level and encourage communities to take responsibility for improving the sanitary conditions of their immediate environment. Implementing the Project will directly contribute to achievement of the Policy
National Energy Policy (2018)	The Policy provides for a sustainable, adequate, affordable, competitive, secure, and reliable supply of energy at the least cost geared to meet national and county needs while protecting and conserving the environment.
Occupational Health and Safety Policy (2012)	This policy is intended to protect the safety and health of workers in workplaces
HIV/AIDS Policy of 2009	The policy identifies HIV/AIDS as a global crisis that constitutes one of the most formidable challenges to development and social progress. The pandemic heavily affects the Kenyan economy through loss of skilled and experienced workforce due to deaths, loss of person-hours due to prolonged illnesses, absenteeism, reduced performance, increased stress, stigma, discrimination, and loss of institutional memories, among others. The policy roots for the provision of basic information and instruction on HIV and AIDS prevention and control to the public.
Gender Policy 2011	This Policy will be referred to during Project implementation especially during hiring of staff to be involved in the Project, procuring of suppliers, sub consultants and sub-contractors to the Project

Policy	Policy Applicability
National Sustainable Waste Management Policy (2021)	The policy aims to create an enabling regulatory environment for Kenya to effectively tackle the waste challenge by implementing sustainable, waste management that prioritizes waste minimization and contributes to a circular economy

4.3. Legislations Policy

The proposed investments will be implemented within provisions of various Acts of Parliament and Local Legislations as summarized in

Table 4-2: Legislation Policies

Policy	Policy Applicability
Constitution of Kenya 2010	The CoK at Article 43 (1) provides that every person has the right – (b) to accessible and adequate housing, to reasonable standards or sanitation; and (d) to clean and safe water in adequate quantities. These provisions cover oblige state organs and bind them to provide not just high quality or clean and safe water but also adequate quantities to all people that they will serve. Also, the Constitution of Kenya provides for sound management and sustainable development of all of Kenya's Projects, both public and private investments. It also calls for the duty given to the Project proponent to cooperate with State organs and other persons to protect and conserve the environment as mentioned in Part II.
Environment Management and Coordination (EMCA 2015)	The Act provides for the establishment of a legal and institutional framework for the management of the environment. This is achieved through various regulations. For sewer Projects proposed in Chogoria, the following EMCA Regulations will be applicable: (i) EMCA (Waste Management) Regulations, 2006 Legal Notice No. 121; (ii) EMCA (Water Quality) Regulations, 2006 Legal Notice No. 120; (iii) EMCA (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Legal Notice No. 61; (iv) EMCA (Air Quality Regulations 2014)
Environmental Impact Assessment and Audit) Regulations, 2003	The regulation provides a framework under which Environment and Social Impact Assessment for the Project will be prepared, Regulation 4(1) further states that: (a)"…no Proponent shall implement a project: likely to have a negative environmental impact. (b) for which an environmental impact assessment is required under the Act or these Regulations, unless an

Policy	Policy Applicability
	environmental impact assessment has been concluded and approved in accordance with these Regulations…"
Environmental Management & Coordination (Water Quality) Regulations, 2006	Regulation 9 provides for water quality monitoring. It states that the "Authority in consultation with the relevant lead agency, shall maintain water quality monitoring for sources of domestic water at least twice every calendar year and such monitoring records shall be in the prescribed form as set out in the second schedule to these regulations".
Waste Management Regulations, 2006	Regulation 4 (1) states that "no person shall dispose of any waste on a public highway, street, road, recreational area or in any place except in a designated receptacle". Regulation 4 (2) further states that "a waste generator shall collect, segregate and dispose such waste in the manner provided for under these regulations". The proponent will use provisions of this regulation to ensure that waste is handled, stored, transported and disposed as per this regulation.
Noise and Excessive Vibration Pollution (Control) Regulations, 2009	The Contractor 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 by vehicles. The regulations provide for a maximum of 60 dcl during the day and 35 dcl during the night for a construction site.
Environmental Management and Coordination (Air Quality Regulations 2014	These regulations provide a framework for management of plant and equipment emissions of hydrocarbons on site. The regulations require that all plant and equipment on site should be well serviced to manufacturers specifications to avoid air pollution, the regulation also require monitoring of baseline air quality within construction site and implementation of correction action where the standards are not complied to. Water spray will be used at all times when working in dry areas to avoid risks associated with dust menace.
Land Act 2012	It is the substantive law governing land in Kenya and provides legal regime over administration of public and private lands. It also provides for the acquisition of land for public benefit. The government has the powers under this Act to acquire land for projects, which are intended to benefit the general public. The Project proposed will be implemented within government land and along road reserves. However, sites for WWTP will be acquired through willing buyer willing seller arrangement.

Policy	Policy Applicability
Water Act 2016	The Water Act 2002 was amended in the year 2016 to align to the Kenyan Constitution 2010. The Act vest the responsibility of developing water and sanitation infrastructure (sewerage and water supply) in Tharaka Nithi to Nithi Water and Sanitation Company (NIWASCO). The Design and ESIA Teams have adequately involved NIWASCO in the preparation the Project.
County Government Act No. 17 of 2012	The proposed Projects will be implemented within Chogoria Project area. 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). The Projects once complete will be handed over to NIWASCO County Government for operation and maintenance.
Physical Planning Act 1996 (286)	Section 29 of the said 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 Projects identified will be implemented with the Spatial Plan developed by the Tharaka Nithi County Government.
Urban Areas and Cities Act 2011	This Law passed in 2011 provides legal basis for classification of urban areas (City) when the population exceeds 500,000; a municipality when it exceeds 250,000; and a town when it exceeds 10,000) and requires the city and municipality to formulate County Integrated Development Plan (Article 36 of the Act). The Projects described in this assessment are within Tharaka Nithi County CIDP 2013-2017.
Occupational Health and Safety Act (OSHA 2007)	The Act provides EHS Guidelines which shall be followed by both the Contractor and Supervising Consultant during implementation of the Project to avoid injuries and even loss of life to workers and neighbouring community.
Public Health Act (Cap.242)	The Act provides Guidelines to the Contractor on how he shall manage all wastes (Liquid and Solid Wastes) emanating from the Project in a way not to cause nuisance to the community. This Act, during construction shall be read alongside the waste management regulations of EMCA 2015 for utmost compliance.
HIV and AIDS Prevention and Control Act 2011	The object and purpose of this Act is to (a) promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS; (b) extend to every person suspected or known to be infected with HIV and AIDS full protection of his human rights and civil liberties. The Act provisions will be applied during Project implementation

Policy	Policy Applicability
	phase where the contractor will be required to create awareness among workers and community at large
Sexual Offences Act 2006	An Act of Parliament that makes provision about sexual offences aims at prevention and the protection of all persons from harm from unlawful sexual acts, and for connected purposes. Section 15, 17 and 18 focuses mainly focused on sexual offenses on minor (children).
Child Rights Act (Amendment Bill) 2014	This Act of Parliament makes provision for parental responsibility, fostering, adoption, custody, maintenance, guardianship, care and protection of children. It also makes provision for the administration of children's institutions, gives effect to the principles of the Convention on the Rights of the Child and the African Charter on the Rights and Welfare of the Child. The contractor under this Project will be required to comply to provisions of the Act during Project implementation
Labour Relations Act 2012	An Act of Parliament to consolidate the law relating to trade unions and trade disputes, to provide for the registration, regulation, management and democratization of trade unions and employers organizations or federations, to promote sound labour relations through the protection and promotion of freedom of association. This act will be applied by labour force on site in addressing disputes related to working conditions.
National Gender and Equality Commission Act 2011	The over-arching goal for NGEC is to contribute to the reduction of gender inequalities and the discrimination against all, women, men, persons with disabilities, the youth, children, the elderly, minorities and marginalized communities. This Act will be applied during hiring of workforce on site.
Public participation bill of 2016	The Bill is an ACT of Parliament that provides a general framework for effective public participation and to give effect for the constitutional principles of democracy. The purpose of the act includes promotion of democracy and public participation of the people according to article 10 of the constitution, promote community ownership for public decisions and promote public participation and collaboration in governance processes. In adherence to the bill two main stakeholder workshops and 5nr public meetings were carried out during Project EISIA study and in the full ESIA study. The purpose of the stakeholder workshops included informing the community on the project, incorporating the views of the

Policy	Policy Applicability
	people into the project design, enhancing the sustainability of the project by allowing feedback of major concerns in the project life.
Energy Act, 2006	The Energy Act, 2006 was enacted on 2nd January 2007establishes an Energy Regulatory Commission (ERC) mandated to perform all function that pertains to energy production, transmission, setting and enforcing of energy policies, public education and enforcing energy conservation strategies, prescribing the energy licensing process and issuing of licenses that pertain to energy sector in Kenya. Section 30 of the Act provides the factors that shall be taken into consideration prior to issuance of license. It states the need and expression of an entity to conserve and protect the environment and natural resources in accordance to the EMCA 1999. Moreover, the Act gives provisions for the need to protect health and safety of users of energy by providing an enabling environment of operation that protects the health and safety of users of the service for which the license or permit is required and other members of the public affected by the undertaking.
County Government Act, 2012	The main purpose of the enactment of this Act was to give effect to Chapter Eleven of the Constitution; to provide for county governments' powers, functions and responsibilities to deliver services and for connected purposes. Functions which were carried out by local governments were effectively transferred to the county governments. The Act gives county the responsibility of planning and co-coordinating all developments within their areas of jurisdiction. Part XI (sections 102-115) of the Act provides for planning principles and responsibilities of the county governments. The land use and building plans provided for in the Act are binding on all public entities and private citizens operating within the county. The proposed project is within the Nairobi City Government and thus there will be need of working in liaison with the County Government. The County government may also issue directives, and authorizations on various aspects e.g., waste management and fire emergency preparedness among others. *The proponent will work in liaison with NCC and in particular the Water, Energy, Forestry, Environment and Natural Resources sector.*
The Penal Code CAP 63	Chapter XVII on "Nuisances and offences against health and convenience" contained in 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

Policy	Policy Applicability
	carrying on business in the neighborhood or passing along a public way is guilty of a misdemeanor." *Waste disposal and other project related activities shall be carried out in such a manner as to conform to the provisions of this code.*
Permits and Licenses	The Proponent should demonstrate compliance to the legislation through acquisition of the appropriate licenses and permits. Furthermore, all contractors and consultants who will be engaged during the planning and design, construction, operation and maintenance and decommissioning should demonstrate compliance to the necessary pieces of legislation. These includes: NEMA registration certificates, collection of Waste by a NEMA licensed handler. NIWASCO will before project operation apply for license to discharge into the environment. Other permits will include leases from Kenya Forest Services (KFS) and Water Resources Authority (WRA) for the sewer Component.

4.4. African Development Bank Policy Provisions

The Project is being financed by AfDB and was therefore checked against the listed Operation Safeguards and appropriate mitigation measures for impacts likely to be triggered under each policy included in the EMSP. Table 4-3 presents a summary of the Bank's applicable Operational Safeguards and their relevance to the proposed project.

Table 4-3: Bank's Operational safeguards

Policy	Criteria in The Project	Discussions
OS 1: Environmental and Social Assessment	Yes	The Project components will trigger OS 1, the assessment identified that According to OS 1 screening provisions, Chogoria sewer Infrastructure is a Category 2, the project is likely to have detrimental site-specific environmental and/or social impacts that are less adverse and largely reversible, and readily minimized by applying appropriate management and mitigation measures. Mitigation measures for impacts identified are detailed in chapter 6 of this report.
OS 2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation	Yes	The policy aims to avoid involuntary resettlement where feasible, or minimise resettlement impacts where involuntary resettlement is deemed unavoidable after all alternative project designs have been explored. For Chogoria sewer Infrastructure, displacement not triggered as pipelines are designed to follow road Right of Way (RoW) and River Riparian- However, impact crops/trees / structures/fences will be identified along the easement to be used by water pipelines.
OS 3: Biodiversity, Renewable Resources and Ecosystem Services	Yes	The safeguard aims to conserve biological diversity and ecosystem integrity by avoiding or, if avoidance is not possible, reducing and mitigating any adverse environment and social risks., For proposed project works might result in loss of vegetation diversity which provide habitat to wildlife and other related ecosystems benefits. However, the impacts to biodiversity by the above-described works will be less significant as detailed in Chapter 7 of this report.
OS 4: Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency	Yes	The Project shall utilize raw materials both during construction and operation phase that could result to pollution of biophysical environment if not handled appropriately. Appropriate mitigation measures for likely waste to be generated by the Project are detailed in Chapter 7 of this report. Project activities shall not result to significant amount of greenhouse gases, EMSP prepared for operation phase provides for measures to be adopted to ensure efficient function of the Plant consequently reducing emission of methane and hydrogen

Policy	Criteria in The Project	Discussions
		sulphide gases. Also, the Project design has ensured that sewer flows through 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 that health, safety and working conditions of both works and community is safeguards. The Labour Relations Act 201 will be applied by labour force on site in addressing disputes related to working conditions.

5. GRIEVANCE REDRESS MECHANISM

5.1. Overview

A Grievance Redress Mechanism (GRM) is an instrument through which dispute resolution is sought and provided. It involves the receipt and processing of grievances from individuals or groups negatively affected by activities of a particular project. A Grievance Redress Mechanism (GRM) plays a critical role in preventing negative interruptions in project implementation occasioned by legal redress that are costly and time consuming. It spells out avenues to mitigate grievances from stakeholders and provides a legitimate, accessible and cost-effective avenue for receiving and addressing grievances whenever they occur.

5.2. Objectives of the Grievance Redress Mechanism

The objectives of the GRM are as follows:

(i) To provide and operationalize structures for receiving and addressing grievances emanating from project activities and providing feedback.
(ii) To sensitize stakeholders on existing avenues and channels for registering and resolving grievances
(iii) To establish a trusting and respectful relationship between the Project and the community.
(iv) To promote early identification of grievances and address them effectively and efficiently towards better manage of project impacts.
(v) To promote good relations between the project implementers, executers and the local communities.
(vi) Facilitate a learning culture, by means of analysing trends and patterns to drive continuous performance improvement and reduce repeat grievances thus improving project management decisions.

5.3 Principles of the GRM

The effectiveness of this GRM will be guided by following principles:

- Accessibility – The GRM shall be accessible to everyone and at any time.
- Predictability –time bound at any stage with specified timeframes for the responses.
- Fairness – The procedures herein are perceived as unbiased in regard to access to information and meaningful public participation.
- Rights compatibility – The outcome of the mechanism should be consistent with the Bank and national standards and should not restrict access to other redress mechanisms.
- Transparency and Accountability – The entire GRM process to be open and transparent and done out of public interest.
- Culturally appropriate, thus sensitive to people's perceptions about fairness, justice and respectful solutions

- Feedback – The GRM to serve as a means of feedback from various stakeholders to improve project outcomes.

5.4 Types of Grievances

The GRM will solely be dedicated to handling grievances related or emanating from activities of the proposed projects under the National Urban Water Supply and Sanitation Programme. The type/ scope of grievances shall include those related to:

- Grievances and disputes emanating from compensation.
- Inadequate stakeholders' consultation and participation at any stage of projects implementation
- Negative social and environmental impacts emanating from projects implementation.
- Concerns on prioritization and/ or distribution of project interventions
- Concerns on social and environmental safeguards matters.
- Cases of gender-based violence, particularly sexual exploitation and abuse/sexual harassment
- Any concerns/ complaints from stakeholders relating to contractors and consultants engaged during projects implementation.

