ATHI WATER WORKS DEVELOPMENT AGENCY (AWWDA).

NATIONAL URBAN WATER SUPPLY AND SANITATION PROGRAMME

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT COMPREHENSIVE PROJECT REPORT FOR THE PROPOSED MURANG'A WATER SUPPLY PROJECT

APRIL, 2024

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ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT COMPREHENSIVE PROJECT REPORT

FOR

MURANG'A WATER SUPPLY PROJECT

EMPLOYER

ATHI WATER WORKS
Accelerating Access to Water and Sanitation

CONSULTANT

Losai Management Limited

REVISION RECORD

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Certificate of Declaration and Document Authentication

This document has been prepared in accordance with the Environmental Management and Coordination Act 2015 and Environmental Impact Assessment and Audit Regulations and African Development Bank Operation Standards

This report is prepared for and on behalf of:

LEAD EXPERT	**PROPONENT**
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DISCLAIMER:

This Environmental Impact Assessment Comprehensive Project Report is based on literature review and findings from field assessment. It is however, subject to conditions in the Environmental Management and Coordination Act 2015 Environmental Impact Assessment ,Audit Regulations and African Development Bank Operation Standards

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AfDB	African Development Bank
AWWDA	Athi Water Works Development Agency
CESMP	Construction Environmental and Social Management Plan
CoC	Code of Conduct
CPR	Comprehensive Project Report
EHS	Environment Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environment and Social Management and Monitoring Plan
EMCA	Environmental Management & Coordination Act
GATAWASCO	Gatanga Water and Sanitation Company
GBV	Gender Based Violence
LRCC	Locational Resettlement Compensation Committee
MUWASCO	Murang'a Water and Sanitation Company
NEMA	National Environment Management Authority
OSHA	Occupational Health and Safety
PAPs	Project Affected Persons
PPEs	Personal Protective Equipment
SDGs	Sustainable Development Goals

SEA	Sexual Exploitation and Abuse
SCRCC	Sub County Resettlement Compensation Committee
STD	Sexually Transmitted Diseases
VCT	Voluntary Counselling and Testing
WIBA	Workplace Injuries and Benefits Act
WSTF	Water Services Trust Fund
WSP	Water Services Provider
WTP	Water Treatment Plant
WRUA	Water Resources Users Authority
WRA	Water Resources Authority

EXECUTIVE SUMMARY

E-1 Overview of the Project and alternatives to the project

The goal of the Murang'a Cluster Project is to enhance water and sewerage coverage in multiple towns within Kenya, as part of the broader National Urban Water Supply and Sanitation Programme (NUWSSP).

Specific Objectives:

1. Increase access to clean water and sanitation facilities for urban and rural communities in Kabati, Murang'a, Gatanga, Kigumo, and Kangema.
2. Improve the efficiency and sustainability of water supply systems in the target areas.
3. Enhance the quality of life, public health, and environmental conditions through improved water and sanitation infrastructure.

Project Components and Main Activities

No	WSP	PROJECT	Description of Scope
1.	Gatanga Water and Sanitation Company (GATAWASCO)	Thithi Githingiri Water Supply System	1. Construction of 4000m3/day intake
			2. 0.3 km raw water mains (OD 315 mm)
			3. Water treatment works 4000m3/day
			4. OD 280-225 mm 10.5km transmission mains
			5. OD 225 mm 6.5km transmission mains
			6. OD 160 mm 12km transmission mains
			7. 2500m3 Kiawahiga tank
2.	Muranga South Water and Sanitation Company (MUSWASCO)	Chathanda - Kenol Water Supply System	1. Rehabilitation of intake (upgrading/ new)
			2. Rehabilitation of Raw Main 10.5km
			3. Construction of 4000m3/day Treatment works
			4. Extension of OD 200 pipeline 4km
			5. Construction of tank 250m3 at Mutheru
			5. Construction of tank 1000m3 at t/works

3.	Murang'a West Water and Sanitation Company (MWEWASCO)	Upgrading of Tuthu Water Supply system	1. 3. 2500m3 tank at Kanyenyaini sec 2. 4. 2000m3 tank at kawariua 3. 5. 2km OD 225 mm pipeline replacement

E-2 Alternatives to the project

Intending to improve water supply services, various alternatives were considered during the design of the project. The consideration of alternatives is one of the proactive sides of environmental and social assessment required to enhance project design. This is achieved through examining options instead of only focusing on the more defensive task of reducing adverse impacts of a single design option. The alternative that was considered for the project was focused on:

Analysis of project location/sites

No alternative project locations were availed by the developer during the environmental assessment exercise; however, the proposed sites are adequate and appropriate to accommodate the proposed water treatment unit, water transmission lines, and the tanks. Consultations with the sub county officials, town council officials and the neighbouring local communities to the project areas revealed no complaints regarding the land where the water treatment plant is located and the associated project component locations

Analysis of Alternative Materials

The proposed project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. Equipment that saves energy and water will be given first priority without compromising on cost or availability factors. The use of local stones, cement, sand (washed and clean), metal bars, pipes and fittings that meet the Kenya Bureau of Standards requirements is recommended. Concrete, Double walled corrugated (DWC) and uPVC pipes are acceptable for use in the reticulation systems. DWC pipe have been proposed for use in this project due to ease of construction and superior hydraulic performance.

As part of our commitment to promoting climate resilience and sustainability in infrastructure development, the design of the Infrastructural Projects has been done in alignment with existing design standards and codes, factoring in Climate Resilience aspects. These parameters are

engineered to enhance the low carbon footprint while addressing the unique environmental, economic, and social challenges of the region.

Analysis of alternative design and technology

The proposal is to lay the new transmission lines in the shoulders along the road reserves. This will help to minimize compensation costs as the land belongs to the government and meant for utilities.

No Project Alternative.

Opting for the "No Project" alternative would mean halting project designs and maintaining the site in its current state. This choice is the most environmentally sound alternative as it ensures no disruption to the existing conditions. However, from an economic perspective, this option would result in significant losses for the proponent, as well as the local and national economies.

If the site remains undeveloped, the proponent would incur financial losses from the funds already invested in project design and planning, including fees paid to engineers and other experts. Additionally, the option would lead to the loss of job opportunities that the project was expected to create. Consequently, the water and sanitation conditions for the residents of Murang'a would continue to be inadequate.

Moreover, both the local and central governments would miss potential tax revenue that the project would generate if it were implemented. Furthermore, this alternative would further strain the already limited water supply in the area, given the increasing demand. Based on the analysis above, it is evident that the "No Project" alternative is not a feasible option for the community.

Proposed Project Sites

The impacts and mitigation measures for this alternative are discussed in detail throughout this report. The positive impacts have been identified. This alternative will have minimal impacts on the physical environment and has considered the necessary measures to eliminate the identified issues of concern. The alternative is likely to have the greatest implications on socio-economic environment of the area and surrounding communities. Due to the proposed quality of the development, it is anticipated that it would provide a major opportunity for area development, employment opportunities via business environment and accessibility to services to both the residents and non-residents of the area. In addition, a development of this caliber will add to the locality's ability to fuel the growth and development of the wider environment.

E-3 Brief description of the Project site and the major environmental and social challenges

The project area is located within Murang'a County. Murang'a County is one of the five counties in the former Central Province and has its headquarters in Murang'a Town. It is bordered by Kiambu County to the South, Nyandarua County to the West, Nyeri County to the North, Kirinyaga County to the North-East, Embu County to the East and Machakos County to the South East.

Murang'a South Water and Sanitation Company Ltd (MUSWASCO) Kangema water and sanitation Company and Gatanga Water and Sanitation Company, are the WSP mandated to provide water and sewerage services in the Project areas. The figure below indicates the targeted project areas under the jurisdiction of the two WSPs;