Any grievances that will be raised outside this scope shall be redirected to other GRMs discussed at national level. Matters that are within project management and coordination will also not trigger the use of this GRM and will be dealt with administratively within the projects.

5.5 The Grievance Redress Mechanism Structure

The GRM structure presents procedures and timeframes for grievance redress at various levels. Figure 5.1. presents the general steps for each grievance reported.

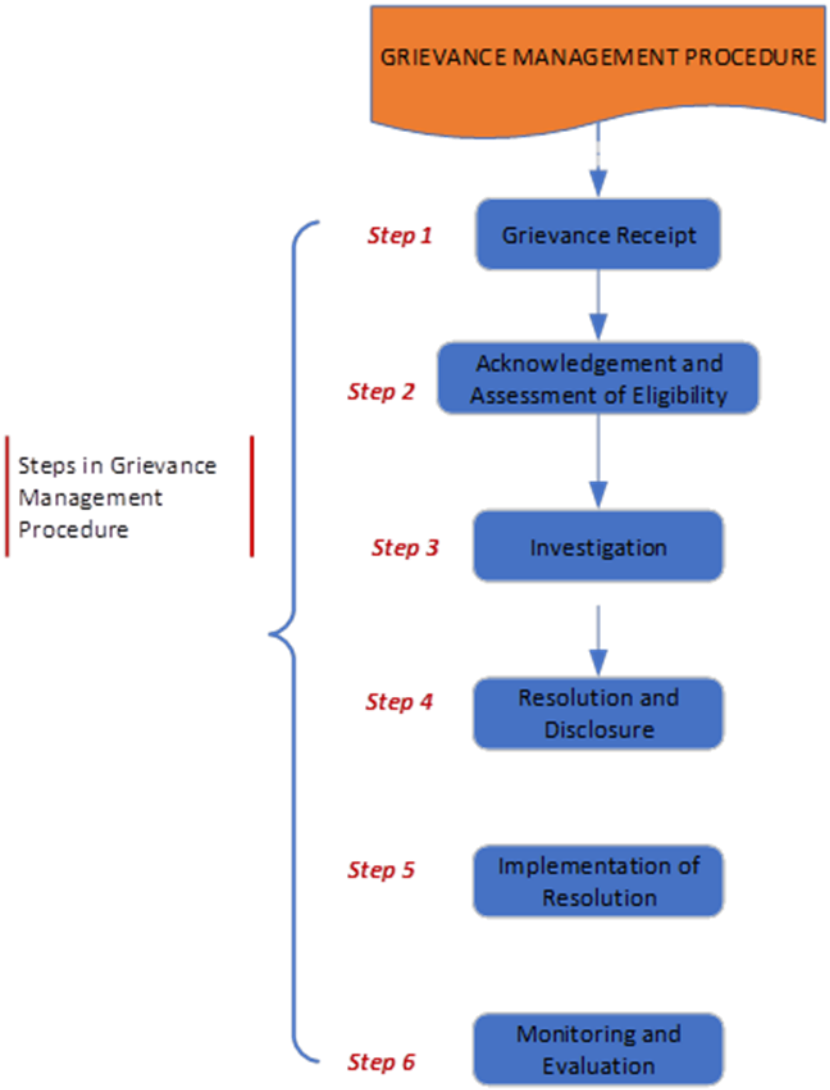


Figure 5.1: Grievance Management Procedure

A three-level redress mechanism targeting all stakeholders involved in project implementation will be adopted.

5.2.1. First Level of Redress: Community Level

The first level of grievance redress will be at the community level mainly targeting the local beneficiary communities and the project affected persons (PAPs). For every community at location level, a local grievance management committee shall be formed and trained to handle community grievances/ complaints emanating from the implementation of the proposed water supply and sanitation projects. The committee shall comprise of five members who shall include the local chief as the chair. The other members shall be nominated by the project beneficiaries ensuring gender balance and a representation of the vulnerable where applicable. The committee shall be trained by the community liaison officer from the local water service provider (WSP) on conflict resolution, group dynamics, project sustainability among other areas that shall be deemed necessary.

(i) Step 1: Receipt of grievances

The mode of receipt of the complaints/ grievances may either be in writing, reported verbally, over the phone or emails. Once the local grievance management committee receives a grievance, the committee secretary shall be mandated to register the grievance. The received grievance and relevant information related to the grievance shall be recorded on a standardized grievance register.

(ii) Step 2: Acknowledgement, assessment for eligibility and recording

The committee shall then determine the eligibility of the grievance received and if eligible, they shall notify the complainant and acknowledge receipt within three (3) days of receiving it. If not eligible, the complainant shall be informed of the reasons and advised on other existing GRMs to address his grievance. The complainant shall also be informed of the next steps and the timeframes including any further information/ documentation that maybe required to aid in investigation. The timeframes should not be later than twenty-one (21) days after the grievance is received.

(iii) Step 3: Investigation

The committee shall then set a day when all members are available and begin the investigation by assessing the seriousness/ severity of the grievance and classifying it either as high, medium, or low based on its impact to the complainant and the project. The assessment may necessitate the need for additional data collection through field visits to the sites, interviews with the relevant groups and follow up meetings with the affected groups to validate the information provided by the complainant. Minutes of such meetings shall be recorded and attached to the grievance report.

(iv) Step 4: Grievance Resolution and Disclosure

Depending on the findings and severity of the grievance, a resolution shall be decided immediately, and the deliberations recorded in the grievance resolution form. However, if the grievance cannot be resolved by the local grievance management committee it shall be escalated to the county level and to the national level if not resolved at the county level. In cases where the complainant shall not be satisfied with the resolution given by the concerned committee, they shall be advised to report to the next level of redress. Also, in cases where the project GRM levels are unable to resolve the grievance, the complainant will be referred to the existing legal and judicial mechanisms in Kenya. This process should take a maximum of thirty (30) days from the time the parties are informed of the acceptance of the grievance.

(v) Step 5: Implementation of the Resolution Mechanism

Once a resolution has been determined and the same communicated to the affected parties, an agreement shall be drawn outlining the following among other strategies for settlement of the grievance:

- Requesting the relevant agencies/ contractors responsible for the grievance to take appropriate measures to address the root causes of the grievance.
- Determining reasonable compensation for loss from the accused parties
- Signing agreements between the accused persons and the project for solutions mutually agreed upon.

(vi) Step 6: Grievance monitoring

The local grievance management committee shall then monitor the implementation of the grievance resolution mechanisms given and assess any further impacts of the project related grievances. They shall also monitor to ensure that the redress is granted to complainant in a timely and efficient manner and give regular feedback to the complainants about the progress.

5.2.2. County Level

The second level of redress will be at the county level where a county grievance management committee shall be established and chaired by a nominee of the proponent, TWWDA. The membership of the committee shall entail a nominee from the water service providers (WSPs), community liaison officers from the WSPs and the chairs of the various local grievance management committees in the County. The committee will also be trained in handling project grievances.

Just like the case with the first level of redress, once a complaint has been registered, the county grievance management committee will set a day to investigate the same and offer an action/ solution. If possible, a meeting will be held between the complainants and the concerned project officer to find a solution. Similarly, like in the first level of redress, a grievance resolution form shall be filled providing details of how the grievance was investigated and the recommended action provided. The resolution period shall be expected to take a maximum of fourteen (14) working days after which the complainant shall be notified through a grievance disclosure form. Grievances that shall not be resolved at this level shall be referred to the next level.

The county grievance management committees shall be obligated to submit a quarterly report using the standardized format. of registered complaints to Tana Water Works Development Agency, TWWDA.

5.2.3. Third Level of Redress: National Level

At the National Level, a Grievance Handling Committee shall be appointed and equally trained to handle grievances. The committee shall be chaired by a nominee at the Ministry of Water, Sanitation and Irrigation, other membership shall include the CEO TWWDA, the project co-ordinators at TWWDA, the chairs of the county grievance management committees and a representation from TWWDA legal department. The ministry

shall appoint a grievance handling officer who shall foresee operations of the committee. As in other levels, the reporting tools for other levels shall equally apply at national level reporting.

The resolution period at national level shall be expected to take a maximum of twenty (21) working days and the concerned shall be notified through the GRM/003 form. Should the grievance not be solved within this period, the complainant shall be advised to seek recourse through the legal and judicial mechanisms in Kenya discussed below.

TWWDA shall maintain databases and reports on all grievances and regularly conduct an assessment of the overall effectiveness and the impact of the GRM. The results of the assessment shall be used to improve the performance of the GRM and provide valuable feedback to project management.

5.2.4. National Arbitration Processes in Kenya

In the event that the complainants are dissatisfied with the outcome of grievance resolution, they shall be advised to seek recourse through the following national arbitration processes:

(i) Commission on Administrative Justice (CAJ)
(ii) National Environment Tribunal (NET)
(iii) Land Acquisition Tribunal
(iv) Courts

(i) Commission on Administrative Justice (CAJ)

The Commission on Administrative Justice (CAJ) also known as the Office of the Ombudsman is an independent commission established by the Commission on Administrative Justice Act, 2011 pursuant to Article 59 (4) of the Constitution of Kenya. It is the foremost constitutional commission whose primary function is to ensure public officers and public institutions respect sovereignty of the people of Kenya. The CAJ is mandated to address all forms of maladministration, promote good governance and efficient service delivery in the public sector by enforcing the right to fair administrative action. The CAJ investigates abuse of power, manifest injustice and unlawful, oppressive, unfair or unresponsive official conduct.

(ii) National Environment Tribunal

Tribunals are an integral component of the justice system in Kenya and play an important role in reducing pressure on courts and facilitating expeditious access to justice. The Constitution of Kenya, 2010 recognizes tribunals as part of subordinate courts in the judicial hierarchy hence demonstrating their importance in the administration of justice in Kenya. The National Environment Tribunal (NET) is established under the Environmental Management and Co-Ordination Act (EMCA). The jurisdiction of the Tribunal is set out under section 125 of the Act. The Tribunal hears and determines appeals concerning *grant of a license or permit or refusal*

to grant a license or permit; imposition of any condition, limitation or restriction on a license; revocation, suspension or variation of a license the amount of money required to be paid as fee under the Act or imposition against the person of an environmental restoration order or environmental improvement order by the Authority under the Act or its regulations. The Act requires appeals to be lodged with the Tribunal within sixty days of the occurrence of the event which a person is dissatisfied with.8 In addition, the jurisdiction of the Tribunal extends to appeals against decisions of the Director General of the National Environment Management Authority (NEMA). All grievances related to project licensing by NEMA shall be referred to the National Environment Tribunal.

(iii) Land Acquisition Tribunal

The Land Act, 2012 was amended in 2019 to include Section 133A which provided for the establishment of a tribunal, the Land Acquisition Tribunal to hear and determine appeals from decisions of the National Land Commission in matters relating to the compulsory acquisition of land.

The jurisdiction of the Land Acquisition Tribunal is in respect of appeals from the decision of the National Land Commission (NLC) on matters compulsory acquisition, as per section 133C (1) of the Land Act. Further, section 133C (6) of the Land Act grants initial/first instance jurisdiction to the tribunal to deal with disputes on creation of wayleaves, easements, and public right of way. Also, as per section 133C (8) of the Land Act, the Land Acquisition Tribunal has the powers to uphold and enforce the Bill of Rights and review any administrative action as to compulsory acquisition. In summary, the LAT has jurisdiction on disputes regarding:

(i) Compulsory acquisition of land
(ii) Wayleaves; easements; and public right of way
(iii) Upholding and enforcement of the Bill of Rights, as well as review of administrative action, as to compulsory acquisition

Even though, compulsory acquisition of land is not envisaged in this project, the role and provisions of the Land Acquisition Tribunal have been reviewed and provided as a precaution.

The Courts have power to hear and determine disputes, primarily of criminal and civil nature. Criminal cases are those in which the State prosecutes a person or an organization for committing an act which is not in the interest if the public, and therefore considered to be an offence against the state. Civil cases originate from a person who seeks redress for a private wrong such as breach of contract, trespass or negligence; or to enforce civil remedies such as compensation, damages or to stop some action.

Figure 5.2 presents a summary of the levels of grievance redress mechanism.

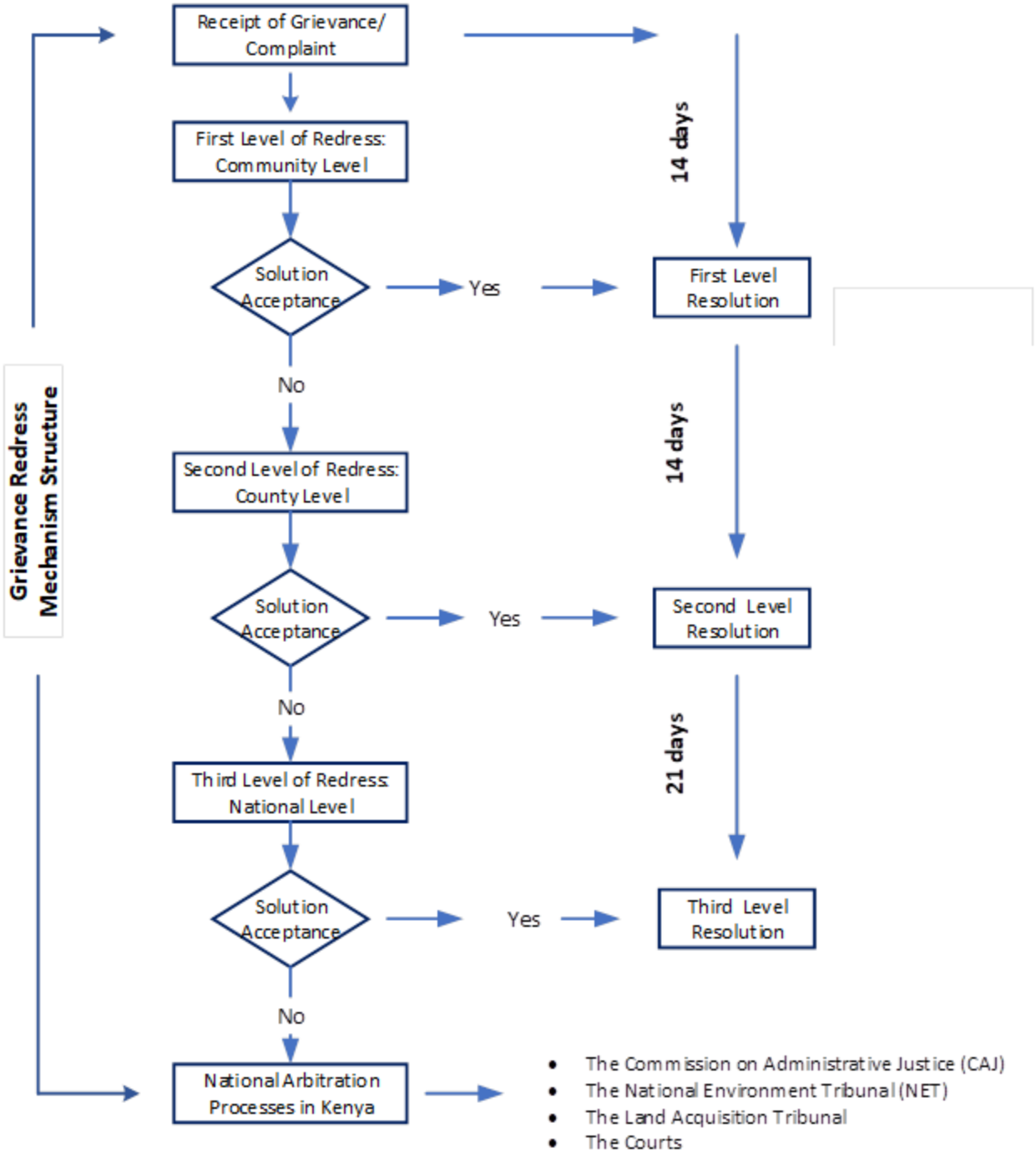


Figure 5.2: Levels of Grievance Redress Mechanism

6. STAKEHOLDERS CONSULTATION

6.1. Overview

This report section discusses the stakeholder engagement and public participation process conducted as part of the Environmental and Social Impact Assessment (ESIA) Study. It details the legal prerequisites for engaging stakeholders, describes the methodology employed in analyzing stakeholders, and summarizes the results of the consultations. Engaging with key project stakeholders is crucial within an ESIA study, as it significantly contributes to gaining the social acceptance for the project from both the local community and regulatory authorities.

6.2. Legal Requirements for Stakeholder Engagement

Kenya has established legal frameworks that mandate public involvement in development projects. In addition to the stipulations of the constitution of Kenya, specific laws have been enacted by parliament to implement these requirements. Furthermore, Kenya has adopted international conventions that further govern the consultation process.

6.2.1. Constitution of Kenya 2010

- Article 10(2) of the Constitution Provides **national values and principles of governance** in this Article bind all State organs, State officers, public officers, and all persons whenever any of them whenever they (c) make or implements public policy decisions. The national values and principles of governance as provided in the constitution include patriotism, national unity, sharing and devolution of power, the rule of law, democracy and **participation of the people and sustainable development**.
- Article (35) of the same constitution provides for Access to information, the articles indicates that every citizen has the right of access to information held by the State; an information held by another person and required for the exercise or protection of any right or fundamental freedom. The same article provides that the **State shall publish and publicize any important information affecting the nation**.
- Articles 174(c) state objectives of devolutions, among them is that devolution give powers of self-governance to the people and enhance the **participation of the people in the exercise of the powers of the State and in making decisions** affecting them and to recognize the right of communities to manage their own affairs and to further their development.
- Article 184 is exclusive on urban areas and Cities, the article provides that National legislation shall provide for the governance and management of urban areas and cities and shall, among other provision provide **for participation by residents in the governance of urban areas and cities**.
- Article 201(a) provides principles of public finance which require openness and accountability, **including public participation in financial matters**.

- Article 232(1) provides values and principles of public service include among others **involvement of the people in the process of policy making**.

6.2.2. The Public Participation Bill 2016

The Bill, when enacted by parliament, will be referred to as "Public Participation Act". The Bill provides general guidelines of ensuring public participation in nation governance. The Bill will give effect to Articles of the Constitution referred to above namely Articles 10(2), 35, 69(1), 118, 174(c), 184(1)(c), 196, 201(a), 232(1) d.

The Bill provides that public participation shall be guided by the following:

- The public, communities, and organizations to be affected by a decision shall have a right to be consulted and involved in the decision-making process.
- Provision of effective mechanisms for the involvement of the public, communities, organizations, and citizens that would be affected by or that would be interested in a decision.
- Participants' equitable access to the information they need to participate in a meaningful manner.
- That public views shall be taken into consideration in decision making.
- Development of appropriate feedback mechanisms
- Adherence to the national values under Article 10 of the Constitution
- Adherence to the principles of leadership and integrity set out in Chapter Six of the Constitution
- Adherence to the principles of public participation as may be prescribed by any written law.
- Promotion of sustainable decisions recognizing the needs and interests of all participants, including decision makers

6.3. Objectives of Public Consultations

The key objectives of the consultation and public participation for the proposed Last Mile Connectivity (LMC) for Chogoria Sanitation Project was to:

(i) Disseminate and inform the public and stakeholders about the project with special reference to its key components and description.
(ii) Create awareness among the public on the need for the ESIA for the proposed project.
(iii) Gather comments, suggestions, and concerns of the interested and affected parties.
(iv) Incorporate the information collected in the ESIA.
(v) Build community consensus and acceptance of the proposed project.

6.4. Methodology and of Public Consultations Process

Public participation for the proposed project was conducted through the public consultative meetings and admission of questionnaires to allow for systematic understanding and interaction of the project beneficiaries,

neighbors, local community members/ surrounding enterprises and any other would be affected/ interested parties.

6.4.1. Public Consultation Questionnaires

ESIA questionnaires were administered, to gather information from key stakeholder and the members of the public. This was done using structured questionnaires to assess the environmental and socio-economic views of the respondents. Copies of the filled questionnaires administered in the project area are appended to this report **(Appendix III).**

6.4.2. Key Informant Interviews

The key stakeholder engagements were conducted to foster better and mutual understanding of public concerns as well as incorporate key stakeholders' opinions to this report.

6.4.3. Public Consultation Meetings

To gather the perspectives of essential stakeholders and any other parties that might be affected or interested, the consultant arranged a meeting that primarily targeted the local administration, including the client. This meeting aimed to inform attendees about the proposed project, its expected impacts, and benefits. A stakeholder mapping exercise was conducted before the meeting to determine which key stakeholders should be invited**.** Those directly impacted by the project were carefully examined in discussions with the project's initiator.

The meeting included a presentation on the project's scope, followed by an open discussion forum where all relevant issues were addressed, and consensus was reached among stakeholders. At the public participation meeting, stakeholders had the opportunity to engage with the project's representative, the ESIA expert. The outcomes of this engagement are documented in this report, capturing the issues, suggestions, concerns, and recommendations from the public meetings held on-site. The meeting saw high attendance, with participants actively engaging in the discussions (**refer to the Minutes in Appendix I and the List of Participants in Appendix II).**

6.5. Consultation and Disclosure Outputs

The appendices contain details on the public consultations conducted as part of the environmental impact assessment for the proposed project. The details feature selected responses recorded in the minutes **(Appendix I**). It was observed that attendees praised the initiative and expressed eagerness for the project's commencement. Nonetheless, there were certain aspects for which the members requested further clarification. A summary of the main issues highlighted by the participants is outlined in **Table 6-1** below:

Table 6-1:Summary of the baraza outcome

Issues raised	Brief explanation	Technical Team Response
Employment	Fences and roads/paths damaged during excavation	The contractor shall endeavour to restore the fence or any damaged structure back to its original form as much as possible.
Local work force	Need for employment during the Project	In a bid to grow the economy of the project area, the contractor shall be keen on hiring locals especially for the unskilled labour.
Compensation of PAPs	Fear of lack of compensation	Compensation for all persons that'll be directly affected by the projects shall be done diligently following the Resettlement Action plan that shall be formulated by the consultant.
Repair and maintenance	If a person detects a leakage from the proposed pipeline during the project operation phase, they can report the leakage to a designated reporting center or authority.	After construction and successful commissioning of the water and sewer project, the TWWDA shall hand over the project to the area Water Service Provider; EWASCO any reports pertaining leakage or system failure shall be reported to their field officers who will in return carry out quick repairs. The area water provider shall provide hotline numbers on which they can be reached.
Water	• High water rates of community water proposed cheaper rates. • Need for repair of damaged water pipelines during construction	• Rates reviewed by water company are expected to be reasonable. • Water lines damaged during construction will be restored as immediate as possible.

6.6. Anticipated impacts

6.6.1. Positive Impacts

Positive impacts identified by stakeholders include the following:

- **Reduction in Water Pollution**: Sewer systems collect wastewater from homes, businesses, and industries, treating it before releasing it back into water bodies. This process significantly reduces the

levels of pollutants such as pathogens, chemicals, and heavy metals in natural water sources, thereby protecting aquatic ecosystems and biodiversity.

- **Protection of Groundwater**: Proper sewer connectivity prevents the contamination of groundwater by untreated sewage, which is especially important in areas where groundwater serves as a critical source of drinking water. This helps maintain the purity and safety of underground water reserves.
- **Reduction in Soil Contamination**: By diverting wastewater to treatment facilities, sewer systems prevent the leaching of contaminants into the soil, thereby preserving soil health and fertility. This is crucial for agriculture and landscaping in urban and peri-urban areas.
- **Improved Public Health**: Sewer connectivity eliminates exposure to untreated sewage, significantly reducing the incidence of waterborne diseases such as cholera, dysentery, and typhoid fever. This leads to healthier communities and reduces the burden on healthcare systems.
- **Enhanced Living Conditions**: Access to proper sewage disposal and water treatment is a fundamental aspect of urban infrastructure that improves the overall quality of life. It eliminates unsanitary conditions, reduces foul odors, and prevents the proliferation of disease vectors such as mosquitoes.
- **Economic Benefits**: Investments in sewer infrastructure generate employment during construction, operation, and maintenance phases. Moreover, a healthy population and a clean environment boost productivity and attract business investments, fostering economic growth.
- **Social Equity and Inclusion**: Extending sewer connectivity to underserved communities can bridge the gap in sanitation access, promoting social equity. It ensures that all residents, regardless of their socio-economic status, benefit from basic sanitation services.
- **Education and Awareness**: The development of sewer systems is often accompanied by educational programs on hygiene and environmental protection, raising awareness among the population and encouraging sustainable practices.

6.6.2. Negative impacts

- **Environmental Disruption**: Construction activities may disrupt local ecosystems, including flora and fauna, water bodies, and natural landscapes, potentially leading to habitat destruction or alteration.
- **Noise and Dust Pollution**: The construction phase is often associated with increased noise and dust, which can affect the quality of life for nearby residents and wildlife.
- **Temporary Water Supply Interruptions**: During both construction and maintenance of the sewer system, there might be temporary interruptions to existing water supplies, affecting residents' daily lives.
- **Social Disruption**: The introduction of construction teams and new workers into a community can sometimes led to social disruption, including issues related to the influx of non-local labour.

- **Increased Traffic and Safety Risks**: The transportation of materials and workers can increase traffic, leading to congestion and heightened safety risks for residents, especially children.
- **Resource Allocation Conflicts**: Competition for water resources, especially in areas with limited water availability, can lead to conflicts among communities, agricultural users, and other stakeholders.
- **Operational Challenges**: Technical issues, poor management, or inadequate maintenance during the operation phase can lead to water quality problems, supply interruptions, and inefficient service delivery.

Addressing these potential negative impacts requires careful planning, effective community engagement, and sustainable management practices to ensure the long-term success and acceptance of the project.

Plate 6-1: The chief giving remarks during the public consultative forum at Chogoria chief's office

Plate 6-2: Mr. Mutuma attending to issues raised by community members at Chogoria

6.7. Stakeholder Engagement Plan

6.7.1. Stakeholder mapping

Stakeholder mapping in development projects enables the engagement to be tailored appropriately to meet the needs and interests of different stakeholder groups and hence ensure their views and concerns area addressed in a suitable manner. The proposed Water Supply and Sewerage Projects by TWWDA under the National Urban Water Supply and Sanitation Programme shall bring on board various stakeholders as presented in **Table 6-2.**

Table 6-2: Stakeholder Analysis for the Proposed Water Supply and Sewerage Projects

Category of Stakeholder	Entities/ Groups	Role of Stakeholder
1. Implementing Agency	TWWDA	• Overseeing project implementation • Compensation of Project Affected Persons • Providing regular updates on project's progress to relevant stakeholders • Maintenance and management of the water and sewerage infrastructure works during operation phase
2. Affected Parties		
a) Directly Affected Parties	Project Affected Persons (PAPs) who are affected through loss of land, land use or loss of livelihood	• Provision of land and wayleave for the proposed projects • Participation in project activities • Project beneficiaries
	Local communities	Project beneficiaries, ownership to ensure sustainability of the projects
b) Indirectly Affected Parties		
• National Government Institutions	Ministry of Finance and National Treasury	Coordination of project finances
	Ministry of Water, Irrigation and Sanitation	Coordination of Water Supply and Sewerage Projects under the National Urban Water Supply and Sanitation Programme
	National Land Commission (NLC)	To monitor and have oversight responsibilities over land use planning throughout the country.

Category of Stakeholder	Entities/ Groups	Role of Stakeholder
• Project executors	Contractors and their workers and Consultants	Project construction and Supervisory role; adherence to approved designs
• Project operators	Water Service Providers (WSPs) in respective project areas	• Technical support during planning and construction phases of the projects • Operationalization/ running of the projects after commissioning
• Relevant Tribunals and the Court	The Commission on Administrative Justice (CAJ),	• National arbitration processes in Kenya where stakeholders can seek recourse on project related grievances • Adjudication of environmental and land related matters
	National Environment Tribunal (NET),	
	Land Acquisition Tribunal	
	The Courts	
• County Government Institutions and relevant agencies	Water Resource Authority, WRA	Issuance of water abstraction permits and monitoring water resource use
	Kenya Forest Service, KFS (applicable to projects using forest land e.g Runyenjes Water Supply Project)	Permits and wayleave acquisition
	NEMA	• Project licensing and monitoring adherence to conditions of licensing • Review of annual project audit reports and issuance of improvement orders
	Directorate of Occupational Health and Safety Services	• Registration of workplaces by all contractors

Category of Stakeholder	Entities/ Groups	Role of Stakeholder
		• Monitoring of adherence to Occupational, Health and Safety standards as stipulated by the (OSHA) Act
	Water Services Regulatory Board (WASREB)	• Regulation of water and sewerage tariffs for sustainability purposes and for purposes of consumer protection
	Water Resource User Associations (WRUAs)	• Resolve conflicts arising from water use • Development of a Sub Catchment Management Plans (SCMPs) • Monitoring water resource availability, quality and use
	Other service providers using the road reserve e.g. KPLC, county government (drainage and pavements)	Support and cooperation with the project implementing teams
• Road Agencies	Kenya National Highways Authority (KENHA), Kenya Urban Roads Authority (KURA) and Kenya Rural Roads Authority (KERRA)	Necessary permits and approval to use road reserve
• Political Leaders	Political Leaders in the project areas (Governors, Deputy Governors, Senators, Members of Parliament (MPs), Members of County Assembly (MCAs)	• Political goodwill • Share project information in meetings
• Public Administration	County Commissioner, Deputy County Commissioner, Ward Administrator, Chiefs and Subchiefs)	• Security provision during all project phases • Community mobilisation
• County Departments	Water and Sanitation	

Category of Stakeholder	Entities/ Groups	Role of Stakeholder
	Environment and Natural Resources	Technical support to implementing agency e.g relevant approvals, provision of planning data for specific projects
	Public Health	
	Lands Department	
	Physical Planning	
3. Interested Parties		
• Financier/ Development Partners	African Development Group (AfDB)	• Projects Financing • Monitor project implementation process • Project evaluations and reviews
• Civil Society Groups	Human Rights Groups, Social Welfare Groups, Non-Governmental Organizations (NGOs) and Community Based Organizations (CBOs)	• Monitoring and evaluating the implementation of development projects • Provide feedback from communities
• Media	Local radio stations, newspapers	• Information sharing • Community mobilization through local broadcasting stations
4. Vulnerable and disadvantaged groups	• Female-headed households • Households with persons with disability • Elderly • Youth (18-35 years)	• Participation in project activities • Project beneficiaries

7. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION

7.1. Introduction

The Environmental and Social Impact Assessment (ESIA) for the proposed project has been thoroughly conducted to evaluate its potential environmental effects. Guided by the Environmental Management and Coordination Act (EMCA) No.8 of 2015, which sets forth the legal framework for such assessments in Kenya, the study identifies the project's impacts across various phases—construction, operation, and decommissioning.