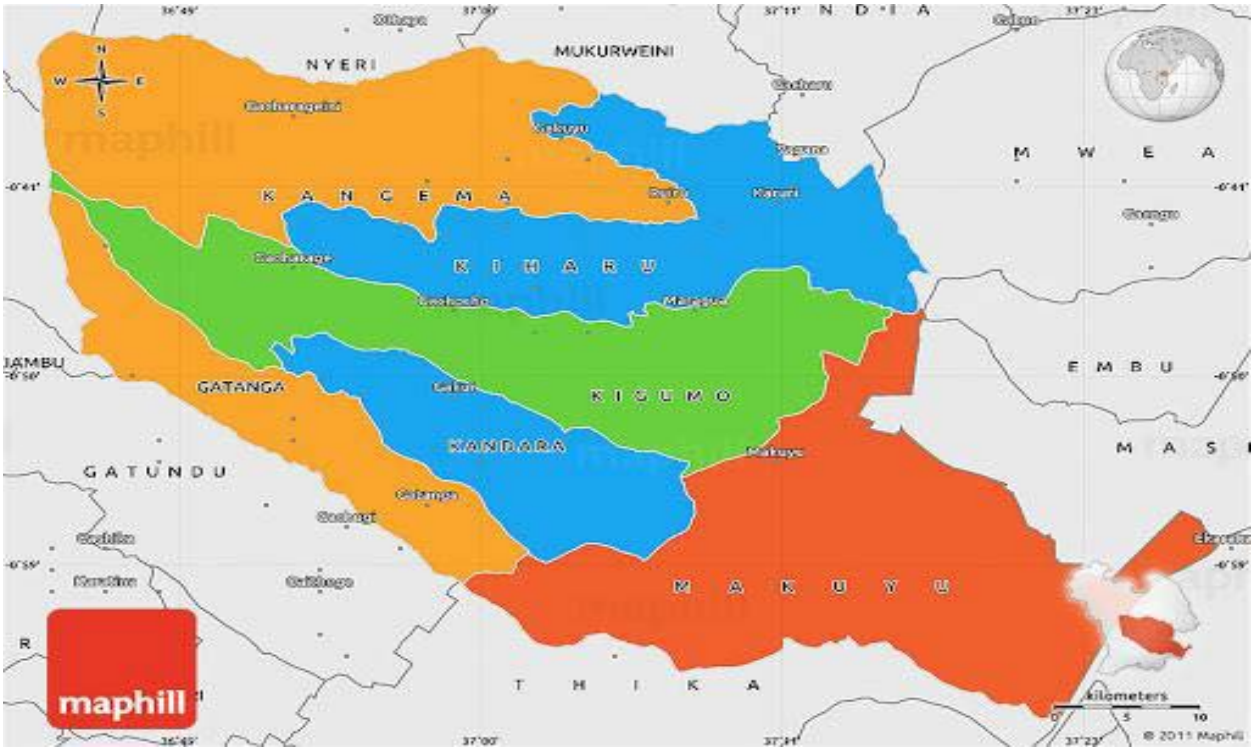


Figure E3-1: Murang'a County Map Highlighting The 7 Sub Counties

The proposed project components are geographically spread out as tabulated below:

Table E3-1 Proposed Project components are geographically spread out in Murang'a county

Target Town	Sub-County	Location/ Ward	Nature of Proposed Intervention	Area WSP
Gatanga	Gatanga	Gatanga	Water	GATAWASCO
	Chomo	Chomo		
Kenol	Maragua	Kimorori, Wempa	Water	MUSWASCO
		Kagaa		
	Kandara	Kagundu-ini		
Kangari	Kigumo	Kangari	Water	
Kangema	Kangema	Muguru	Water	MWEWASCO
		Koimbi		
	Wangu	Weithaga	Water	
		Gatheru		
		Muguru		
		Kahuro	Water	
		Kahatia		

Project influence area

This report describes the baseline environmental and social conditions of the project area.

Climate and Rainfall: The annual rainfall in the county ranges from 1280.1 mm to 2214.1 mm per year. The rainfall pattern is evenly distributed all year round with March and July receiving heavy rains while December and February receive light rains. The temperatures range from 180 C to 290 C. January, February and March are the hottest months with other months having relatively similar temperatures except for July and August which have relatively cold spells. The county has an average humidity of 67 percent.

Geology and Ecological Conditions: The geology of this area comprises of basement systems which are mainly grits, sandstones, shales and limestones that have been metamorphosed by heat and pressure or by impregnation by pervading fluids. Other types are derived from lavas and volcanic fragmental rocks. The variety of rocks is extensive and includes mica and mica

hornblende gneisses and schists, pyrexinite, granulites, quartzites and marbles. There is also a considerable development of migmatites.

Topography: The Project area lies between 3,353m above sea level, in the West along the slopes of Aberdare Mountains and 914m ASL in the East. The western highlands have deep dissected topography and drain into various rivers. These rivers flow from Aberdare ranges to the West, South Eastward and drain into Tana River. The County's geology and basement system comprises of volcanic rocks of the Pleistocene age and Achaean rock type respectively. The western part of the County bordering Aberdares is characterized by volcanic rocks while Eastern part is composed of the rocks of the basement system. Porous beds and disconformities within the volcanic rock system form important aquifers, collecting and moving ground water, thus regulating water supply from wells and boreholes. The County's rugged, dissected topography and geology is both an asset and liability to the County's development. The highest parts bordering Aberdares form the rain catchment areas, from where most of the rivers passing through the county originate. The volcanic rocks hence fertile soils result in thriving agricultural activities. The ecological conditions in the high areas provide a suitable environment for tea and coffee farming. However, this dissected topography causes gulley erosion and landslides hence construction and maintenance of bridges and roads are very expensive.

Water Sources: The main source of water for the project areas in Makuyu and Kagundu-ini is the Murang'a Bulk Water Supply which was developed between 2011 and 2013. The Murang'a Bulk Water Supply System sources its water from the Irati River, via the Gachocho intake. The raw water is transmitted through a 14'' (DN350 mm) pipe to the Kiawambeu Water Treatment Plant which has a capacity of 10,000m3/day. The system serves an area of 140km2.

The water source for Kangari area is the Kigumo Water Supply scheme. The scheme derives water from Irati River at the Kinyona intake located at the edge of Aberdare Forest adjacent to the Kinyona track that leads to Gatare Forest Station. The water is then treated at Kinyona treatment works which has an output capacity of 13,000m3/day.

The major environmental and social stakes/challenges of the project site and its influence area include:

1. **Environmental Stakes/Challenges**:

- Potential disruption to local ecosystems and biodiversity due to construction activities.

- Changes in land use and interruptions with the valued environment.
- Impact on water quality and hydrological systems during construction and implementation stages.
- Generation of construction waste and its disposal.
- Potential increase in energy consumption for water treatment processes.

2. **Social Stakes/Challenges**:

- Displacement and resettlement of communities residing in the project area.
- Loss of livelihoods, particularly for individual's dependent on affected land or resources.
- Social disruption and community cohesion challenges during construction.
- Access to water and sanitation services may remain inadequate for certain marginalized groups.

Valued Environment and Social Compounds (VEC): The valued environment includes:

- Natural water sources, rivers, and associated riparian zones.
- Agricultural lands and forested areas.
- Cultural heritage sites and community landmarks.
- Residential areas and public spaces.
- The valued social compounds comprise:
- Community cohesion and traditional practices.
- Livelihoods dependent on agriculture, fishing, and other natural resources.
- Access to education, healthcare, and other essential services.
- Socio-economic dynamics and local governance structures.
- Mitigating these challenges and preserving valued environments and social compounds are essential components of the project's Environmental and Social Management and Monitoring Plan (ESMMP). This plan aims to minimize adverse impacts, enhance community resilience, and ensure sustainable development outcomes.

E-4: Policy, Legal and Administrative Framework

The report has presented the relevant policies, legislation and institutional frameworks that guide preparation of ESIA at both National and International levels.

Policy provisions included; Constitution of Kenya 2010, Kenya Vision 2030, National Environment Policy (NEP) 2013, National Climate Change Response Strategy, 2010, The National Environment Policy, 2013, Kenya National Youth Policy 2006, The National Environmental Sanitation and Hygiene Policy-July 2007, Noise and Excessive Vibration Pollution (Control) Regulations, 2009, The Environmental Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006 Legal Notice No. 160 , The Physical and Land Use Planning Act, 2019, Land Act, 2012, Water Act, 2016, Water Rules 2007, County Government Act No. 17 of 2012, Occupational Health and Safety Act (OSHA 2007), The Public Health Act (CAP.242), Employment Act, HIV and AIDS Prevention and Control Act 2011, Sexual Offences Act 2006, Child Rights Act (Amendment Bill) 2014, Work Injury Benefits Act (WIBA), Labour Relations Act 2012, National Gender and Equality Commission Act 2011, Public Participation Bill of 2016.

The assessment has also made reference to AfDB's Operational Safeguards (OS). The OS include;

- OS1: Environmental and Social Assessment,
- OS2: Involuntary Resettlement, Land Acquisition, Population Displacement, and Compensation), OS3 (Biodiversity and Ecosystem Services,
- OS4: Pollution Prevention and Control, Hazardous Materials, and Resource Efficiency), and
- OS5: Labour Conditions, Health, and Safety), as well as with the National Environment Management Authority (NEMA) requirements set out in the Environmental Management and Coordination Act 1999 (Amended 2015).

E-5: Management Responsibility of ESMMP

In order 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 which will be involved in the project. The following entities should be involved in the implementation of this ESMMP are presented in table E5-1 below

Table E5-1: Management responsibility of ESSMP

Nos	Name of Institution	Role of Institution
1.	Athi Water Works Development Agency	• Ensuring that the proposed development has been put up in an environmentally sound manner. AWWDA has a safety team consisting of environmentalist, sociologists and project engineers. This can be enhanced by inclusion of environmental specifications in the tender specifications, selection of renowned environmentally conscious contractors and supervision to ensure that the objectives of this ESMMP are met.
2.	County Government of Murang'a	• The relevant departmental officers in the above local authorities should be called upon where necessary during project implementation to provide the necessary permits and advisory services to the project implementers.
3.	MUSWASCO, MWEWASCO, MUWASCO GATAWASCO	• Responsible for day-to-day coordination and implementation of the project. • Assist in the establishment of the SCRCC and LRCCs. • Establish the SCRCC and LRCCs operations. • Ensure the grievance committees are established and working. • Monitor the ESMP implementation.
4.	Resettlement and Compensation Committee	• Ensure effective flow of information between the Contractor and public • Coordinate, validate inventories of PAPs and affected assets; monitor the disbursement of compensation funds; guide and monitor the implementation of relocation • Coordinate activities between the various organizations involved in relocation; facilitate grievance and conflict resolution; and provide support and assistance to vulnerable groups.