These effects are classified into three main categories**: impacts on the biophysical environment**, **health and safety impacts,** and **socio-economic impacts**, all derived from an analysis comparing the project's anticipated environment against its proposed actions.

7.2. Positive impacts during project planning and design phase

7.2.1. Creation of awareness

During the planning and design phase of the proposed project, awareness done through consultations on different aspects of the project strengthened project acceptance and ownership. Awareness creation improves project acceptance in its planning, implementation and operations phases as well as promote project sustainability.

7.2.2. Employment opportunities

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

7.3. Negative impacts during planning and design phase

The proponent mobilized a team of project design experts from Tana Water Works Development Agency and Environmental and Social consultants to undertake the surveys and other EA studies required for the project. There are potential risks of poor siting of the facilities or non-adherence to the guidelines and specifications on the design of the infrastructure. However, the planning and design studies do not allow for any large-scale destruction and disturbance of vegetation and soils.

Mobilization of the skilled experts and the process of consultations with key stakeholders however led to heightened expectations and speculations and especially on employment opportunities for the surrounding community members.

Proposed Mitigation Measures:

It is envisaged that there will be minimal to no negative impacts during the planning and design stage. However, the design team, Environment and Social experts shall take the necessary measures to mitigate risks through:

- Liaising with the relevant Technical Government department in development of the designs.
- Proper siting of the distribution pipeline to avoid destruction of properties and existing infrastructure.
- Ensure all the legally required permits such as getting the designs approved, acquiring the ESIA License prior to undertaking the construction activities.
- The contractor bidding documents should contain clauses on Environmental Social Health and Safety (ESHS) requirements to guide the contractor on the key requirements; and
- Project Management Team (PMT) specifically the Environmental and Social Expert should ensure the design requirements are adhered too in the planning stage.

7.4. Positive impacts during construction phase

The construction stage of the Project is divided into Pre-Construction and Construction phases. The duration of this phase is contingent on the specific activities involved in the project, typically ranging from one to three years. The project's direct positive effects include:

- The proposed project will improve hygiene and reduce water borne diseases associated with improper management of wastewater in the region.
- An efficient sewage collection and treatment system will protect the environment, surface and underground water resources thus improving environmental quality.
- The project will reduce the costs incurred by the business community in the construction and management of pit latrines and septic tanks on their properties.
- Employment opportunities will be generated during both construction and operation phases of the project. These opportunities will mainly benefit the local people.
- It is expected that the development will attract more investment to the region, and this will benefit the people of Meru County

7.5. Negative Impacts During Construction Phase

7.5.1. Vegetation Clearing, Soil Erosion and Siltation

Construction activities have the potential to clear vegetation and loosen soils particularly on slopes which can then be washed down into the lower areas (streams and valleys). Soil quality degradation is also likely to occur during construction as a result of disposal of construction materials on the adjacent lands especially near the base of the valleys and ultimately into the rivers.

Proposed Mitigation Measures:

The following measures are proposed to mitigate against soil erosion and measures to enhance vegetation cover.

- Re-plant the indigenous vegetation as much as practical once work is completed.
- Limit vegetation clearance unless where unavoidable circumstances appear.
- Contain excavated soils so that they will not find their way into nearby water sources.
- Cement mixing should be done in a designated area away at a safe distance from storm water drains.
- Spilled cement or concrete should be collected and disposed away from natural water ways or storm water drainage.
- Sensitize workers and enable them to properly handle concrete spillages or waste cement.

7.5.2. Air Pollution Impacts

Potential air pollution caused by emissions from construction equipment (Carbon, Hydrocarbons, Particulate Matter) – earth movers and excavators, vehicles, concrete and cement batching plants and trucks, emission of dust from trucks and vehicles accessing the construction areas and camp sites as well as material piling (sand, aggregate and pipes).

Proposed Mitigation Measures:

The following measures are proposed to mitigate against air pollution:

- Maintain construction equipment at high operational conditions such as to control emissions into the air.
- Earth moving be done under dump conditions as much as possible to prevent emission of dust into the air.
- Similarly, piled materials (sand and aggregate) should be maintained dump to prevent dust emissions.
- It will be necessary to notify the immediate neighborhoods on the potential odors during the excavations. The period should, however, be kept as short as possible (odour generation may not be fully eliminated during the period)
- Use of sprinklers to regularly water construction site, this suppresses the dust menace at construction sites.
- People working in the sites with dust emissions to use dust masks to prevent respiratory infections.

7.5.3. Noise Pollution

Construction Phase for the proposed Project will most likely result in noise emissions and excessive vibrations as a result of the machines that will be used (excavation equipment among others) and construction vehicles delivering materials to site. Noise can be a nuisance to the local community if construction works begin too early in the day and continues into the night.

Proposed Mitigation Measures:

- Avoid nighttime construction when noise is loudest.
- Conduct periodic noise measuring and monitoring to determine levels and extent of harmful noise.
- Clearly label the high noise areas.
- Provide PPE personal protective equipment (PPE) including masks, goggles, scarfs, boots and overalls among other protective clothing to persons operating within or visit identified high noise areas.
- To meet noise level requirements, the equipment should be equipped with standard noise attenuation features. Machines that exceed acceptable noise limits should be equipped with silencers or lagging materials or specially designed acoustic enclosures.
- Inform residents when construction activities are likely to generate excessive noise in order to minimize disruption to local residents.
- Sensitize truck drivers to avoid hooting especially when passing through sensitive areas such as churches, residential areas, and hospitals.

7.5.4. Water Resources Pollution

Limited discharge of silt into rivers and other local drainage system from earth moving during construction, potential discharge of oil residuals into the same rivers and open drains from the construction equipment and disruption of accumulated solid wastes from work areas and washed down into the river and other drains.

Mitigation Measures

- Isolate solid wastes disrupted from the works during excavations for safe disposal. The wastes should be collected and disposed in approved sites.
- Earth moving and excavations for the construction are carried out considering safety of the river and surface drainage. Control siltation of rivers and other surface drains
- Ensure spilt oil does not discharge into water sources. Provide oil spill containment including concrete platform for servicing of construction equipment and holding of scrap oil drums.

7.5.5. Drainage and Hydrology Disruptions

Project construction will involve earthworks and excavation that could interfere with local drainage with a potential to divert the normal surface drains towards homes and private plots. No significant implications are expected in the general hydrology of the larger Project area.

Earthwork activities will result in the generation of some soil materials. When not handled properly the soils could lead to sedimentation of the nearby water sources which will interfere with the habitats and hence flora and fauna downstream of such rivers within the project area.

Mitigation Measures

- Excavated channels to follow contours to avoid interference with surface drains.
- Where the drainage system and pavements might be interfered with, restoration to be done after construction activities are completed.
- Whenever necessary, drains along the construction line are directed towards existing drainage systems to cater for storm water during the rains. However, construction should be carried out during a dry season and should take the shortest period possible.
- Utilize excavated soil to level excavated ground where necessary and cover the water and sewer lines that will have been laid in the ground.
- Construction materials and other debris (lime, cement, and fresh concrete.) should be handled carefully to prevent them from finding their way into the nearby water sources.
- Ensure compliance with environmental laws.

7.5.6. 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., water lines and communication lines
- 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.

7.5.7. Waste Generation Impacts (Liquid and Solid)

During construction, solid waste will be generated from a wide range of project activities. Some of the waste includes earth spoils, wrapping materials discarded by the workers on site, food waste from kitchens, waste from the workshops and offices consisting of waste papers, toners and cartridges, broken equipment and containers, steel, timber, etc.

Also, during construction various types of liquid waste will be produced such as concrete washings, runoff from workshops and grey water from contractor's camp. Just as with solid waste, liquid waste can attract wildlife especially for meeting their drinking water needs. This can affect wildlife especially primates.

Mitigation Measures

To minimize pollution and visual intrusion, the waste will have to be managed appropriately as provided by Waste Management Regulation of 2006.

(iv) Solid Wastes

- The contractor shall develop a comprehensive waste management plan prior to commencement of works.
- Properly labelled and strategically placed waste disposal containers shall be provided at all places of work.
- Recycling of construction material shall be practiced where feasible e.g., containers and cartons.

(v) Liquids Wastes

- Water containing pollutants such as concrete or chemicals should be directed to a conservancy tank for removal from the site where applicable.
- Potential pollutants of any kind and form shall be kept, stored, and used in such a manner that any escape can be contained.
- Wash areas shall be placed and constructed in such a manner to ensure that the surrounding areas including groundwater are not polluted.
- No grey water runoff or uncontrolled discharges from the site or working areas to any.

(vi) Hazardous Wastes

- Ensure proper handling of lubricants, fuels and solvents while maintaining the equipment.
- Any chemical or fuel spills shall be cleaned up immediately. The spilt liquid and clean- up material shall be removed, treated, and transported to an appropriate site licensed for its disposal.
- A safety and emergency response plan will need to be developed for all operations with emphasis on the protection of the environment prior to start up.

7.5.8. Resettlement Impacts

Displacement not triggered as pipelines are designed to follow road Right of Way (RoW) and River Riparian, however, there will be impact on crops / trees / structures / fences.

Mitigation Measures

Prepare a Resettlement Action Plan (RAP) for purposes of compensation of likely assets and sources of livelihood for Project Affected Persons.

7.5.9. Social Risks

The Project activities as described in the report have the potential of triggering various social risks both at Project Construction Phase and Operation Phase. These risks are likely to be significant in Market centers and towns along the proposed Project route.

This assessment has identified potential social risks associated with the Project as listed below:

(i) Project Impacts to Vulnerable and Marginalized Groups (VMGs)
(ii) Labor Influx Impacts
(iii) Human Rights and gender inclusivity
(iv) Increased Transmission of communicable diseases including HIV/AID

(i) Labor Influx Effects

This impact is triggered during Project Construction Phase due to the Project attracting various categories of workers from local, national and international markets. This therefore leads to concentration of people in one area drawn from diverse social and cultural backgrounds often resulting to a number of issues as listed:

- Strain on various resources especially water resources for road works
- Grievances from local community members over job opportunities
- Sexual Offences
- Teenage Pregnancies

Mitigation Measures

- Effective community engagement and strong grievance mechanisms on matters related to labor.
- Effective contractual obligations for the contractor to adhere to the mitigation of risks against labor influx, the contractor should engage a local community liaison person as provided for in Chapter 6
- Proper records of labor force on site while avoiding child and forced labor.
- Comply to provisions of WIBA 2007
- Develop and implement a children Protection Strategy, this strategy will ensure that no child under the legal age of 18 years in employed to the Project.

(ii) Human Right and Gender Inclusivity

This impact is triggered during Project Construction Phase due to the potential of the Contractor's failure to comply with the following provisions:

- Gender Inclusivity requirements in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 gender rule.

- Failure to protect Human Risk areas Associated with, Disadvantaged Groups, Interfering with Participation Rights, and interfering with Labor Rights

Mitigation Measures

- Mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 Gender Rule.
- The existing community structures headed by location chiefs should be involved in local labor hire, emphasize the requirement of hiring women, youth, and people with disability.
- Protecting Human Risk Areas Associated with, Disadvantaged Groups, Interfering with Participation Rights and interfering with Labor Rights

(iii) Child Protection

The possibility of contractor children abuse is through hiring of child labour, also labour force on site might abuse children within the Project area through sexual advance that could lead to early pregnancies and school dropout including exposure to communicable diseases such as HIV and AIDS. The contractor will undertake the below listed mitigation measures.

Mitigation Measures

- Develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project.
- All staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behavior.
- Children under the age of 18years should be hired on site as provided by Child Rights Act (Amendment Bill) 2014

(iv) Prevalence of Communicable Diseases

This impact is triggered during Project Construction Phase due to the Project attracting various categories of workers from local, national, and international markets. This therefore leads to concentration of people in one area drawn from diverse social and cultural backgrounds often resulting to people engaging in risky sexual activities.

Mitigation Measures

- HIV/AIDS Awareness Program and other communicable diseases to be instituted and implemented as part of the Contractor's Health and Safety Management Plan to be enforced by the Supervising Engineer.

- This will involve periodic HIV/AIDS and other communicable diseases Awareness Workshops for Contractor's Staff.
- Access to Contractor's Workforce Camps by outsiders to be controlled.
- Contractor to provide standard quality condoms to personnel on site.

7.6. Positive Impacts During Operational Phase

The project's main objective is to improve the quality of life of people within Chogoria and environs through provision of improved Water Services. Specific benefits are listed below:

- **Reduction in Water Pollution**: Sewer systems collect wastewater from homes, businesses, and industries, treating it before releasing it back into water bodies. This process significantly reduces the levels of pollutants such as pathogens, chemicals, and heavy metals in natural water sources, thereby protecting aquatic ecosystems and biodiversity.
- **Protection of Groundwater**: Proper sewer connectivity prevents the contamination of groundwater by untreated sewage, which is especially important in areas where groundwater serves as a critical source of drinking water. This helps maintain the purity and safety of underground water reserves.
- **Reduction in Soil Contamination**: By diverting wastewater to treatment facilities, sewer systems prevent the leaching of contaminants into the soil, thereby preserving soil health and fertility. This is crucial for agriculture and landscaping in urban and peri-urban areas.
- **Improved Public Health**: Sewer connectivity eliminates exposure to untreated sewage, significantly reducing the incidence of waterborne diseases such as cholera, dysentery, and typhoid fever. This leads to healthier communities and reduces the burden on healthcare systems.
- **Enhanced Living Conditions**: Access to proper sewage disposal and water treatment is a fundamental aspect of urban infrastructure that improves the overall quality of life. It eliminates unsanitary conditions, reduces foul odors, and prevents the proliferation of disease vectors such as mosquitoes.
- **Economic Benefits**: Investments in sewer infrastructure generate employment during construction, operation, and maintenance phases. Moreover, a healthy population and a clean environment boost productivity and attract business investments, fostering economic growth.
- **Social Equity and Inclusion**: Extending sewer connectivity to underserved communities can bridge the gap in sanitation access, promoting social equity. It ensures that all residents, regardless of their socio-economic status, benefit from basic sanitation services.
- **Education and Awareness**: The development of sewer systems is often accompanied by educational programs on hygiene and environmental protection, raising awareness among the population and encouraging sustainable practices.

7.7. Negative Impacts During Operation

7.7.1. Public Health and Safety Issues

Occupation health and safety hazards during the operation and maintenance phases shall result from various sources and have adverse effects if not controlled within recommended limits.

Some of the risk sources are opening of air valve to vandalize water; disease vectors; water borne diseases. The air valves have high pressure and can lead to fatal accidents or even flooding of project area among other sewerage related accidents.