Nos	Name of Institution	Role of Institution
		• Conducting extensive public awareness and consultations with the affected people so that they can air their concerns, interests and grievances. • Resolve disputes that may arise relating to resettlement process. If it is unable to resolve any such problems, will channel them through the appropriate formal grievance procedures laid out in this ESIA.
5.	NEMA	• Provide approval of the ESIA report • Escalate unsolvable grievances to the tribunal. • 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.
6.	Contractor	• Implementing the project • To ensure strict compliance environmental specifications of this ESMP • The persons/firms contracted to put up the proposed sanitation project interventions will be required to comply with the requirements of the ESMMP within this report. • To ensure strict compliance, environmental specifications of this ESMMP shall form part of the contract documents. The contractor will prepare the specific ESMP.
7.	Supervision Consultant	• Ensure that the proposed ESMP is up to date and is being used by the contractor. • Periodic audits of the ESMP will have to be done to ensure that its performance is as expected..

Nos	Name of Institution	Role of Institution
8.	KERRA & KURA	• Provide approval to allow laying pipes along the road reserve

E-6: Project Impact

Assessment of project Impacts was based on analysis of the proposed project components and existing environmental conditions. The impacts arising during each of the phases of the proposed development namely construction, operation and decommissioning, can be categorized into:

- Impacts on biophysical environment;
- Health and safety impacts; and
- Social-economic impacts

The impacts are highlighted below for both the Moderate and Major impacts during the three phases;

E-6-1 Positive Impacts during Construction Phase:

The project is envisaged to have more impacts that are positive after completion of the civil works and commissioning.

A summary of anticipated positive impacts of the project include:

- **Employment opportunities:** The implementation of the proposed Project will create job opportunities for both skilled and unskilled workers, leading to improved living standards through increased earnings. The workforce will comprise casual laborers, plumbers, and engineers who will be engaged on-site for a specific duration. Additionally, semi-skilled, unskilled laborers, and formal employees will also find gainful employment during the construction phase. The adoption of labour-intensive construction techniques will not only provide employment opportunities for the youth but also align with the government's initiatives aimed at job creation.
- **Creation of Wealth:** The proposed development brings many opportunities in investment and procurement where the youth and people of Murang'a can compete to provide different goods and services to the proponent during construction of the distribution pipelines. This in turn creates opportunities for entrepreneurship and wealth creation for

the residents. The construction phase will attract temporary business such as food vendors who will benefit from the trade by selling the food to the construction workers. This will improve their living standards from their earnings**.**

- **Creation of a market for construction materials:** The project will require materials, some of which will be sourced locally and some internationally. These include plant steel and plastic pipes, valves, cement, sand, hardcore and chemicals. This will provide a ready market for suppliers in and outside the project area.
- **Increased local incomes:** The local community may get extra income from the sale of construction materials from their firms and also renting spaces for camp sites.
- **Economic growth:** Through the use of locally available materials during the construction phase for example pipes and others; the project will contribute towards growth of the country 's economy by contributing to the gross domestic product. The consumption of these materials, oil, fuel and others will attract taxes.
- **Injection of money into the local economy:** A large sum of the Project money shall be released into the local economy due to the construction activities. It is envisaged that during construction a large number of downstream activities shall take place including but not limited to the following:

i. Payments for skilled and unskilled labour;

ii. Purchases of construction materials; and

iii. Payments for local provisions including fuel, foods and accommodation.

E-6-2: Positive Impacts during Operation Phase:

- **Stable Water Supply:** Continued reliability supporting community and economic needs.
- **Efficient Water Management:** Reduced non-revenue water, contributing to sustainability. The WSPs will have efficient water management and save a lot of water ie non-revenue water.
- **Job Creation**: Opportunities for managing and maintaining waterlines. People will be employed especially at the WSPs. This will also improve living standards of the people.
- **Improved Health**: With the availability of clean and efficient water and systems, there will be reduction in water-borne diseases and improved hygiene.
- **Development of Infrastructure:** Modern infrastructure development within Murang'a. Modern Infrastructure will come up due to availability of clean and efficient water systems.

E-6-.3: Positive Impacts during Decommission Phase:

- Restoration of site to natural condition or better.
- Upgraded Infrastructure: Well-maintained infrastructure with extended lifecycle.
- Legacy of Improved Services: Improved water services benefiting the community.

E-6 -4Negative Impacts and Mitigation Measures during Project Construction Period

Activities during the Construction Phase with potential to trigger negative environment and social impacts include the following;

i. Manual excavation of trenches.

ii. Temporary stockpiling of soils, sub-soils and rock along the trenches

Table E-6-1 below provides a summary of potential negative impacts and proposed mitigation measures.

Table E6-1: Summary of potential negative impacts and proposed mitigation measures.