Proposed Mitigation Measures

- Educate community against interfering with sewer infrastructure for example pipes and water valves;
- Conduct continuous monitoring to curb vandalism; monitoring can also be done through use of online electronic monitoring gadgets to enable curb vandalism on time;
- Ensure that, sewerage connection infrastructure is tested for integrity prior to commencing work.

7.7.2. Odour and Air Pollution:

The operation of sewage systems can sometimes lead to unpleasant odours and air pollution in the surrounding areas.

Proposed Mitigation Measures

- Regular maintenance and cleaning of the sewer lines,
- Installation of odour control systems such as activated carbon filters or biofilters, can help mitigate odour and air pollution issues.

7.7.3. Potential Contamination of Water Sources:

Improperly maintained sewer lines or sewage leaks can result in the contamination of water sources, posing risks to public health and the environment.

Proposed Mitigation Measures

- Implementing regular monitoring programs to detect leaks
- Promptly repairing any damaged or leaking sewer lines can help prevent contamination of water sources.
- Ensuring that sewage treatment plants are operating effectively can reduce the risk of contamination.

7.7.4. Infrastructure Damage and Disruptions:

The operation of heavy machinery or vehicles required for maintenance and repairs of sewer lines can cause damage to roads and disruptions to traffic flow in the area.

Proposed Mitigation Measures

- Proper planning of maintenance activities to minimize disruptions to traffic flow,
- Timely repairs of any damages caused to roads or infrastructure, can help mitigate this impact.
- Implementing traffic management plans and providing advance notice to residents about planned maintenance activities can help minimize inconveniences.

7.7.5. Vandalism

Vandalism of sewer infrastructure can have serious consequences, including service disruptions, environmental contamination, and costly repairs.

Proposed Mitigation Measures

- The county government through NIWASCO shall educate the community about the importance of sewer infrastructure and the negative impacts of vandalism on public health, the environment, and community well-being.
- NIWASCO shall foster a sense of ownership and pride in the sewer system by involving local residents in its protection and maintenance.
- NIWASCO shall install clear signage indicating that the sewer infrastructure is protected by law and that vandalism will be prosecuted.
- The project proponent Consider situating infrastructure in areas with high visibility and natural surveillance to discourage vandalism.
- NIWASCO shall employ security personnel and community patrol appointees to monitor sewer infrastructure and respond promptly to any suspicious activities.
- NIWASCO shall collaborate with local law enforcement agencies and community organizations to establish neighborhood watch programs aimed at preventing vandalism and promoting community safety.
- The NIWASCO technical team shall ensure prompt repair of any damage to sewer infrastructure to minimize service disruptions and prevent further deterioration.

7.7.6. Social Disruptions:

The presence of sewerage infrastructure and associated maintenance activities may cause social disruptions and inconvenience to residents in the area.

Proposed Mitigation Measures

- Engaging with the community through effective communication channels, providing timely updates on maintenance schedules, and addressing any concerns or complaints promptly can help minimize social disruptions.

- Involving local community members in the planning and decision-making processes related to sewerage system operation can foster a sense of ownership and cooperation.

7.8. Decommissioning and withdrawal

7.8.1. Loss of jobs

The decommissioning of the sewer project may lead to job losses, impacting individuals employed directly or indirectly in various project-related activities. This loss of employment can have economic and social repercussions on affected individuals, their families, and the community at large.

Proposed Mitigation Measures

- Establish social safety net programs, including unemployment benefits, job retraining grants, and financial assistance, to support affected workers and their families during the transition period.
- Implement community development projects aimed at creating employment opportunities, improving infrastructure, and enhancing local amenities to stimulate economic growth and mitigate the negative impacts of job losses.
- 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 sewerage project where possible.

7.8.2. Air Pollution:

During the decommissioning phase, vehicle emissions from transportation of materials and machinery activity can contribute to air pollution. Dust generation from site access and material piling could further degrade air quality, leading to respiratory issues and environmental pollution.

Proposed Mitigation Measures

- Provide appropriate Personal Protective Equipment (PPE) for workers involved in decommissioning.
- Apply water on exposed areas and access roads to suppress dust emissions
- Transportation trucks carrying debris and scrap materials should be well covered

7.8.3. Solid Waste Generation:

Decommissioning activities can generate various types of solid waste, such as debris, concrete, and human waste. Inadequate handling and disposal of these wastes can result in environmental pollution and pose health hazards to workers and nearby communities.

Proposed Mitigation Measures

- Execute careful demolition to maximize material reusability.
- Sell or donate reusable/recyclable materials to minimize waste.
- Adhere to an approved Decommissioning plan by the National Environmental Management Authority (NEMA) for proper site rehabilitation and waste management.

7.8.4. Water Pollution

The decommissioning process may contaminate nearby water bodies or groundwater sources. Activities such as pipe excavation and material handling can introduce pollutants into the environment, adversely affecting water quality and posing risks to aquatic ecosystems and human health.

Proposed Mitigation Measures

- Implement a comprehensive waste management plan to handle, store, and dispose of materials and waste properly.
- Minimize the use of harmful chemicals or substances during decommissioning.
- Develop spill prevention and response protocols to handle any accidental releases of pollutants.

7.8.5. Noise and Vibration

Demolition works during decommissioning can produce significant noise and vibrations, causing disturbance to residents and disrupting local ecosystems. Increased noise levels can lead to annoyance, stress, and sleep disturbances among nearby residents.

Proposed Mitigation Measures

- Schedule demolition activities during daytime hours when noise impact is expected to be lower.
- Choose demolition equipment designed to minimize noise emissions.
- Conduct regular maintenance of equipment to prevent excessive noise.

7.8.6. Occupational Health and Safety Concerns

Risks associated with the decommissioning phase include accidents due to material movement, uncovered holes, and structures. Workers may be exposed to hazards such as falls, trips, and exposure to harmful substances if proper safety measures are not implemented.

Proposed Mitigation Measures

- Supply proper Personal Protective Equipment (PPE) and provide safety training to workers.
- Establish designated pathways for machinery and personnel movement.
- Develop incident reporting mechanisms to address any safety concerns promptly.

7.8.7. Disruption of Ecosystems

Decommissioning activities may disrupt local ecosystems and habitats, leading to the displacement of wildlife and loss of biodiversity. Disturbance of soil and vegetation can result in erosion, habitat fragmentation, and loss of ecosystem services.

Proposed Mitigation Measures

- Restore the land to its original state by revegetating the surrounding.
- Development of a decommissioning plan to take care of the native ecosystem.
- Conduct biodiversity assessment before decommissioning
- Unnecessary cutting down of trees should be avoided.

7.8.8. Visual and Aesthetic Impact

The decommissioning phase may result in unsightly construction sites and temporary disruptions to the visual landscape. This can negatively impact the aesthetics of the area and reduce property values in the vicinity.

Proposed Mitigation Measures

- The contractor to utilize landscaping techniques to camouflage construction areas, such as planting trees or shrubs.
- Schedule decommissioning activities during off-peak hours to minimize disruptions to the visual landscape.
- Coordinate with local authorities and stakeholders to ensure that decommissioning activities adhere to aesthetic guidelines and regulations.
- Restore the visual landscape post-decommissioning by cleaning up construction debris and restoring affected areas to their original state.

8. PROJECT ALTERNATIVE ANALYSIS

8.1. Introduction

This chapter also analyses the design process used to arrive at the proposed project capacity, technology used and location of project components. The 'No Project' alternative was also considered. This section evaluates potential alternatives for the project across different dimensions relevant to its proposal. The primary considerations for these alternatives include the location of the project, its design, and technological scale. It's crucial that these alternatives are not only economically viable but also minimize negative impacts on the environment, society, health and safety, and avoid unnecessary delays.

Often, the ESIA process is initiated too late in the planning stage, limiting the exploration of a comprehensive range of alternatives. This limitation can detract from the ESIA's objective of fostering solutions that are both environmentally responsible and accepted by the public. Introducing new alternatives and objectives that adapt based on environmental and social conditions, public preferences, and the sustainability of the project could address many environmental and socio-economic challenges linked to new project implementations (Anderson *et al.,* 2003).

8.2. The proposed project alternative

The design considerations analyzed were as follows:

- Project location
- Pipeline location
- Material sourcing sites and disposal of spoil
- Proposed project option
- No project alternative

8.3. No project alternative

The 'No Project Option' in respect to the proposed Project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions.

However, if the Project is not implemented, the following issues will continue affecting residents of Chogoria and surrounding rural areas:

- Poor accessibility to reliable sewer system to residents.
- High non-revenue water losses of abstracted water.
- No improvements in living standard/well-being, employment, and local economy in the target beneficiaries.

- Limited opportunities for future growth of the Town and surrounding areas.
- No creation of employment during both construction and operation phases of the Project.
- Uncontrolled tariff charges by the community sewer management companies.
- Unplanned & uneconomical sewer network system because of many parallel pipes by different community/company sewer schemes.
- High risk of residents contracting water borne diseases.

8.4. Location of project components

Water mains have been routed and will be laid in road reserves where there is minimum:

- Utility congestion
- Native plant vegetation and undisturbed areas
- Environmental clearance (archaeology, endangered species)
- Service interruptions
- Traffic disturbance

All water pipeline extensions would be installed in the adjacent street, pathway, or easement, along the entire length of the property to be served.

8.5. Material Selection

8.5.1. Pipe Selection

The choice of pipe material is influenced by:

- Hydraulic and structural design; in consideration of whether it is gravity or pumping sewer.
- Resistance to chemical and biological processes internally and externally e.g., Corrosion
- Physical properties of the pipe material i.e., strength (to prevent abrasion)
- Types of joints; in view of water tightness which affects infiltration.
- Availability of required sewer diameters and necessary fittings
- Cost of materials and installations

The disadvantages of using ***concrete pipes*** include their high friction coefficient and susceptibility to corrosion due to the generation of hydrogen sulphide gas especially at high ambient temperatures and long retention time.

Exposure of ***uPVC pipes*** to strong sunlight over a long period can cause brittleness of uPVC sewers, but this has become less common with modern pipes. There has also been reservation regarding the quality of the locally manufactured large diameter uPVC pipes and the ability of Contractors to properly lay these large

diameter pipes. Their use has therefore generally been limited to diameters less than 300 mm. Despite the high cost, it is customary to specify the use of Class 41 uPVC pipes (with thicker walls) for sewers to provide additional safeguards.

With manufacture of ***HDPE Pipes*** gaining momentum in the country and considering its rapid use by most Water Service Providers, the benefits of using HDPE pipes in Sewerage Systems including reduction in the number of manholes required, ease of use in confined spaces and resistance to corrosion, make HDPE Pipes the ideal sewer pipe material. Most of the HDPE Pipes manufactures have introduced Double Walled Corrugated Pipes which have the following advantages over other pipe materials:

- High Strength
- Light weight and easy to transport and install.
- Good chemical and abrasion resistance
- Offers a range of ring stiffness from 2 to 8kN/m2
- Flexibility to withstand high loads.

When ***steel pipes*** are exposed to the strong sunlight, the external protective bitumen coating become brittle and crack, thus become susceptible to the atmosphere. There are also cases where the pipe couplings, and even the pipes, have been vandalised and stolen for recycling purposes. The high cost of steel pipes also discourages their use in other normal conditions.

Considering performance, cost and availability, ***HDPE(DWC) and concrete pipes*** are the most appropriate pipes for use in large diameter sewer construction in Kenya. For smaller diameters, **uPVC sewer pipes** are more cost effective. **Steel pipes are inevitable** for aerial river crossings, pumping mains, high impact resistance and bridging ability; either spun iron or mild steel pipes can be used. **Shallow sewer sections** or those laid on road crossings shall consist of **DWC protected with reinforced concrete raft slab**.

8.5.2. Manholes

Cast in situ or precast concrete manholes have been proposed for use in the project. Heavy-duty cast-iron manhole covers have been proposed for use in trafficable areas, while medium duty manhole covers and frames or equivalent have been proposed where vehicle access is limited. Manhole covers on the road are to be imbedded in road bitumen after final inspection if required. Heavy Duty PVC covers have been proposed in selected areas.

8.5.3. Benching

The area of benching in each manhole that would permit a man to stand easily, comfortably and without danger to him, on such benching while working in the manhole has been provided.

Manholes benching have been designed at grades ranging between 1 in 5 and 1 in 25 and will be battered back equally from each-side of the manhole channels such that the opening at the level of the soffit of the pipes will have a width of 1.2 d where d is the nominal pipe diameter.

8.6. Project Benefits

The Project will directly result to realization of social and economic benefits described in section of this assessment and summarized below:

- The Project shall lead to realization of TWWDA strategic goals of improving access to sewer services.
- The Project addresses improved access to sewer facility that underpins the Kenyan economic and social developments (Vision 2030) and its associated Medium-Term Plan (MTP) IV, Bottom-Up Economic Transformation Agenda (BETA), Sustainable Development Goal (6) which is the new 2030 agenda and expands Millennium Development Goal (MDG) as guided by resolutions of Rio+20 conference.
- The goal focuses more on investment in adequate infrastructure in water sanitation, Hygiene, water quality/quantity, wastewater management, water scarcity and use efficiency, integrated water resource management and protection of water related ecosystems.

9. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

9.1. Purpose and Objectives of ESMMP

The specific objectives of the ESMMP are to:

- Act as a binding agreement and guide for the contractor to follow the Environmental and Social Management and Monitoring Plan (ESMMP), including adhering to the approval conditions set by NEMA.
- Serve as a key reference for overseeing environmental and social monitoring tasks for the supervising consultant, contractor, and client management, encompassing necessary progress updates.
- Offer precise guidelines for managing and lessening the negative impacts of project activities on the environment.
- Provide directives to project staff on procedures aimed at environmental conservation and reducing environmental harm, aligning with the project's objective of achieving minimal to no incidents.
- Record environmental issues and recommended protective steps, ensuring that remedial measures are executed promptly.

9.2. Auditing of ESMMP

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

- The ESMMP being used is the up-to-date version.
- Variations to the ESMMP 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 ESMMP.
- Ensure that appropriate corrective and preventive action is taken by the Contractor once instructions have been issued.

9.3. Management Responsibility of ESMMP

To ensure the sound development and effective implementation of the ESMMP, it will be necessary to identify and define the responsibilities and authority of the various persons and Organizations who will be involved in the project. The following entities should be involved in the implementation of this ESMMP:

(i) TWWDA/NIWASCO

(ii) NEMA

(iii) Contractor

(iv) Design Consultant

(v) Tharaka Nithi County Government

9.3.1. Tana Water Works Development Agency/Nithi Water and Sanitation Company

TWWDA in conjunction with NIWASCO the proponent, will be charged with the responsibility of ensuring that the proposed development has been put up in an environmentally sound manner. This can be achieved by inclusion of environmental specifications in the tender documents, selection of renowned environmentally conscious contractors and supervision to ensure that the objectives of this ESMMP are met.

9.3.2. National Environment Management Authority (NEMA)

NEMA's responsibility is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government of Kenya in the implementation of all policies relating to the environment.

9.3.3. The Contractor

The persons/firms contracted to construct the proposed Last Mile Connectivity for Chogoria sanitation Project will be required to comply with the requirements of the ESMMP within this report. To ensure strict compliance environmental specifications of this ESMMP should form part of the contract documents.

9.3.4. Consultant

The sourced consultant will have to ensure that the proposed ESMMP is up to date and is being used by the contractor. Periodic audits of the ESMMP will have to be done to ensure that its performance is as expected.