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
1.	Excessive Vibration and Noise Pollution	Access roads should be cut that are exclusively used for the transportation of workers, goods and materials. These roads should be sited in such a way that the noise from this movement affects as few of the existing residents as possible. Where possible silenced machinery and instruments	Depending with the opened site this should implemented during the entire construction period.	500,000 Kshs	Noise surveys/Monitoring Reports, Grievance book on grievances on Noise and Vibrations	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		should be employed to reduce the impact of noise on the existing residents and workers. Machinery, vehicles and instruments that emit high levels of noise should be used on a phased basis to reduce the overall impact. These pieces of equipment such as drills, graders and cement mixers should also be used when the least number of residents					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		can be expected to be affected, for example during periods where most residents are at work or school. Construction hours should be limited to the hours of 8:00 a.m. and 6:00 p.m. daily. The delivery of raw materials must be limited to 8:00 a.m. and 6:00 p.m. daily. Provision of appropriate personnel protective					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		equipment to the workers.					
2.	Dust Emission	Wet all active construction areas as and when necessary to lay dust; Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls, including air extraction and treatment through a bug house or cyclone	Depending with the opened site this should implemented during the entire construction period.	200,000	Amount of water used for sprinkling, Photo logs	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		for material handling sources, such as conveyors and bins. Ensure that all material (sand and aggregate) stockpiled on the site to be used in construction activities are regularly sprayed to reduce the effects of wind whipping Ensure that all trucks carrying aggregate and sand are covered during delivery to the site.					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		Earth moving be done under dump conditions as much as possible to prevent emission of dust into the air. Strict measures are to be applied for the handling of construction materials in powder form such as cement, lime, concrete additives, etc. and for the disposal of the packaging Excavation, handling and transport of					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		erodible materials shall be avoided under high wind conditions or when a visible dust plume is present. Minimizing the number of motorized vehicles on use.					
3.	Vegetation Clearing	Only clear vegetation that is absolutely necessary for the construction activities; Retain all mature trees (> 25 cm diameter at breast height during this	Depending with the opened site this should implemented during the entire construction period.	KShs. 50,000	Records of vegetation reinstatements Photo logs	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		phase of the development if possible; Avoid the use of Invasive Alien Species in the landscaping activities Determine access roads which are to be used by machinery used in the construction and site clearance phase of the development to avoid the unnecessary trampling of vegetation that will					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		be maintained within the development area. 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; Re-vegetation of exposed areas					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		around the site should be carried out rapidly in order to mitigate against erosion of soil through surface water runoff and wind erosion.					
4.	Risks of solid waste mismanagement leading to pollution	All solid waste will be collected at a central location at each site and will be stored temporarily until removal to an appropriately permitted disposal site in the vicinity of the site.	Depending with the opened site this should implemented during the entire construction period.	400,000	Availability of a contract between the contractor and a NEMA licensed waste handler Waste collection records House keeping records	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		No dumping within the surrounding area is to be permitted. Where potentially hazardous substances are being disposed of, a chain of custody document should be kept with the environmental register as proof of final disposal. Waste generated at the site should be segregated and disposed of in NEMA designated dumping site			Number of waste bins available and in use		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		Wherever possible reusing and recycling should be carried out. A site waste management plan should be prepared by the contractor prior to commencement of construction works. This should include designation of appropriate waste storage areas, collection and removal schedule and identification of					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		approved disposal site; Proper solid waste receptacles and storage containers should be provided, particularly for the disposal of lunch and drink boxes so as to prevent littering of the site.					
5.	Occupation safety and health impact	Sensitize the migrant workers on risky sexual behaviour. Have VCT services on site and encourage workers to undergo the same.	During the entire construction period.	Kshs.500,000	Records for all the trainings conducted Records for PPE issuance	All work areas	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		Provision of protective devices such as condoms. Provision of appropriate personal protective equipment Provision of hand washing points/ sanitizers Encourage wearing of masks Keeping social distance as recommended by the ministry of health of safety gear and			Worker's induction records Signed code of conducts		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		enforcement of application					
6.	Site Related Oil Spills	The Contractor should ensure that the employees on site are aware of the company procedures for dealing with spills and leaks; All vehicles and equipment should be kept in good working order, serviced regularly in accordance to the manufacturers specifications and stored in an area	Depending with the opened site this should implemented during the entire construction period.	Ksh 100,000	Availability of a contract between the contractor and a NEMA licensed waste handler Waste collection records Photo logs for the garage/where machines are being serviced Service records for machineries	All work areas <u>Responsibility</u> Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		approved by the Resident Engineer/Supervising Consultant; Ensure spill kits are provided at the construction sites Ensure fuels, oils, lubricants and chemicals are stored are stored in impermeable containers and away from surface drains					
7.	Impact on existing water Resources	Areas dedicated for hazardous material storage shall provide spill containment	Depending with the opened site this should	Kshs 1,000,000	Availability of a contract between the contractor and a	All work areas Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		and facilitate clean up through measures such as: maximum separation from sensitive features (water bodies); clear identification of the materials present; access restricted to authorized personnel and vehicles only and dedicated spill response equipment Provide solid and liquid waste disposal system - a waste collector, NEMA recommended waste	implemented during the entire construction period.		NEMA licensed waste handler Waste collection records Photo logs for the garage/where machines are being serviced Service records for machineries		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		disposal manual and a waste collection bin for each housing unit, workshop, plant, structural shelter. Ensure fuels, oils, lubricants and chemicals are stored are stored in impermeable containers and away from surface drains Ensure that the machines are serviced in specific locations off-site to avoid spillage of oils					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		and grease into the surface runoff channels.					
8.	Soil related Impacts	The valuable top soil containing organic material, nutrients as well as seeds and the soil fauna should be excavated separately and piled in an adequate manner for re-use where applicable. Minimise compaction during stockpiling by working with the soil in a dry state. The	Depending with the opened site this should implemented during the entire construction period.	Ksh 500,000	Records of completed works Reinstatement records Photo Logs Grievances recorded	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		stockpiling should be done in specific locations subject to the engineer's approval. Plan emergency response measures in case of accidental oil spills. In cases where it is identified that during construction there is a danger of increased run-off or at the project site, drainage channels with stone pitching or holding					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		ponds can be employed After completion of the construction works, restoration of the ground by sowing adequate grass cover and planting of trees will be followed, therefore the impact is temporary and reversible. In areas prone to erosion, provision of soil stabilization in form of a retaining wall or planting of trees, subject to					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		approval by the Resident Engineer					
9.	Fire outbreak	Label all inflammable materials and store them appropriately Provision of adequate firefighting equipment capable of fighting all classes of fire Put — 'No Smoking' Signs in areas where inflammables are stored Train workers on the use of fire fighting equipment	Depending with the opened site this should implemented during the entire construction period.	500,000	Number of Fire drills conducted Records for the trainings conducted Number of serviced fire extinguishers available and in use Number of the engaged first aiders	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
10	Demolition of Structures and Loss of livelihood	Implement RAP before commencement of civil works at the affected sites Limit damage to property by observing construction area limits The contractor to communicate with the owners of the potential structures to be demolished that are within the project sites.		As per the RAP/lrp	Stakeholder engagement records Reinstatement records Notification records to residents for carrying out works Records of incidents and accidents Updated grievance logs	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		Ensure that solid waste generated from the demolitions is properly disposed to suitable locations. Provide training, skills development, work experience, and employment opportunities, with first preference being extended to project-affected persons. Consult local and higher-level government officers in the					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		implementation of the RAP and its monitoring. Coordinate closely with local and higher levels of government. Many aspects of livelihood restoration overlap with responsibilities of government, and interaction with government is key. Train affected persons in skills that relate to real opportunities outside of the					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		employment provided on the construction sites. This is a transitional support measure not a sustainable livelihood activity. It is meant to equip affected person with skills beyond the temporary construction jobs provided by the project					
11	Liability for loss of life, injury to	Develop a site safety action plan detailing safety equipment to be used, emergency	Depending with the opened site this should	Kshs 2,000,000	Stakeholder engagement meeting minutes,	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
	private property	procedures, restriction on site, frequency and personnel responsible for safety inspections and controls. Provision of requisite PPE as established from risk assessment in the safety action plan and enforcing their usage. The workers should receive requisite training especially on the operation of the	implemented during the entire construction period.		Records for toolbox talks Records of PPE issuance Number of signages available and in use Worker induction records Notifications done to residents Reinstatement records Signed code of conducts		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		machinery and equipment. There should be adequate warning and directional signs. Ensuring that the prepared code of conduct for staff is followed to prevent accidents. Provide First Aid Kit within the construction sites and ensure that at any moment during the works, there is a trained first aider on site. The ration of			Records of incidents and accidents Number of the engaged first aiders		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		trained first aiders to worker will be as per defined by the OSHA First Aid Rules. Recording of all injuries that occur on site in the incident register, corrective actions for their prevention are instigated as appropriate. Contractor to ensure compliance with the Workmen's Compensation Act, ordinance regulations and					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		union agreements and maintain insurance cover throughout the construction period. The Contractor to promptly repair any damage done to private property. Limit damage to property by observing construction area limits by clear demarcation					
12	Spread of HIV and AIDS	Develop HIV/AIDS awareness programs or initiatives to target	During the entire	Ksh 250,000	Records of trainings conducted	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		the construction workers, community, institutions and the general members of the community, particularly the youth; with the objective of reducing the risks of exposure and the spread of HIV/AIDS within the project area. Sensitize the migrant workers on risky sexual behaviour. Provide VCT services on site and	construction period.		Number of signages available and in use		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		encourage workers to undergo the same. Provision of protective devices such as condoms. Maximize hiring skilled and unskilled workers from the host community					
13	Traffic and access	Provide diversion routes where possible. Give a construction itinerary in advance so that the potentially affected population can use alternative routes	Depending with the opened site this should implemented during the entire construction period.	Ksh 300,000	Records of trainings conducted, Records of traffic marshals on site Number of traffic signages available and in use	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		and start early to get to their destinations on time. Erect warning signs of on-going works. Expedite construction works so as to reduce the times where roads are blocked. Traffic department should approve crossing plan prior to construction, and should approve obstruction times during construction.			Photo logs		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		Access of residents should be facilitated by installing appropriate temporary bridges over trenches. Suitable warning signs should be placed at near locations and should be visible at night. A guard should be available 24 hours to help people access across sewer trenches. Alternatives access ways should be					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		communicated to the community.					
14	Interruption of existing amenities	Ensure dissemination of relevant information to each of the affected parties; A work plan with clear responsibilities for each party should be developed to ensure smooth execution of the construction	Depending with the opened site this should implemented during the entire construction period.	Kshs 100,000	Reinstatement records, Photo logs	Contractor(s)	AWWDA / Supervising Consultants
15	Labour Influx	Reduce labour influx by tapping into the local workforce. Depending on the	Depending with the opened site this should	Kshs 50,000	Records of workers and their ID Numbers	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		size and the skill level of the local workforce, a share of the workers required for the project may be recruited locally. This may be easier for unskilled workmen. Specialised workmen may be hired from elsewhere. Local workers may also be trained especially if they are required for the operation of the project.	implemented during the entire construction period.		Worker inductions records Where possible provision of certificates, work permits and licenses		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		Effective contractual obligations for the contractor to adhere to the mitigation of risks against labour influx. Depending on the risk factor, appropriate mitigation measures may be deployed. These may range from engagement with a local community liaison to the use of the local elders. The works contractor should be required,					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		under its contract, to prepare and enforce a No Sexual Harassment and Non-Discrimination Policy, in accordance with national law as well as to the World Bank Code of Conduct guidelines where applicable. The contractor should prepare and implement a gender action plan					
16	Child labour and Protection	Ensure no children are employed on site	During the entire	No additional cost	Records of workers and their ID Numbers	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		in accordance with national labour laws. Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police.	construction period.		Worker inductions records		
17	Social Exclusion, Gender-Based Violence (GBV), Sexual Exploitation And Abuse And Sexual Harassment	• Ensure project workers are sourced from the local population as far as possible. This will benefit the local community in terms of income	During the entire construction period.	No additional cost	Recordings of trainings conducted, Topics of discussion during the Toolbox Talks,	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
	(SEA/SH) And Violence Against Children (VAC)	generation and will also reduce the influx of transient workers to the host community, which will result in SEA/SH. • Monitor changes in women's status and the project's potential impacts on them by conducting regular focus group consultations			Availability and use of signages for sensitization Signed code of conducts Worker inductions records		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		with women in a sample of villages (in small groups facilitated by a woman). • Ensure a GRM fully includes mechanisms for reporting GBV and SEA/SH. In addition, GBV and SEA/SH will be regularly monitored on the project site and neighboring community.					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		• Ensure GRM will apply along transportation routes of the project and will be widely publicized to ensure coverage. • Ensure the project site/construction camp management plan makes consideration of GBV and SEA/SH when planning the lighting on					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		and around the site and along routes that workers may use to access and exit the site. • Ensure that SEA/SH Action Plan is developed and implemented prior to the physical start of civil works. Develop and implement a complaint/grievance mechanism					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		(GM) sensitive to GBV, SEA/SH, VAC, and other forms of discrimination with accessible entry points to submit complaints, referral to GBV service providers and confidential, survivor-centered procedures for verifying and managing complaints.					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		• Sensitization of both project workers and host community members on possible GBV and SEA/SH and its implications for the prosecution					

E-7: Highlights of Stakeholder Consultations

Environmental Impact Assessment / Audit Regulations 2019 and AfDB ISS 2013 require that in the process of conducting Scoping, Environmental Impact Assessment, the proponent shall in consultation with the Authority herein referred to as the National Environment Management Authority (NEMA); seek the views of persons who may be affected by the project.