9.3.5. Tharaka Nithi County Government

The relevant departmental officers in Tharaka Nithi local authorities should be called upon where necessary during Project implementation to provide the necessary permits and advisory services to the Project implementers.

9.4. Emergency procedure during construction and operation phase of the project

An emergency means unforeseen happening resulting in serious or fatal injury to employed persons or the neighboring communities. In the event of an emergency during construction, the workers shall: -

(i) Alert other persons exposed to danger.

(ii) Inform the OSHA coordinator.

(iii) Do a quick assessment on the nature of emergency.

(iv) Call for ambulance.

When emergency is over, the OSHA coordinator shall notify the workers by putting a message: "ALL CLEAR". In the event of such an emergency during operation the workers shall:

a) Alert other persons exposed to danger.

b) Ring the nearest police station and ambulance service.

The proponent has already put measures to respond to emergencies like alarms and a fire assembly point there are also trained staff can assist in case of emergency.

9.5. ESMP for the Construction Phase

Table 9-1: Proposed ESMMP for Construction phase

Associated Impact	Proposed Management Actions	Responsible Party	Monitoring Indicator	Provisional Budget
Preconstruction phase				
Poor siting of the facilities or non-adherence to the guidelines and specifications on the design of the infrastructure.	• Liaising with the relevant Technical Government department in development of the designs. • Proper siting of the distribution pipeline to avoid destruction of properties and existing infrastructure. • Ensure all the legally required permits such as getting the designs approved, acquiring the ESIA License prior to undertaking the construction activities. • The contractor bidding documents should contain clauses on Environmental Social Health and Safety (ESHS) requirements to guide the contractor on the key requirements; and • Project Management Team (PMT) specifically the Environmental and Social Expert should ensure the design requirements are adhered too in the planning stage.	• TWWDA/Design engineer	• A well-designed system	If designed by proponent, no direct cost.
Delay in implementation of the Project due to	• The Contractor shall ensure that all pertinent permits, certificates and licences have been obtained prior to any activities commencing on site and are strictly enforced/ adhered to;	• TWWDA & Contractor	• Number of approvals / permits issued	500,000

Associated Impact	Proposed Management Actions	Responsible Party	Monitoring Indicator	Provisional Budget
objections and stop orders	• The Contractor shall maintain a database of all pertinent permits and licences required for the contract as a whole and for pertinent activities for the duration of the contract			
Resettlement Impacts	• Prepare a Resettlement Action Plan (RAP) for purposes of compensation of likely assets and sources of livelihood for Project Affected Persons.	• TWWDA& Consultants	• A comprehensive RAP	300,000
Construction phase				
Vegetation Clearing, Soil Erosion and Siltation	• Re-plant the indigenous vegetation as much as practical once work is completed. • Limit vegetation clearance unless where unavoidable circumstances appear. • Contain excavated soils so that they will not find their way into nearby water sources. • Cement mixing should be done in a designated area away at a safe distance from storm water drains. • Spilled cement or concrete should be collected and disposed away from natural water ways or storm water drainage. • Sensitize workers and enable them to properly handle concrete spillages or waste cement.	• Contractor(s)	• Soil erosion extend and intensity on site	• 150,000

Associated Impact	Proposed Management Actions	Responsible Party	Monitoring Indicator	Provisional Budget
Air Pollution Impacts	• Maintain construction equipment at high operational conditions such as to control emissions into the air. • Earth moving be done under dump conditions as much as possible to prevent emission of dust into the air. • Similarly, piled materials (sand and aggregate) should be maintained dump to prevent dust emissions. • It will be necessary to notify the immediate neighborhoods on the potential odors during the excavations. The period should, however, be kept as short as possible (odour generation may not be fully eliminated during the period) • Use of sprinklers to regularly water construction site, this suppresses the dust menace at construction sites. • People working in the sites with dust emissions to use dust masks to prevent respiratory infections.	• Contractor(s)	• Cases of respiratory complication at nearby health center	• 250,000
Noise Pollution	• Avoid nighttime construction when noise is loudest. • Conduct periodic noise measuring and monitoring to determine levels and extent of harmful noise. • Clearly label the high noise areas. • Provide PPE personal protective equipment (PPE) including masks, goggles, scarfs, boots and overalls among other	• Contractor	▪ State of machines used. • Type of machines used for compaction	200,000

Associated Impact	Proposed Management Actions	Responsible Party	Monitoring Indicator	Provisional Budget
	protective clothing to persons operating within or visit identified high noise areas. • To meet noise level requirements, the equipment should be equipped with standard noise attenuation features. Machines that exceed acceptable noise limits should be equipped with silencers or lagging materials or specially designed acoustic enclosures. • Inform residents when construction activities are likely to generate excessive noise in order to minimize disruption to local residents. • Sensitize truck drivers to avoid hooting especially when passing through sensitive areas such as churches, residential areas, and hospitals.			
Water Resources Pollution	• Isolate solid wastes disrupted from the works during excavations for safe disposal. The wastes should be collected and disposed in approved sites. • Earth moving and excavations for the construction are carried out considering safety of the river and surface drainage. Control siltation of rivers and other surface drains	• Contractor/ Public Health Officer/ County Environmental Officer	• Number of complaints from community not happy with waste management of the contractor	300,000

Associated Impact	Proposed Management Actions	Responsible Party	Monitoring Indicator	Provisional Budget
	• Ensure spilt oil does not discharge into water sources. Provide oil spill containment including concrete platform for servicing of construction equipment and holding of scrap oil drums.			
Drainage and Hydrology Disruptions	• Excavated channels to follow contours to avoid interference with surface drains. • Where the drainage system and pavements might be interfered with, restoration to be done after construction activities are completed. • Whenever necessary, drains along the construction line are directed towards existing drainage systems to cater for storm water during the rains. However, construction should be carried out during a dry season and should take the shortest period possible. • Utilize excavated soil to level excavated ground where necessary and cover the water and sewer lines that will have been laid in the ground. • Construction materials and other debris (lime, cement, and fresh concrete.) should be handled carefully to prevent them from finding their way into the nearby water sources. • Ensure compliance with environmental laws.	• Contractor(s) • Supervision	• Number of complaints from community due to lack of certain services	No direct costs

Associated Impact	Proposed Management Actions	Responsible Party	Monitoring Indicator	Provisional Budget
Interruption of Existing Infrastructure	• Roads both main roads and feeder roads in the towns and estates • Underground utilities e.g., water lines and communication lines • Fences and temporal structures along the main roads	• Contractor(s) • Supervision	• Number of complaints from community due to lack of certain services	400,000
Waste Generation Impacts (Liquid and Solid)	**(vii) Solid Wastes** • The contractor shall develop a comprehensive waste management plan prior to commencement of works. • Properly labelled and strategically placed waste disposal containers shall be provided at all places of work. • Recycling of construction material shall be practiced where feasible e.g., containers and cartons. **(viii) Liquids Wastes** • Water containing pollutants such as concrete or chemicals should be directed to a conservancy tank for removal from the site where applicable. • Potential pollutants of any kind and form shall be kept, stored, and used in such a manner that any escape can be contained.	• Contractor(s) Supervision	• Number of complaints from community not happy with waste management of the contractor	500,000

Associated Impact	Proposed Management Actions	Responsible Party	Monitoring Indicator	Provisional Budget
	• Wash areas shall be placed and constructed in such a manner to ensure that the surrounding areas including groundwater are not polluted. • No grey water runoff or uncontrolled discharges from the site or working areas to any. **(ix) Hazardous Wastes** • Ensure proper handling of lubricants, fuels and solvents while maintaining the equipment. • Any chemical or fuel spills shall be cleaned up immediately. The spilt liquid and clean- up material shall be removed, treated, and transported to an appropriate site licensed for its disposal. • A safety and emergency response plan will need to be developed for all operations with emphasis on the protection of the environment prior to start up.			
Loss of livelihoods	• Prepare a comprehensive Resettlement Action Plan (RAP) for purposes of compensation for land, assets and crops for the Project Affected Persons (PAPs)	• Contractor(s)	• Numbers of satisfied PAPS • Extend of route opened to the contractor	To be provided by RAP

Associated Impact	Proposed Management Actions	Responsible Party	Monitoring Indicator	Provisional Budget
	• Prepare a Grievance Redress Mechanism (GRM) to guide all grievances and complaints emanating from compensation issues. • Providing fair and timely compensation to displaced persons, including compensation for lost land, property, and livelihoods. • Offering support services such as vocational training, employment opportunities, and access to alternative land for agricultural purposes. • Engaging with affected communities in the decision-making process and ensuring their participation in project planning and implementation. • Implementing transparent and accountable grievance redress mechanism to address concerns and disputes related to displacement effectively			
Social Risks	**(v) Labor Influx Effects** • Effective community engagement and strong grievance mechanisms on matters related to labor. • Effective contractual obligations for the contractor to adhere to the mitigation of risks against labor influx, the contractor	• Contractor(s)	• Number of Trainings Held • Availability of Training reports	500,000

Associated Impact	Proposed Management Actions	Responsible Party	Monitoring Indicator	Provisional Budget
	should engage a local community liaison person as provided for in Chapter 6 • Proper records of labor force on site while avoiding child and forced labor. • Comply to provisions of WIBA 2007 • Develop and implement a children Protection Strategy, this strategy will ensure that no child under the legal age of 18 years in employed to the Project. **(vi) Human Right and Gender Inclusivity** • Mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 Gender Rule. • The existing community structures headed by location chiefs should be involved in local labor hire, emphasize the requirement of hiring women, youth, and people with disability. • Protecting Human Risk Areas Associated with, Disadvantaged Groups, Interfering with Participation Rights and interfering with Labor Rights **(vii) Child Protection**		• Attendance list of participants during the training sessions • Reported complaints from neighbor community and institutions	

Associated Impact	Proposed Management Actions	Responsible Party	Monitoring Indicator	Provisional Budget
	• Develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project. • All staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behavior. • Children under the age of 18years should be hired on site as provided by Child Rights Act (Amendment Bill) 2014. **(viii) Prevalence of Communicable Diseases** • HIV/AIDS Awareness Program and other communicable diseases to be instituted and implemented as part of the Contractor's Health and Safety Management Plan to be enforced by the Supervising Engineer. • This will involve periodic HIV/AIDS and other communicable diseases Awareness Workshops for Contractor's Staff. • Access to Contractor's Workforce Camps by outsiders to be controlled. • Contractor to provide standard quality condoms to personnel on site.			
TOTAL				3.1M

9.6. ESMP for Operation Phase

Table 9-2: Proposed ESMMP for the operation phase

Issue	Action required	Responsible party	Provisional Budget
Risk of encroachment and construction of structures on the water easement corridor	• Mapping and installation of beacons to which illustrate the width of the pipeline reserve. • Regular inspection of the pipeline corridor for encroachment. • Prosecution of encroachers as required by City County By laws on way leaves and road reserves maintenance. Conduct public sensitization programs on importance not interfering with way leaves and public reserve land.	NIWASCO & Tharaka Nithi County Government	To be established at operation phase and included in the operation of the projects
Risk of illegal connection to the wastewater pipeline	• This is common in the informal settlements where residents illegally tap the water pipeline. • This will require constant inspection by NIWASCO officials and installation of leak and burst detectors at designated areas along the pipeline. Conduct public sensitization programs on importance not interfering with the water pipeline and the need to seek official water connection from NIWASCO	NIWASCO	To be established at operation phase and included in the operation of the projects
Contamination of soil and water from sewage leakages and overflows	• Regular monitoring and inspection of sewer lines to identify broken pipes and damaged manholes for repair or maintenance. • Use of high-quality materials that can withstand anticipated sewage loads and as recommended by the design engineers to prevent leakages and overflows. • Clear and unclog blocked sewer lines within the shortest time possible to contain sewage spills and overflows. Clean and disinfect contaminated sites	NIWASCO	To be established at operation phase and included in the operation of the projects
Odours from wastewater system	• Maintaining proper operations and maintenance practices such as sewer inspections and management to avoid odours. • Provide adequate buffer areas such as trees between sewer site and potential receptors. • Minimize hydraulic detention times in pipes. • Reduce turbulence by minimizing the use of drop manholes. Cover emission points (e.g., manholes, and channels)	NIWASCO	To be established at operation phase and included in the operation of the projects

9.7. Decommissioning

Project decommissioning involves the process of safely closing or dismantling a project and its facilities once they reach the end of their useful life or operational period. It aims to minimize environmental impacts, restore sites to their natural state or prepare them for future use, and address any social implications, ensuring compliance with relevant regulations and standards.

At the end of its design life, the proposed project will undergo decommissioning. This can take two forms:

(i) Abandoning the pipeline.
(ii) Removing the pipeline from the ground and restoring the area.

In case of the first option, there will be minimal damage and disturbance to the environment. However, if the Proponent opts for the second option, the impacts will be far reaching. Apparently, these impacts compare favorably to the impacts in the Construction Phase. Thus, similar mitigations to those of construction phase will apply. The responsibility of the implementing decommissioning phase ESMMP will be shared between the Contractor and the Proponent.

9.7.1. Decommissioning Flow Chart

The Project has been designed to operate effectively for over 20years. If the infrastructure will be required to be overhauled, then the following steps should be considered in order to undertake the procedure in a structured manner with minimum impact to both human and natural environment as illustrated in.

Step	Action	Actor
1	**Initiation** Development of an Objective Worksheet and checklist incorporating references, legal and policies Undertake decommissioning audit	Proponent then
2	**Prepare Road Map for Decommissioning Design** Conduct design review to validate elements of the design and ensure design features are incorporated in the decommissioning design. Public consultations	Proponent then
3	**Prepare and Award Contract** Prepare a contract that incorporates validated Project information and award to a Contractor as per the Procurement rules.	Proponent then
4	**Execute Decommission Works** Implement design elements and criteria on the Project in accordance with specifications and drawings. Inspect during decommissioning and at	Contractor

Step	Action	Actor
	Project completion to ensure that all design elements are implemented according to design specifications.	
5	**Commissioning Environmental Management Plan**	Contractor
6	**Non-Conformance, Corrective/Preventive Action** Determine root cause. Propose corrective measures. Propose future preventive measures.	Contractor

10. CONCLUSIONS AND RECOMMENDATIONS

10.1. Conclusions

There was upmost acceptability and goodwill from the enterprises and community living around the project area. There are major environmental and social issues both positive and negative associated with the construction, operation, and decommissioning of the proposed project. Mitigation measures have been proposed in every negative impact raised in construction, operation, and decommissioning under the environmental and social management plan (ESMP) for consideration in these various stages of the proposed project.

The ESIA and preparation of this Comprehensive Project Report was carried out to fulfil legal requirements, as outlined in the Environmental Management and Co-ordination Act (1999), and the Environmental (Impact Assessment and Audit) Regulations (2003) revised in 2015&2019. Mitigation measures for the potentially significant and/or adverse environmental and social impacts and safety risks have been provided as an integral part of this ESIA report. The positive impacts outweigh the negative impacts. The listed negative impacts can be corrected with the proposed mitigation measures, and it is also economically viable therefore the project should be allowed to proceed.

10.2. Recommendations

The following are some of the recommendations made to minimize or mitigate for the adverse environmental and social impacts from the proposed project:

(i) There is need for rigorous implementation of the Environmental Management and Monitoring Plan which will facilitate the mitigation and/or prevention of potentially adverse environmental impacts.