Table E7-1: Public participation meeting schedule

No.	Date	Venue	Location	No. of Participants
1.	13.02.2024	Kiriani-Ndunyu Chege	Gatanga- Thithi	16
2.	14.02.2024	Kiawahiga Grounds	Gatanga - Kiawahiga	38
3.	15.02.2024	Chomo Grounds	Gatanga-Chomo	15
4.	26.02.204	Mariira Farm	Kigumo-Mariira Farm	19
5.	TBC	TBC	Murang'a Urban	

The following stakeholders were present in the meetings;

- Area chiefs
- Area assistant chiefs
- Village Elders
- Area Resident

Table E7-2 below presents a summary of the outcome from the 3 No. public participation meetings that were held;

Table E7-2: Summary of Comments and Responses from the Public Sensitization Meetings

Location	Comments	Response
Kiriani-Ndunyu Chege (GATAWASCO)	The community members inquired whether the community members affected will be compensated	Consultant representative, emphasized to the participants that PAPs (Project Affected Persons) will be notified in advance before commencement of works to vacate. This is to avoid destruction of farm produce.
	The Community members inquired how will the riparian be established from the river.	The Consultant representative, responded to the community members' query regarding the establishment of riparian boundaries from the river. He explained that the Water Resources Authority (WRA) oversees all matters concerning rivers. According to WRA protocols, riparian zones are determined based on the size of the river, with assistance from hydrologists who assess various factors to establish the boundaries
	The community members wanted to know whether they will still draw water from the river.	The Consultant conveyed to the attendees that they would still be permitted to draw water from the area, albeit from a distance away from the newly constructed Intake.

	The community inquired on when the Project will commence	The Consultant stated that the commencement date of the project would be communicated once all the necessary documentation and approvals from the Government have been cleared.
	The community inquired on how much they will be paid and the compensation channels that will be used	The Consultant stated that the valuation of the affected lands would be carried out and the value validated by National Land Commissioners, aligning with current market prices. Subsequently, negotiations and agreements regarding compensation would be reached with the Project Affected Persons (PAPs). The community members recommended for continuous public participation in future, this would help to continuously get opinions from the community members and ensure the success of the Project
Kiawahiga	The community members enquired whether the Project will supply sufficient water to the Residents of Kiawahiga	The Consultant articulated that the project's objective is to enhance water supply in the area by building a Water storage tank and increasing the water intake.

	The community members enquired about the water charges	Gatanga Water and Sanitation officials communicated that upon the completion of the project, residents are encouraged to visit the Gatanga Water and Sanitation Company to gain information about the applicable charges. He further clarified that these charges constitute a modest percentage relative to the amount of water consumed
	The community members wanted to know whether the Project will affect private land	The Consultant stated that the water lines will be constructed in road existing wayleaves. PAPs that will be affected at the intakes and water treatment works sites will be eligible for compensation upon submission of legal land ownership documents.
Chomo grounds	The community members asked whether the residents of Chomo will be provided with water by the Project	The Consultant clarified that the project's scope encompasses the construction of water lines from Chomo intake, the water will benefit the residents of Chomo.
	The community members wanted to know whether the youths of Chomo will be considered for employment during the Project implementation Phase	The Consultant explained that the in line with the Labor laws the local residents should be given a 70% stake in employment opportunities.

	The community members wanted to know whether the Project will provide water for irrigation	The Consultant explained that, the project was not allocated for irrigation but rather providing clean and adequate water for drinking.
	The community wanted to know what measures will be put in place to prevent water pipe bursts.	The Consultant stated that will be used for waterlines construction will be HDPE, which are prone to bursts.

The main key informants targeted in the consultations were both Government and private Institutions operating within the project area. Listening to stakeholder concerns and feedback is a valuable source of information that can improve project design and outcomes and help in identifying any impacts. The KII are yet to be interviewed but consultations are underway.

E-8 Environmental and Social Monitoring Plan

The ESMP guidelines for implementing mitigation measures for the proposed sanitation improvement interventions during construction activities are presented in Table below:

:

Table E-8-1 Construction ESMP

Code	Impact	Monitoring	Method	Frequency	Responsibility	Performance indicator	Cost
1.	Soil related impacts	Visual inspection of any erosion from the construction area and transport of sediments and contaminants	Interview of workers and communities on and around project sites	Quarterly	Contractor Environmental Safeguard and Social Specialists	• Restoration od site after construction • Availability of drainage channels	Ksh 5,000
2.	Air Quality Pollution	Emissions from vehicles and equipment Dust generated from construction activities, construction vehicle movement, stockpiles, storage of construction materials, etc.	Visual monitoring o Interview of workers and communities on and around project sites	Quarterly	Contractor Environmental Safeguard and Social Specialists	• Complete records of monitoring activities • Regular vehicle maintenance records. • No visible dust plumes originating from	Ksh1 5,000

Code	Impact	Monitoring	Method	Frequency	Responsibility	Performance indicator	Cost
						construction sites. • No of irregular exhaust (heavy black or white smoke) from equipment and vehicles.	
3.	Excessive Vibration and Noise Pollution				Contractor Environmental Safeguard and Social Specialists	• Reported complaints from neighbor community and institutions	Ksh 15,000
4.	Risks of solid waste mismanagement leading to pollution	Site clean and proper storage and handling of (hazardous) waste and sewage. Segregated waste disposal or storage areas are marked.	Visual monitoring	Daily throughout project implementation phase	Contractor Environmental Safeguard and Social Specialists	• Current and complete records of regular waste collection and disposal. • Records of workers	Ksh 10,000

Code	Impact	Monitoring	Method	Frequency	Responsibility	Performance indicator	Cost
		Toilet facilities are readily available near the construction site for all workers				attending follow up health and safety training on a monthly basis. • Compliance with applicable regulations, • Regulation of Harmful and Hazardous Waste Management	
5.	Impact on existing water Resources	Visual inspection of any erosion from the construction area and transport of sediments and	Visual monitoring	On demand run-off after heavy rainfall events	Contractor Environmental Safeguard and Social Specialists	• Number of complaints from community not happy with waste	Ksh 5,000

Code	Impact	Monitoring	Method	Frequency	Responsibility	Performance indicator	Cost
		contaminants (e.g., oil, grease).				management of spoil material	
6.	Gender-based Violence (GBV) and Sexual Exploitation and Abuse/Harassment (SEA/SH)	Monitor the existence of workplace Violence, Sexual Exploitation, and Abuse/Harassment (SEA/SH)	Interview with the workers Interview with the local community	Monthly	Contractor Environmental Safeguard and Social Specialists	• Whether cases of discrimination, GBV, and indiscipline are reported • Number of grievances addressed • All workers to comply to the Code of Conduct	Ksh 5,000
7.	Occupation safety and health impact	Visual inspection of compliance with health and safety procedures Monitor working conditions: o H&S	Visual Check training records Visual o Grievance mechanism	Monthly	Contractor Environmental Safeguard and Social Specialists	• No identified non-compliances with health and	Ksh 5,000

Code	Impact	Monitoring	Method	Frequency	Responsibility	Performance indicator	Cost
		training provided o Use of personal protective equipment for workers o Accessibility of workers to a grievance mechanism	in place and grievances records			safety procedures. • Regular training records of personnel on health & safety procedures on site. • Injuries or accidents to workers/personel on site are reported and traffic management plan on site • Availability of temporary bridges • Trained traffic marshals	

E-8 Grievance Resolution Mechanism

It should be expected that grievances could arise in implementing the measures at the community level. Therefore, the following mechanism is proposed to redress any grievance or complaint.

1. Set up a grievance redress committee easily accessible to the beneficiaries; the composition needs to be discussed between the Project team and the beneficiaries.
2. Sensitize the beneficiaries on the existence of the Committee and its roles, how to contact the Committee, and register grievances.
3. The following process should be followed in receiving and responding to grievances.

i. The grievance is received by the Chairperson of the Committee and recorded in a grievance register.

ii. The Chairperson summons a meeting within seven calendar days of receiving the grievance, inviting the representative of the Project area

iii. if the Committee agrees to an immediate action to satisfy the complainant, the latter shall be briefed by the Chairperson of the remedial action and how it will be implemented.

iv. For a corrective action that requires a longer period, the Chairperson will inform the complainant of the action and proposed timeline for correction.

v. In either 'iii' or 'iv' above, the Chairperson gets written satisfaction from the Complainant on the action taken and formally closes the case in the Register. In managing grievances, a Grievance Redress Mechanism will be employed, and it will include:

- ✓ Setting up a site-level GRM/Grievance Redress Mechanism Committee (GRMC) for the adaptation and implementation by the contractor with regular reporting to the PIU.
- ✓ The PCU will constantly engage project affected persons through its Stakeholder and Public Disclosure Plan. This will keep the communities informed of developments on the project, including planned activities, project impacts and mitigation measures, grievance mechanism, the right to submit complaints and the compensation process.
- ✓ Building capacity of the project team and site-level GRMC to ensure they can engage the communities, record and resolve grievances.

- ✓ Alternative Dispute Resolution Mechanisms will also be used as a key element of the GRM.

Grievances are expected to be communicated either verbally (in a language of choice) or in writing to the GRC. Upon receipt of complaints, timely responses are expected to be given. If grievances cannot be resolved locally, they are expected to be referred quickly to the client for resolution. Actions to be taken to address the grievance will be agreed upon by the GRMC, and the progress of implementation of agreed measures will be reported to the Local community PCU.

E-8: Roles and responsibilities within the PIE (UCP), and institutional arrangement for an efficient implementation of the ESMP

The construction implementation oversight will be Athi water works development agency while the water service providers will be the project engineers. Monitoring of the ESMP is paramount as it ensures that mitigation and enhancement measures are implemented. Monitoring assists to:

- Improve environmental and social management practices.
- Check the efficiency and quality of the environmental processes
- Compliance with the environmental and social screening requirement

The monitoring shall be viewed in three phases: compliance, impact monitoring, and cumulative impact monitoring. The WSPs will be responsible for monitoring compliance, and resources should be made available by the project for the Agency to execute this task, followed by reporting.

E-9: Estimated overall budget

The proposed budget for implementation of the ESMP is **US$119,083** including capacity building for relevant stakeholders as indicated in the table below.

ESMP Implementation Budget.

Table-E-9: ESMP Implementation Budget

No	Designation	Cost in Ksh	Cost in U.S D	Responsibility
1.	Mitigation measures	3,750,000	28,240	Contractor

2.	Environmental and Social Monitoring Programme	3,000,000	22,593	PIU
3.	Capacity-building measures	2,000,000	15,062	PIU
4.	Information and awareness-raising of stakeholders	2,000,000	15,062	Public
5.	Implementation of the GRM-related activities	1,000,000	7,531	PIU
6.	ESMP audits	2,000,000	15,062	Consultant
	Total	**13,750,000**	**103550**	
	Contingency (15%)	**2062500**	**15532**	
	Overall cost	**15,812,500**	**119,083**	

In summary, although the proposed project is without major negative environmental and social impacts, the environmental and socio-economic benefits. These far outweighed the negative impacts that could arise during implementation. As evident from the consultation, all the respondents support the project, citing its significance in health improvement, improved water supply and reliability will improve the teaching and learning environment. Mitigation measures and management plans have been suggested and developed for the negative impacts. Project staff should be sensitized on GBV and SEA/SH upon recruitment and continuous toolbox meetings onsite periodically. An appropriate institutional framework has been drawn up to implement the mitigation measures and environmental management plan, while the proposed monitoring programmes shall be set in motion as soon as possible.

E-10 Conclusion

The proposed project aligns with environmental, legal, and social standards. The potential significant environmental impacts outlined can be effectively mitigated through the proposed measures, and it remains the duty of the proponent and all stakeholders to ensure the diligent

implementation of these measures. This concerted effort will contribute to the reduction of environmental threats to acceptable levels.

E 11 Recommendations

This assessment recommends the following provisions:

i. The Bid documents prepared for the project incorporate the Environment, Social Health and Safety Provisions discussed under Chapter 7 (Environment and Social Impact Assessment and Mitigation Measures).
ii. The proponent should be given all the available support to implement the project
iii. Necessary permits (NEMA license, DOSH and business permit) should be issued by the licensing authority so that the work can commence
iv. Contractor will be required to commit to implementing the Environment, Social Health and Safety (ESHS) Provisions by developing site-specific (ESHS) plans.
v. At project implementation stage, the Contractor to report to the project management team comprising of the Consultant and the project proponent on a monthly basis on how ESHS provision detailed in this ESIA are addressed
vi. On completion, AWWDA to commission an independent Consultant to undertake an initial Environment, Social, Health and Safety Audit as required by and Environmental (Impact Assessment and Audit) (amendment) Regulations, 2019. The audit will identify nonconformities which the Contractor together with AWWDA will address through the defect's liability period of the project. This audit will also form basis of annual project self-audits by AWWDA.

CHAPTER 1 INTRODUCTION

1.1 Project Background

Access to water and sanitation in Kenya lags population growth, as only 70% of Kenyans have access to basic drinking water and only 32% have access to basic sanitation. The 2019 Kenya Population and Housing Census estimates the population at 47.5 million, 31% of whom are urban dwellers, with an annual population growth rate of 2.2%. As people move to cities, estimates suggest that 30 million Kenyans (48% of the population) are expected to live in urban areas by 2030. This places increased demands on urban infrastructure and stretches the limited available sector finance for services.

This project entails the construction and rehabilitation of water supply infrastructure (intakes, pipelines, water treatment plants, reservoirs, distribution networks, last mile connections and metering) and construction and rehabilitation of sanitation infrastructure (construction of water treatment plants, water lines and last mile connections. The table below shows the proposed interventions:

Table 1-1: Summary of Proposed project interventions

No	Water Service Provider	Prioritized Project	Description Of Scope
1.	Gatanga Water and Sanitation Company (GATAWASCO)	Proposed Thithi Githingiri Water Project	1. Construction of 3000m3/day intake 2. Laying of 0.2-0.3 km raw water mains (OD 315 mm) 1. Construction of Proposed treatment works 3000m3/day 2. Laying of proposed OD 280mm 4km transmission mains 3. Laying of proposed OD 225 mm 6.5km transmission mains 4. Laying of proposed OD 160 mm 12km transmission mains 5. Construction of 5000m3 Kiawahiga tank
2.	Murang'a South Water and Sanitation Company (MUSWASCO)	Proposed Chathanda Kenol Pipeline	1. 1.Rehabilitation of intake 2. Rehabilitation of Raw Main 10.5km 3. Construction of 4500m3/day Treatment works 4. Extension of OD 200 pipeline 0.5km 5. Construction of tank 250m3 at Mutheru 6. Construction of tank 1250m3 at Machegecha
3.	Murang'a West Water and	Proposed Tuthu	1. Rehabilitation of the Tuthu Intake works 2. Construction of new Tuthu treatment works 3. Construction 3000m3 tank at Kanyenyaini sec

No	Water Service Provider	Prioritized Project	Description Of Scope
	Sanitation Company (MWEWASCO)	rehabilitation project	4. Construction of 2000m3 tank at Kawariua 5. 2km of rehabilitation of Tuthu raw water mains 6. 2km of extension of OD 280 mm Rwathia Transmission mains

1.2 Project Proponent

The Project Proponent is Athi Water Works Development Agency (AWWDA), Athi Water Works Development Agency (AWWDA) is one of the nine (9) Water Works Development Agencies (WWDA) established under the Ministry of Water and Sanitation. It was established under the Water Act 2016 vide Legal Notice No. 28 of 26th April 2019.

The Agency is responsible for the development, maintenance, and management of water and sewerage infrastructure in the counties of Nairobi, Kiambu and Murang'a Counties covering 5,800.4Km2 with a total population of 9,320,287 people. Currently, the Agency has a bulk water production capacity of 664,337m3/day and a wastewater treatment capacity of 210,500 m3/day.

AWWDA Works Development Agency draws its mandate from the Water Act of 2016 which includes;

- Ownership and custodian of water and sewerage assets/infrastructure.
- Planning, development, and expansion of water and sewerage services infrastructure.
- Appoint viable and well managed Water Service Providers and ensure they have appropriate systems to among others:
- Enforce water quality monitoring,
- Ensure effective and efficient maintenance systems and procedures to minimize interruptions to water supplies.
- Build capacities of Water Service Providers to embrace efficiency, accountability and responsibility in service delivery
- Monitoring and supervision of water and sewerage services provision by WSPs

1.3 Project Financier

The Project financier is African Development Bank. The African Development Bank (AfDB) is a multilateral development finance institution established in 1964. Its primary mission is to promote economic and social development in Africa by providing financial and technical assistance to its member countries

1.4 Project objectives and justification

The following are the objectives of the proposed project;

- Implementing sustainable treatment methods and infrastructure.
- Integrating with existing infrastructure: The project aims to seamlessly integrate the new water infrastructure with the existing water system and treatment plants, ensuring optimal functionality and efficiency.
- Addressing water needs: By providing improved water management and treatment facilities, the project seeks to enhance public health and hygiene standards in the areas.

Project justification

Access to improved water services remains a nationwide problem in Kenya. A majority of residents in the area access water from the river and streams in the areas. There are several water connections from the WSPs with no water.