(ii) The proposed ESM&MP should be followed fully by the contractor with the supervision from the proponent. A report on the findings from the monitoring of the ESM&MP right from implementation all through to decommissioning phase submitted quarterly.

(iii) The mitigation measures proposed should be followed by the proponent as it is highlighted in this ESIA report.

(iv) The design, construction and operation should be carried out in accordance with the specific report for the proposed project.

(v) All contractor's employees and any other person visiting the site should be provided with appropriate PPE and trained on their proper use.

(vi) On completion of the Civil Works, NIWASCO to commission an Independent Consultant to undertake an initial Environment, Social, Health and Safety Audit as required by Environment Impact Assessment and Audit Regulations of 2003. The audit will identify non-conformities which the Contractor together

with NIWASCO will address through the defect's liability period of the Project. This audit will also form basis of annual Project self-audits by NIWASCO.

11. REFERENCES

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12. APPENDICES

12.1. Appendix 1: Minutes of Public Participation Meetings

Chogoria Sewer_Minutes.pdf

12.2. Appendix 2: Attendance list of the Public Participation Meetings

Kairuni chief's office attendance list.pdf

chogoria chief's office attendance list.pdf

12.3. Appendix 3: Photo Gallery

The chief giving remarks during the public consultative forum at Chogoria chief's office

Mr. Mutuma attending to issues raised by community members at Chogoria

12.4. Appendix 4: Filled Questionnaires

Questionnaires for Chogoria Sewer Project LMC.pdf

12.5. Appendix 4: Chogoria Sewer EIA License

Chogoria sewer_EIA License.pdf

TANA WATER WORKS DEVELOPMENT AGENCY

THE PUBLIC PARTICIPATION MINUTES FOR THE LAST MILE CONNECTIVITY OF THE CHOGORIA LMC SEWERAGE PROJECT HELD ON 15TH, FEBRUARY, 2024 AT CHOGORIA CHIEF'S CAMP IN THARAKA NITHI COUNTY AT 11: OOAM

MEMBERS PRESENT

Attendance List Attached

AGENDA

The agenda of the meeting was as follows:

- Preliminary matter
- Introduction and Presentation of the Last Mile project to the community
- Comments and Concerns of the Community
- Recommendation
- Closing remarks

MIN 1/15/02/2024: PRELIMINARY MATTER

The area chief Mr Mutembei called the meeting to order promptly at 11:00 a.m. and set a tone with a prayer led by one of the community members creating a conducive environment for the meeting's agenda to proceed smoothly.

The chief then welcomed everyone to the meeting and extended a heartfelt invitation to the Tana Water Works Development Agency and Environmental consultants' team to express themselves freely. He explained to the members of the community about the intentions of the meeting regarding the current state of their sewerage coverage. He further expressed the joy of the community in regards to the last mile connectivity of the Chogoria sewerage project. Additionally, he encouraged every community member to voice their thoughts and concerns regarding the project, emphasizing an open and inclusive atmosphere for discussions. He then opened the floor for the representative from the Proponent's side (Tana Water Works development Agency) Mr.. Mwenda to take over the meeting.

MIN 2/15/02/2024: INTRODUCTION AND PRESENTATION OF THE PROJECT

Mr. Mwenda from TWWDA gave his opening remarks and explained to the members of the community the objectives of Tana Water Works Development Agency in ensuring sustainable water works within their area of Jurisdiction in Tharaka Nithi County.

He went on to elaborate that the agency is currently proposing for the addition of Last Mile Connectivity of the Chogoria Water Supply and the Sewerage project within Chogoria in Maara Sub-County. He emphasised that the comprehensive project aims at bridging gaps in water access, sanitation, and water resource management within the 1st phase of the Kenya Small Towns and Rural Water Supply and Sanitation Project.

He later explained to the community members that public consultations in regards to the projects are what has led to the convention of the meeting. He asked members of the community to feel free to ask any question and raise any concern as he welcomed one of the ESIA consultants Mr. Mutuma to take over the floor.

Mr. Mutuma provided crucial insights and remarks aimed at fostering sustainable development and environmental responsibility. He emphasized the importance of integrating environmentally sustainable practices into the last mile connectivity project. This includes implementing measures to minimize the ecological footprint, ensuring proper waste management, and preserving local biodiversity. Moreover, he also highlighted the necessity of ensuring that the last mile connectivity project is socially inclusive. This involves considering the needs of vulnerable and marginalized groups within the community. Special attention should be given to accessibility for people with disabilities and the elderly, fostering an inclusive and equitable development process. The consultant discussed the importance of designing infrastructure with resilience in mind, considering potential climate change impacts. This includes proper drainage systems, flood prevention measures, and the incorporation of climate-resilient materials to enhance the project's longevity.

MIN 3/15/02/2024: COMMENTS AND CONCERNS OF THE COMMUNITY

NAME OF THE CONCERNED MEMBER	QUESTION ASKED	RESPONSE FROM THE TECHNICAL TEAM
Grace Njeru	Due to loss of utility of the land through which the sewer line will pass, will the affected persons be compensated and when will the compensation process commence?	Compensation for all persons that'll be directly affected by the projects shall be done diligently following the Resettlement Action plan that shall be formulated by the consultant.
Linus Miriti	In case a person detects leakage from the proposed sewer line during the project operation phase, where can they report the incident?	After construction and successful commissioning of the water and sewer project, the TWWDA shall hand over the project to the area Water Service Provider; EWASCO. Any reports pertaining to leakage or system failure shall be reported to their field officers who will in return carry out quick repairs. The area water provider shall provide hotline numbers on which they can be reached.
Margaret Njeru	Where the topography makes it difficult for a household to be connected to the sewerage system, how will TWWDA be of help in the waste water management of such households?	Such households will need to have the tankers collecting the fecal sludge from their septic tanks and delivering it to the discharge bay which shall be constructed in Chogoria town for further conveyancing to the treatment plant.

MIN 4/15/02/2024: CLOSING REMARKS

The team leader of the consultants addressed the community, assuring them that their grievances and wishes would be carefully considered and incorporated into the project's recommendations for consideration. He emphasized on the importance of sustainability and acknowledged the community's valuable input in shaping the project's outcomes. The ESIA consultant's remarks underscored the need for a holistic and sustainable approach to the Chogoria sewer last mile connectivity project. By prioritizing environmental responsibility, community engagement, social inclusivity, infrastructure resilience, and capacity building, the project can contribute significantly to the well-being of the community while minimizing its impact on the environment. The consultant's insights serve as a valuable guide for steering the project towards a more sustainable and socially responsible future.

The chief then took the step to formally conclude the meeting by making a few announcements in regards to the community development. The chairman thanked everyone for their active participation and fruitful contributions during the session.

There being no any other business the meeting was adjourned with a closing prayer from Madam Anastancia Muthoni at 12:30 hrs.

TANA WATER WORKS DEVELOPMENT AGENCY

CONFIRMED BY:

LEAD EXPERT	**THE PUBLIC ADMINISTRATION**
Eng. Bernadett Wairimu NEMA Reg No. 7394 11th, March 2024 Sign.....	**CHIEF CHOGORIA LOCATION:** Mr GEORGE MWIEMBE MUKARAKU Date: 13/03/2024 Sign: ..... Stamp: Office Of The President THE CHIEF CHOGORIA LOCATION
TWWDA REPRESENTATIVE	
Gregory Mwenda 11th March 2024 Sign.....	

THE NATIONAL URBAN WATER SUPPLY AND SANITATION PROGRAM)
SITE SPECIFIC STUDIES, ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT(ESIA) AND RESETTLEMENT ACTION PLAN (RAP) FOR PROJECTS IN MERU COUNTY

PROJECT: PROPOSED LAST MILE CONNECTIVITY OF CHOGORIA WATER and Sewerage SUPPLY PROJECT

PUBLIC PARTICIPATION LIST

VENUE ..... Chogoria church office ..... DATE 15/2/2024 ..... TIME 11:00 AM .....

S/ No.	NAME	VILLAGE/INSTITUTION	ID No	CONTACTS	SIGN	
1	ROBERT MURITH GILBERT	KITHTUNI	13359100	0725292469		M
2	JAMES KABI MAVASHA	KAIRUNI	24657328	0721135759		M
3	JOHN GITONGA	KAIRUNI	21053734	0723795360		M
4	MURUNGI THIORARI	KAIRUNI	21387391	0705542423		M
5	Charles MUTUURI IDERI	KIMUCHIA	21616055	0793973181		M
6	ALVIN NGERU NABEA	KIMUCHIA	7458857	0720149120		M
7	PETERSON MARANGA	KAIRUNI	8861657	0727949659		M
8	JOHN K. NJERU	KAIRUNI	24633492	0728121522		M
9	ASHFORD M'IITI	KAIRUNI	7460739	0796083693		M
10	JASPER MARANGA MUNYUA	KAIRUNI	24622228	0729803534		M
11	MARTIN MUCHOKI	KAIRUNI	28961932	0726762[illegible]		M

The President Office of THE CHIEF CHOGORIA LOCATION

THE NATIONAL URBAN WATER SUPPLY AND SANITATION PROGRAM)
SITE SPECIFIC STUDIES, ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT(ESIA) AND RESETTLEMENT ACTION PLAN (RAP) FOR PROJECTS IN MERU COUNTY

PROJECT: PROPOSED LAST MILE CONNECTIVITY OF CHOGORIA WATER SUPPLY and sewerage PROJECT

PUBLIC PARTICIPATION LIST

VENUE: Chogoria Chiefs Office DATE: 7/02/2024 TIME: 11:00AM

S/ No.	NAME	VILLAGE/INSTITUTION	ID No	CONTACTS	SIGN	
12	LAWRENCE GUANTAI	KAIRUMI	9696817	0724501453	[signature]	M
13	AMARIA NKUENE	KAIRUNI	2438262	0729620375 0729620375	[signature]	F
14	MARGARET NJERU	KAIRUNI	11608762	0725713379	[signature]	F
15	MBAE SABARI	KAIRUNI	13251854	N/A	Mbaya	M
16	SARAH NKINGA MUKETHA	KAIRUNI	5098095	N/A	[signature]	F
17	ANASTACIA MUTHONI	KAIRUNI	13812089	0718674233	[signature]	F
18	GILBERT WANGIDHI	KAIRUNI	8857542	0769795572	[signature]	M
19	JULIUS NJERU	KAIRUNI	9908906	0726968587	[signature]	M
20	JAMES NJAGI	KAIRUNI	21528374	0752574390	NJAG.	M
21	GRACE NJERU	KAIRUMI	2462136	0720312039	[signature]	F
22	LINUS MURITI M'ITHIRA	KAIRUNI	7461098	0705406099	[signature]	M

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THE NATIONAL URBAN WATER SUPPLY AND SANITATION PROGRAM)
SITE SPECIFIC STUDIES, ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT(ESIA) AND RESETTLEMENT ACTION PLAN (RAP) FOR PROJECTS IN MERU COUNTY

PROJECT: PROPOSED LAST MILE CONNECTIVITY OF CHOGORIA WATER SUPPLY and sewerage PROJECT

PUBLIC PARTICIPATION LIST

VENUE ..... Chogoria Chief's Office ..... DATE..... 15/02/2024 ..... TIME ..... 11:00AM .....

S/ No.	NAME	VILLAGE/INSTITUTION	ID No	CONTACTS	SIGN	
23	JEDIEL KIAMBI GITONGA	KABECHE	11610875	0726277174		M
24	MORRIS MUTUMA KIRIMI	ASST. CHIEF KIRAMO	26008048	0713148995		M
25	JONES MUGENDI MICHENI	ASST-CHIEF MURWEGO	22582370	0728244787		M
26	GEORGE MWIEMBEI M.	CHIEF CHOGORIA	11327164	0795124660		M
27	EUSEBIO. G. WAWERU	TWWDA	07025365 14	35782578		M
28	Barry Wanjiku	TWWDA	0768751227			F
29	Noel KOECH	Environment Expert	0716816405	33171998		M

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THE NATIONAL URBAN WATER SUPPLY AND SANITATION PROGRAM)
SITE SPECIFIC STUDIES, ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT(ESIA) AND RESETTLEMENT ACTION PLAN (RAP) FOR PROJECTS IN THARAKA NITHI COUNTY

PROJECT: PROPOSED LAST MILE CONNECTIVITY OF Chogoria and water supply SEWERAGE PROJECT

PUBLIC PARTICIPATION LIST

VENUE Kairuni's chief office in Chogoria DATE 14/02/2024 TIME 4:15 P.m

S/ No.	NAME	VILLAGE/INSTITUTION	ID No	CONTACTS	SIGN	
1.	Bernadett Nkatsimu Njoroge	Greenville Nexus Int'l Ltd	24147035	0725 928 477		F
2	EUSEBIO GICHUKI KAMERU	TWNDA	35282578	0702536514		M
3	JONES MUGENDI MUCHENI	ASST CHIEF - MUKWEGO	22582370	0728244787		M
4	MORRIS MUTUMA KIRIMI	ASST. CHIEF KIRIMA	26008048	0713148995		M
5	Gregory Mwenda Kirunga	TWDA	34341831	0740780565		M
6	JEREMIAH MUTEGI NGARU	NIWASCO	33645561	0758517535		M
7	ROBERT MUTUGI	NIWASCO	24715001	0710246608		M
8	GEORGE MUTEMBEI MUKARAKU	NGAO-CHIEF CHOGORIA	11327164	0795124606		M

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS/ SORROUNDING ENTERPRISES/INTERESTED PARTIES

Proposed Last Mile Connectivity of Chogoria Sewerage Project

Tana Water Works Development Agency (TWWDA) is one of the nine (9) water Agencies under the Ministry of Water, Sanitation and Irrigation which is supporting the government in developing, maintaining, and managing national public water works to attain sustainable access to quality water and improved sewerage services within its area of jurisdiction. As part of its strategic plan, TWWDA is committed to increase the water and sewerage coverage in its area of jurisdiction from 57.8% and 8.1% in 2023 to 90% and 30% by 2027 respectively through development of sustainable Water and Sanitation Infrastructure

TWWDA has identified various water and sewerage projects within its area of jurisdiction to be undertaken under the National Urban Water Supply and Sanitation Program (NUWaSSaP) and have engaged the services of a consultant to undertake review and site-specific studies, Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for implementation of the above proposed project. The implementation of the project is to be funded by the African Development Bank (AfDB) and the Government of Kenya (GoK). As a prerequisite for project funding and subsequent implementation, ESIA and RAP studies have to be undertaken and the reports approved.

As a member of the local community / surrounding enterprise / interested party, we request your comments on the expected socio-economic and environmental impacts of the proposed project. As a requirement of the AFDB Integrated Safeguards System, the Environmental Management and Co-ordination Act (1999), the Environmental (Impact Assessment and Audit) Regulations (2003) revised in 2015, Relevant Environmental and Social Policies, Public Health Act and Legal Supplement 2003, on environmental impact assessment, public participation is an important exercise for achieving the fundamental principles of sustainable development.

(Please note that these details are required for the purposes of authenticity in relation to the proposed project)

a) What is the distance between your house/enterprise and the project site? (*Tick where applicable*)

Less than 100m [✓] 100 – 500m [ ] 501 -1000m [ ] Over 1Km [ ]

b) Are you familiar with the activities that would be involved in the Proposed Project?