When the project is implemented, it is anticipated that the project will not only lead to reduced risks of health problems, but also lead to pollution control of waters, water sources and the environment in general. Construction of water treatment systems will reduce the high pollution levels and incidences of water-borne diseases and mortality rate.

1.5 Implementation Arrangement

The Executing Agency (EA) for the program is the MoWSI, who will have a coordinating role and it is recommended that a Project Coordinating Unit (PCU) be established at the MoWSI for coordination purposes. The Government proposed that actual implementation be done by the Project Implementation Units (PIUs) established in the Water Sector Institutions. The program will have 13 agencies under the Ministry of Water, Sanitation and Irrigation benefitting from the National Urban Water Supply and Sanitation Program. It was proposed that the nine water works development agencies and KEWI to implement the projects within their jurisdictions directly as implementing agencies while the other national institutions (WASREB, WRA and RCGWRERT) to implement their projects through the PCU. Further assessment of the implementing capacities of

the PCU, WWDAs and KEWI will be done at appraisal with appropriate measures stipulated to fill any capacity shortfalls. Final decisions on implementation arrangements will be made during the appraisal phase.

The PCU will be responsible for collating and compiling the environment and social safeguards monthly reports and quarterly progress reports for the program from all agencies and submitting a single report for the program to the Bank.

The PCU and each PIU will have the following key personnel: Program Coordinator; Water and Sanitation Engineer; Procurement Expert; Accountant; Environment and Social Safeguards Expert and Monitoring and Evaluation Officer. These positions will be assigned to the program by the time of appraisal. Any additional positions will be identified and agreed during the appraisal. In addition to the PCU and PIUs, the program will ensure the recruitment of qualified design review and supervision consultant to support the implementation of the program.

At national level, a steering committee (SC) will be established composed of representatives of NT, MoWSI, the nine (9) WWDAs, Water Resources Authority (WRA), WASREB, KEWI, RCGWRERT and the PIUs to provide program oversight and coordinate the implementation.

1.6 Environmental and Social Safeguards

1.5.1. Environmental and Social Safeguards Categorization

In-country environmental assessment, legal and institutional framework, and the Banks Integrated Safeguards Systems Operational Safeguards (ISS, OS) are key to determining project categorization based on the level of Environmental and Social risks and impacts. The National Urban Water Supply and Sanitation program/project components, sub-components, and activities related to the construction of water treatment plants, main water lines, last mile connections thus will trigger High-intrinsic environmental and social risks and impacts. The National Urban water and Sanitation program/project is proposed as Category 1.

1.5.2. Applicable Safeguards Instruments

The Project Executing Agency Ministry of Water, Sanitation and Irrigation and its Implementation Agencies are required to prepare Location/site specific Environmental and Social Impacts Assessments ESIA embedded with an Environmental and Social Management Plan ESMP, Resettlement Action Plan RAP per component as applicable and general Stakeholder Engagement Plan SEP and Grievance Redress Mechanism to be reviewed, cleared, and subsequently disclosed

in-country and by the Bank in compliance with the Bank and Borrower information sharing and disclosure policies.

1.5.3. Institutional capacity to implement the safeguards Instruments

The Ministry of Water, Sanitation and Irrigation as the Executing Agency will have a Coordination E&S/OHS Unit that will coordinate all E&S aspect of the project. At the Level of the Implementation Agencies, there are existing E&S/OHS units with qualified E&S safeguards and compliance officers. Institutional capacity in E&S risk management is confirmed adequate.

1.5.4. Compliance

The project will be implemented in compliance with the Bank's ESS policy/procedure and In-country legislations/policies. The Ministry of Water, Sanitation and Irrigation will be the Executing Agency. The PIUs will be located at (Athi Water Works Development Agency, Tana Water Works Development Agency, Lake Victoria North Water Works Development Agency, Lake Victoria South Water Works Development Agency and Kenya Water Institute) for smooth implementation of the project. The E&S measures implementation reporting will be done on a monthly basis, while an annual E&S performance/compliance audit conducted by an independent external expert will be submitted at the end of every project year (annual basis).

1.5.5. Gender assessment and gender categorization

The program's main objective is to secure universal access to water and sanitation services in Kenya. This is a prerequisite for greater gender equality, allowing women and girls to pursue their aspirations outside the home; to access resources and financial autonomy; to escape violence; to engage in decision-making processes; and to demand more equal division of labour which are normally hampered by domestic social responsibilities that require women to provide water and sanitation services at the household and community levels. The project is expected to provide temporary employment opportunities where at least 30% of the jobs will go to women. It will catalyze commercial activities, drive economic growth, improve quality of life of both men and women, boys and girls enabling building of resilience against climate variability and change.

1.7 Significance of the Project

The project will contribute towards solving the wastewater related problems in Maragua, Kenol Kabati and Murang'a Towns and their surrounding areas and this will go far in reducing cases of water related diseases.

The project will also lead to realization of the Sustainable Development Goal (6) which is the new 2030 agenda and expands Millennium Development Goal as guided by resolutions of Rio+20 conference. The goal focuses more on investment in adequate infrastructure in water sanitation, hygiene, water quality, waste water management, water scarcity and use efficiency, integrated water resource management and protection of water related ecosystems

1.8 Objectives of ESIA

1.8.1 General Objective

The purpose of an Environmental Assessment (EA) is to improve decision making and to ensure that the project under consideration is environmentally and socially sound and sustainable. This ESIA has been conducted in compliance with Environmental (Impact Assessment and Audit) Regulations 2003 with 2019 amendments established under the Environmental Management and Coordination Act (EMCA), 1999 (Amended in 2015).

1.8.2 Specific Objectives of ESIA Investigations

This Environmental & Social Impact Assessment (ESIA) is expected to achieve the following objectives:

- To present existing environmental, social and cultural setting of the target project area
- To identify potential environmental and social impacts (direct and indirect), including opportunities for enhancement; this includes the cumulative impact of the proposed project and other developments which are anticipated;
- To generate feasible alternative investments, sites, technologies, and designs,
- To provide preventive, mitigating, and compensatory measures
- To provide detailed results of the public consultation
- To prepare an Environmental and Social Management and monitoring Plan to mitigate the identified impacts so as to ensure sustainability of the proposed projects and
- To recommend cost effective measures to be implemented to mitigate against the expected impacts.

1.9 ESIA Approach and Methodology

The ESIA was carried out in line with the provisions of the Environmental Management and Coordination 2015 and the Environmental (Impact Assessment and Audit) Regulations 2003 amended in 2019. The study also referred to the African Development Development Bank (AfDB) Integrated Safeguards System (ISS) mainly the Operational Safeguard 1 (Environmental and social assessment); Operational Safeguard 2 (Involuntary resettlement); Operational Safeguard 3 (Biodiversity and ecosystem services); Operational Safeguard 4 (Pollution prevention and control, greenhouse gases, hazardous materials and resource efficiency); and Operational Safeguard 5 (Labour conditions, health and safety). The approaches to the study involved stakeholder consultations, questionnaire administering, site visits/physical inspections, baseline surveys, integration and assessment of this information

An Environmental and Social Management Plan comprising of an impact mitigation plan and modalities for monitoring and evaluation was then developed to guide environmental management during all phases of project development. The assessment involved the following:

1.9.1 Literature Review

The Consultant reviewed literature related to the proposed project and the project area. These included project drawings, project description, and other studies on physiography, geology, hydrogeology, water resources and socio-economics of the project area. Legislation, policies and procedures in social and environmental management were also reviewed.

1.9.2 Scoping

Scoping process involved the identification of significant environmental and social issues associated with the proposed works. The impacts of the proposed project were assessed through project site visits and the following;

- Evaluation of the location, extent of the water connections and the current land use of the affected area.
- Evaluation of the design and proposed construction activities, materials and methodology
- One on one interviews with key stakeholders and proposed project beneficiaries were applied in the determining location of pipeline available way leaves especially in areas where there are no settlements and general opinions of the people.

- Discussion with the area residents on the potential impacts related to project implementation activities and corresponding mitigation measures.

1.9.3 Baseline Data Collection

Baseline data was collected on the proposed project site and the immediate neighborhood. The data collection begun in February and March 2024 during field reconnaissance and continued through the detailed ESIA study phase.

The data collected was on aspects such as: topography; local flora and fauna; soils and geology; socioeconomics, existing and past activities including human settlements; local surface and ground water resources; ambient air quality and noise levels (qualitative); waste management practices; and natural resources and cultural heritage aspects of the project areas.

1.9.4 Stakeholder Consultations

Stakeholder consultations were carried out to: inform project stakeholders of the proposed project; to explain the likely impacts (positive/negative) of implementing the project; and to obtain views, concerns, comments and suggestions from interested and affected parties regarding the proposed project.

Stakeholder identification and analysis was carried to determine who the project affected people were and the most appropriate means of engagement. Details of the outcome of consultation are discussed in chapter 6 of this report.

CHAPTER 2 PROJECT DESCRIPTION

2.1 Existing Water Supply and Sanitation Situation under MUWASCO Service Area

2.1.1 Water supply

There are three (3) major water supply systems within MUWASCO service area, these include; Kawambeu, Kayahwe and Maragua Systems. In addition, the WSP operates some Boreholes at various locations. The table below summarizes the main details of the main water systems.