Yes [✓] No [ ]

c) Do you think you and your enterprise will be affected by the above proposed project?

Yes [✓] No [ ]

d) Do you think this proposed project is suitable and compatible with the surrounding developments?

Yes [✓] No [ ]

e) What **POSITIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project:

....It.....is.....good.....to.....have.....water.....sewer.....

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f) What **NEGATIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project?

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g) Make suggestions on the measures that the developer needs to put in place during the construction/setting up and operation stages.

TO PLAN WHAT it will destroy

h) Any other **comments/suggestions** you would like to make in relation to the proposed project activities?

EMPLEMENT TO LOCAL PEOPLE

WATER PIPES THEY ARE NOT IN Good order because are not Deep as what it may be.

Name: F. MOGAMBI JEREMIAH Date: 22/3/2024

Designation / Residence: CHOGORIA

Contact: 0720 597105

Signature: [signature]

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS/ SORROUNDING ENTERPRISES/INTERESTED PARTIES

Proposed Last Mile Connectivity of Chogoria Sewerage Project

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TWWDA has identified various water and sewerage projects within its area of jurisdiction to be undertaken under the National Urban Water Supply and Sanitation Program (NUWaSSaP) and have engaged the services of a consultant to undertake review and site-specific studies, Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for implementation of the above proposed project. The implementation of the project is to be funded by the African Development Bank (AfDB) and the Government of Kenya (GoK). As a prerequisite for project funding and subsequent implementation, ESIA and RAP studies have to be undertaken and the reports approved.

As a member of the local community / surrounding enterprise / interested party, we request your comments on the expected socio-economic and environmental impacts of the proposed project. As a requirement of the AFDB Integrated Safeguards System, the Environmental Management and Co-ordination Act (1999), the Environmental (Impact Assessment and Audit) Regulations (2003) revised in 2015, Relevant Environmental and Social Policies, Public Health Act and Legal Supplement 2003, on environmental impact assessment, public participation is an important exercise for achieving the fundamental principles of sustainable development.

(Please note that these details are required for the purposes of authenticity in relation to the proposed project)

a) What is the distance between your house/enterprise and the project site? (*Tick where applicable*)

Less than 100m [✓] 100 – 500m [ ] 501 -1000m [ ] Over 1Km [ ]

b) Are you familiar with the activities that would be involved in the Proposed Project?

Yes [✓] No [ ]

c) Do you think you and your enterprise will be affected by the above proposed project?

Yes [✓] No [ ]

d) Do you think this proposed project is suitable and compatible with the surrounding developments?

Yes [✓] No [ ]

e) What **POSITIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project:

...CLEAN ENVIRONMENT.....
.....
.....
.....
.....

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f) What **NEGATIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project?

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BLOCKING BUSSINESS WAY OF ENTRACE

g) Make suggestions on the measures that the developer needs to put in place during the construction/setting up and operation stages.

AFTER REMOVING THE EXISTING POLELINE
TO REPLACE
TO USE LOCAL EXPERTS AND CO-OPERATE
WITH EXPERTS FROM THE PROJECT OWNERS

h) Any other **comments/suggestions** you would like to make in relation to the proposed project activities?

EMPLOYMENT OF LOCAL PEOPLE WITH
THE KNOWLEDGE OF WHAT IT NEEDS

Name: ERNEST C. KINYUA Date: 22/3/2024

Designation / Residence: CHOGORIA

Contact BOX 84 CHOGORIA

Signature KINYUA

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS/ SORROUNDING ENTERPRISES/INTERESTED PARTIES

Proposed Last Mile Connectivity of Chogoria Sewerage Project

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As a member of the local community / surrounding enterprise / interested party, we request your comments on the expected socio-economic and environmental impacts of the proposed project. As a requirement of the AFDB Integrated Safeguards System, the Environmental Management and Co-ordination Act (1999), the Environmental (Impact Assessment and Audit) Regulations (2003) revised in 2015, Relevant Environmental and Social Policies, Public Health Act and Legal Supplement 2003, on environmental impact assessment, public participation is an important exercise for achieving the fundamental principles of sustainable development.

(Please note that these details are required for the purposes of authenticity in relation to the proposed project)

a) What is the distance between your house/enterprise and the project site? (*Tick where applicable*)

Less than 100m [✓] 100 – 500m [ ] 501 -1000m [ ] Over 1Km [ ]

b) Are you familiar with the activities that would be involved in the Proposed Project?

Yes [✓] No [ ]

c) Do you think you and your enterprise will be affected by the above proposed project?

Yes [✓] No [ ]

d) Do you think this proposed project is suitable and compatible with the surrounding developments?

Yes [✓] No [ ]

e) What **POSITIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project:

CLEAN THE ENVIRONMENT

Office Of The Presidency
THE CHIEF
CHOGORIA LOCATION

f) What **NEGATIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project?

DISTRUPTIONS BLESSINGS FROM AREA

g) Make suggestions on the measures that the developer needs to put in place during the construction/setting up and operation stages.

AFTER REMOVING THE EXISTING REFERENCE TO YOUR REFERENCE

h) Any other **comments/suggestions** you would like to make in relation to the proposed project activities?

TO UNITE LOCAL PEOPLE SO THAT

Name: BERNARD MIRITI Date: 22-3-2024

Designation / Residence: CHOGORIA Box 95

Contact: 0781 395470

Signature:

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS/ SORROUNDING ENTERPRISES/INTERESTED PARTIES

Proposed Last Mile Connectivity of Chogoria Sewerage Project

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Yes [✓] No [ ]

c) Do you think you and your enterprise will be affected by the above proposed project?

Yes [✓] No [ ]

d) Do you think this proposed project is suitable and compatible with the surrounding developments?

Yes [✓] No [ ]

e) What **POSITIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project:

.....Clean the environment.....
.....
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.....
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Office Of The President
THE CHIEF
CHOGORIA LOCATION

f) What **NEGATIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project?

Blocking our business

g) Make suggestions on the measures that the developer needs to put in place during the construction/setting up and operation stages.

Give notice

h) Any other **comments/suggestions** you would like to make in relation to the proposed project activities?

Kindly employ our local guys.

Name: MILLICENT MUKAMI Date: 22/03/2024

Designation / Residence: CITOGORA

Contact: MUKAMI 0728900649

Signature: MA

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS/ SORROUNDING ENTERPRISES/INTERESTED PARTIES

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Yes [✓] No [ ]

d) Do you think this proposed project is suitable and compatible with the surrounding developments?

Yes [✓] No [ ]

e) What **POSITIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project:

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.....Cleaning Environment.....

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Office Of The President
THE CHI
CHOGORIA LOCA

f) What **NEGATIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project?

Business was very much Staped

g) Make suggestions on the measures that the developer needs to put in place during the construction/setting up and operation stages.

Magnoi Should be flat with wood

h) Any other **comments/suggestions** you would like to make in relation to the proposed project activities?

In case of any work lock peope Should be Engaged.

Name: JOHN Gitonga Thuo Date: 22 03 2024

Designation / Residence: CHOGORIA TOWN

Contact: 0723791655

Signature: Waihenya

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS/ SORROUNDING ENTERPRISES/INTERESTED PARTIES

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d) Do you think this proposed project is suitable and compatible with the surrounding developments?

Yes [✓] No [ ]

e) What **POSITIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project:

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.....Cleaning Environment.....

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Office Of The Provincial Administration
THE CHIEF
CHOGORIA LOCATION

f) What **NEGATIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project?

Evicted By cutting of trees and Shamba

g) Make suggestions on the measures that the developer needs to put in place during the construction/setting up and operation stages.

Notifying us in time Because of Bridge.

h) Any other **comments/suggestions** you would like to make in relation to the proposed project activities?

Locality people should be Employed instead of bring people from Out Side

Name: DAVID MUTEVE Date: 22-03-2024

Designation / Residence: CHOGORIA TOWN

Contact: 0724669282

Signature:

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS/ SORROUNDING ENTERPRISES/INTERESTED PARTIES

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.....Cleaning Environment.....

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Office Of The President
THE CHIEF
CHOGORIA LOCATION

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Yes [✓] No [ ]

d) Do you think this proposed project is suitable and compatible with the surrounding developments?

Yes [✓] No [ ]

e) What **POSITIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project:

.....Betterment of Our Life.....
.....
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.....
.....

Office Of The President THE CHIEF CHOGORIA LOCATION

f) What **NEGATIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project?

no negativity.

g) Make suggestions on the measures that the developer needs to put in place during the construction/setting up and operation stages.

Repair Verander

h) Any other **comments/suggestions** you would like to make in relation to the proposed project activities?

Employing the Local Community.

Name: Zachary Njue Ngaine Date: 22/3/2024

Designation / Residence: Retire Snr. Chief

Contact: Tel. No. 0723987945, P.O. Box 75 CHUKA

Signature:

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) QUESTIONNAIRE FOR LOCAL COMMUNITY MEMBERS/ SORROUNDING ENTERPRISES/INTERESTED PARTIES

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Yes [✓] No [ ]

e) What **POSITIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project:

.....It 'S good for betement of.....
.....our lives.....
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Office Of The Public Service
THE CHIEF
CHOGORIA LOCATION

f) What **NEGATIVE** socio-economic and environmental impacts do you anticipate during the construction and operation stages of the project?

no negativity

g) Make suggestions on the measures that the developer needs to put in place during the construction/setting up and operation stages.

repair water pipes

h) Any other **comments/suggestions** you would like to make in relation to the proposed project activities?

Employing the local community

Name: Nimrod Mutegi Date: 22/3/2024

Designation / Residence: CHOGORIA

Contact: 0725107913

Signature:

THANK YOU FOR YOUR RESPONSE

EIA 2 3062802

nema
Mazingira Yetu | Uhai Wetu | Wajibu Wetu

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/2184**

Application Reference No: **NEMA/EIA/VEIA/3526**

This is to certify that the Environmental Impact Assessment License No **NEMA/EIA/PSL/8265** issued on 7/17/2019 to **Tana Water Services Board.** of

P.O.Box 1292- 10100, Nyeri.

regarding

Proposed Sewerage Infrastructure.

whose objective is

Construction of Chogoria town public sewerage system comprising secondary sewers, trunk sewers, sewerage treatment plant and associated facilities.

located at

Chogoria Township in Tharaka Nithi County.

has been varied to

Extend the EIA License validity period by an additional twenty four (24) months to allow completion of the project, subject to conditions on EIA License No. NEMA/EIA/PSL/8265 and the additional condition overleaf.

with effect from **03 May, 2024** in accordance with the provisions of the Act.

Date: **03 May, 2024**

Signature

(Seal)

Director-General
The National Environment Management Authority.

P.T.O.

ISO 9001: 2015 BUREAU VERITAS Certification

ISO 9001 : 2015 Certified

1. The proponent shall **undertake annual Environmental Audit (EA)** to ascertain the efficacy of the impacts mitigation measures proposed in the Environmental and Social Management Plan (ESMP) and report compliance to the Authority by submitting the EA report within the first year of commencement/commissioning as stipulated in the EIA License and Section 68 (3) & (4) of EMCA, 1999 and Regulations 31 of the EIA/EA Regulations, 2003.

nema

mazingira yetu | uhai wetu | wajibu wetu

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
ENVIRONMENTAL IMPACT ASSESMENT LICENSE

License No: NEMA/EIA/PSL/8265

Application Reference No: NEMA/EIA/SR/1277

This is to certify that the Environmental Impact Assessment Study Report received from

Tana Water Services Board.

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 Sewerage Infrastructure.

whose objective is to carry on

Construction of Chogoria town public sewerage system comprising secondary sewers, trunk sewers, sewerage treatment plant and associated facilities.

located at

Chogoria Township in Tharaka Nithi County.

has been reviewed and a license is hereby issued for the implementation of the project, subject to attached conditions.

Issue Date : **17 July, 2019**

Signature

(Seal)

Director-General
The National Environment
Management Authority.

P.T.O.

ISO 9001 BUREAU VERITAS Certification

ISO 9001: 2008 Certified

1.0 General Conditions

1.1 This project is for the construction supervision of Chogoria town public sewerage system comprising secondary sewers, trunk sewers, sewerage treatment plant and associated facilities in Chogoria Township, Tharaka Nithi County at an estimated cost of Kshs. 675, 701, 317. 11.

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 The proponent shall provide the final project accounts (final project costs) on completion of construction phase. This should be done prior to project commissioning/operation/occupation.

1.5 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.

1.6 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, Cap 387 and regulations there-under.

1.7 This license shall not be taken as statutory defense against charges of pollution in respect of any manner of pollution not specified herein.

1.8 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.

1.9 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.

1.10 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 Tharaka Nithi and all other relevant Authorities prior to commencement of works.

2.2 In the event that the project borders a river or a stream, the proponent, Pursuant to regulation 6 (c) of the Water Quality Regulations 2006, shall protect the riparian by ensuring that **NO** development activity is undertaken within the full width of the river or stream to a minimum of six (6) metres and a maximum of 30 metres on either sides based on the highest recorded flood levels.

2.3 The proponent shall ensure that the construction is done as per the approved drawings in adherence to the Building code 1968, and the provisions of the National Construction Act, 2011.

2.4 The proponent shall ensure relocation, compensation and restoration of livelihoods for any project affected persons (PAPs) and develop a consultative plan for emerging issues and grievance redress mechanisms (GRM) as shall be prescribed in the Resettlement Action Plan (RAP).

2.5 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.

2.6 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.

2.7 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.

2.8 The proponent shall ensure air pollution control measures are put in place to mitigate against dust during the construction phase.

2.9 The proponent shall ensure that all excavated material and debris is collected, re-used and where need be disposed off as per the Environmental Management Coordination Management (Waste Management) Regulation 2006.

2.10 The proponent shall ensure strict adherence to the provisions of the Environmental Management and Coordination (Noise and Excessive Vibrations Pollution Control) Regulations of 2009.

2.11 The proponent shall ensure strict adherence to the Occupational Safety and Health Act (OSHA), 2007.

2.12 The proponent shall ensure strict adherence to the provisions of the Environmental Management and Coordination (Air Quality) Regulations of 2014.

2.13 The proponent shall ensure that construction workers are provided with adequate personal protection equipment (PPE), sanitary facilities as well as adequate training.

2.14 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.

2.15 The proponent shall ensure the project will not encroach on any way-leave and road reserves.

2.16 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.

2.17 The proponent shall ensure that the development adheres to zoning specification issued for the development of such a project within the jurisdiction of the Tharaka Nithi County Government with emphasis on the approved land use for the area.

2.18 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 obtain an effluent discharge licence from NEMA for the proposed leachate treatment plant within first year of operation.

3.3 The proponent shall ensure that all drainage facilities are fitted with adequate functional oil water separators and silt traps.

3.4 The proponent shall ensure that appropriate and functional efficient air pollution control mechanisms are installed in the facility to control all air emissions.

3.5 The proponent shall ensure compliance with the provisions of the Energy (Solar Water Heating) Regulations, 2012.

3.6 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.

3.7 The proponent shall ensure that all solid waste is handled in accordance with the Environmental Management and Coordination (Waste Management) Regulations, 2006.

3.8 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 Tharaka Nithi 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 Management Authority, Tharaka Nithi Water and Sewerage Company and other relevant Authorities.

3.9 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. **020 6006041** 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.