Table 2-1Existing water supply systems under MUSWASCO

Source	Intake name	Installed capacity	Actual Production	Area served	Status
Irate River	Kiawambeu	15,000	7,000	Maragua municipality	Operational below capacity
Maragua River	Kayahwe	4,000	4,000	Maragua municipality	Operational
Maragua River	Maragua	4,000	-	Maragua municipality	Disused due to challenges in pumping
Maragua River	New Maragua dam	8,000	4,000	Maragua Town	Operating below capacity due to limited distribution

2.1.2 Sanitation

MUWASCO has an existing convectional sewerage treatment facility at Kambirwa approximately 2km south east of Muranga town Centre. The existing treatment works sit on approximately 20acres of land but the total acreage set aside for the treatment works is 32 acres. The existing treatment facility has design capacity of 2500m^3/d. Water service provider has proposed additional reticulation sewers totaling to 10km under the proposed works.

Maragua town does not have a water-borne sewerage system. Pit latrines and septic tanks area

2.2 WATSAN systems under MWEWASCO service area

2.2.1 Water Supply

The main existing water supply schemes under MWEWASCO include; Tuthu phase 1, Rwathia, Tuthu Phase 3 and Rwathai. The table below presents the main details for these systems;

Table 2-2:Existing water supply systems under MWEWASCO area

Source	Intake name	Installed capacity	Actual Production	Area served	Status
South Mathioya River	Tuthu(Phase 1)	3,000	3,000	Kanyenyaini/Murandia	Operational
	Rwathia (Phase 2)	4,000	4,000	Kangema/ Kahuro	Operational
	Tuthu (Phase 3)	4,000	4,000	Kanyenyaini/Kangema	Operational
	Ichichi (Phase 4)	24,000	12,000	Murandia/Kahuro	Operational
	Rwathia (Phase 5)	5,000	5,000	Kangema/Mukangu	Operational

2.2.2 Sanitation

There are is no public sewerage system within the GATAWASCO service area. However, a detailed design for Kangema Sewerage System was carried out in 2021 but is yet to be implemented Maragua town does not have a water-borne sewerage system. Pit latrines and septic tanks area.

2.3 Gatanga Water and Sanitation Jurisdiction Area

The supply area is located 50 km north of Nairobi City. The project area falls in altitude from 2000 mASL. The area is characterized with ridges and valleys.

The major sources of water for domestic use in the area are rivers, springs, shallow wells, borehole and rain harvesting. The main existing water supply schemes in Gatanga sub-county are Thika, Kimakia, Kiama, Gatanga and Maragua water supply schemes.

There are two existing water schemes and one proposed water scheme project namely;

- Chomo Kuria water Scheme,
- Chathada water scheme,
- Thithi-Githingiri water scheme

The map below showcases the project location;

Figure 2-1: Project location map

2.3.1 Chomo Kuria water Scheme

Chomo Karia Water Scheme is managed and operated by Gatanga Water and Sanitation Company (GATAWASCO)

The Scheme sources its water from River Chomo via Chomo intake with a design capacity of 40,000 m³ per day. Water flows by gravity for 7.8 km via OD 160 mm uPVC diameter pipe to 3000 m³ treatment works at Rwegetha for treatment.

The Transmission lines to Rwegetha, Gatanga, Kirwara and Liani zone is of various sizes ranging from outside diameter 315 to 160 mm uPVC pipes. The water is distributed via uPVC pipes of various diameters ranging from outside diameter to 63-20 mm.

Table 2-3 : Condition of existing infrastructure for Chomo water scheme

#	Component	Infrastructure Details	Condition
1.	Chomo Intake	River Chomo Abstraction capacity:40,000m3/d	The condition was reported to be good.
2.	Raw Water Mains	10.8 km DN 500 Epoxy steel pipes	The condition was reported to be good
3.	Rwegetha Treatment works	Treatment type: Convectional full treatment Design capacity of Rwegetha treatment works is 3,000 m^3/d. Current production is 3,000 m^3 per day	The condition was reported to be good.
4.	Transmission mains	0.3 Km DN 300 pipes from T.works to Rwegetha . 7.7 km DN 200 pipes from Rwegetha to Gatanga 8.1 km DN 150 pipes from Gatanga to Laini and Kigio	The condition was reported to be good
5.	Storage tanks	No tanks in the system	
6.	Distribution lines	Consumer offtake is directly from the mains	The secondary and tertiary pipelines are more than 20 years old and frequently experience bursts due to damages from vandalism and deterioration of pipe material. There are some illegal spaghetti connections in the system.

2.3.2 Challenges of the Existing System

The following are shortcomings of the existing system observed, noted and reported during the field visit;

- Leakages and vandalism of the pipes and appurtenances/ fittings;
- Illegal spaghetti connections;
- Tanks to manage high non-revenue water due to frequent bursts and illegal connections

2.4 Murang'a South Water and Sanitation Jurisdiction Area

Murang'a Cluster Water project targets Kenol/Kabati and Maragua towns its environs. Kenol Town is located in Maragua sub-county at the junction of the Nairobi-Nyeri (A2) highway and Murang'a Road (B25). The town is 55km North of Nairobi City. The population in Kenol area in 2019 Census was 44,086. The Town is rapidly growing as an ideal residential area and commercial hub. The outer parts of Kenol town are rural in nature with small scale agriculture. On the other hand, Kabati is a relatively smaller Town with a population of 27540 in the 2019 census. The town has developed linearly along along the D416 road from the Nairobi-Nyeri (A2) highway. It is located 2.7 km from Kenol. The town development is spurred by agriculture both small scale and large scale (Delmonte farm). The Proto gas factory and Mitubiri landfill have also contributed to rapid development in the area. The 2 towns are located between 1530 and 1500 mASL. The project area generally within Kimorori and Wempa wards.

Kenol and Kabati towns and immediate environs are currently not adequately supplied with water. The rapid growth experienced in the area has strained the water supply system and therefore requires strengthening. The proposed components for Murang'a include;

2.4.1 Chathanda Water Scheme

Chathanda Water Scheme is managed and operated by Murang'a South Water and Sanitation Company (MUSWASCO). The Scheme sources its water from River Chathanda via Chathanda intake with a design capacity of 3000 m^3 per day. Water flows by gravity for 10 km via OD 280 mm uPVC diameter pipe to 100 m^3 tank at Wakibugi. The water is distributed untreated via uPVC pipes of various diameters ranging from outside diameter to 160-20 mm. to Kigumo area around Mariira Sublocation. The table below indicates the existing conditions;

Table 2-4 : Condition of existing infrastructure for Chathanda water scheme

No	Component	Infrastructure Details	Condition
	Chathanda Intake	• River Chathanda • Abstraction capacity:3000m3/d	The weir needs structural rehabilitation, de silting and installation of appurtenances
2.	Raw Water Mains	• 10.8 km DN 280 Upvc pipes	The lines lacks working air valves, washouts and sectional valves. The line delivers 30% of its design capacity
3.	Transmission mains	• DN 160mm	The condition was reported to be good
4.	Storage tanks	• 100 m3 wakibugi tank	
5.	Distribution lines	• Consumer offtake is directly from the mains	The condition was reported to be good

2.4.1.1 Challenges of the Existing System

The following are shortcomings of the existing system observed, noted and reported during the field visit;

- Leakages vandalism of appurtenances/ fittings;
- Suspected blockage of the raw water mains
- Frequent bursts
- Siltation of the intake

2.5 Summary of Existing Water condition

Whilst the households connected to water between the year 2018 and 2022 were 212,912, households with access to portable water were 156,467. The county has 28 water resource associations. The directorate provided water to 212,912 households out of 318,105 households in the county. This represented 67 percent coverage in domestic water supply. On the other hand, only 38,134 households were connected to the services representing 12 percent coverage. The services were offered through 5 public water supply entities, 35 community projects and 11 county boreholes as shown in Table 2-1.

Table 2-5:A summary of existing water supply infrastructure

No	Water Supply Source	Production (M3/Day)	Households served
1.	Murang'a Water and Sanitation Company	10,500	25,505
2.	Murang'a' South Water and Sanitation Company	16,685	73,409
3.	Kahuti Water and Sanitation Company	16,154	30,433
4.	Gatanga Community Water Scheme	13,110	28,231
5.	Gatamathi Water and Sanitation Water Company	10,196	37,178
6.	Eleven County Boreholes	660	5,926
7.	35 Community Water Projects	2,587	12,229
	Totals	**69,892**	**212,912**

The project area falls under two areas of jurisdiction namely;

- Gatanga Water and Sanitation Jurisdiction Area
- Murang'a South Water and Sanitation Jurisdiction Area
- Murang'a Water and Sanitation Jurisdiction Area
- Muranga West Water and Sanitation Company jurisdiction area

2.6 Proposed interventions in Gatanga Water and Sanitation Jurisdiction Area

2.6.1 Proposed Interventions Chomo Karia Water Project

The following interventions have been proposed for Chomo Karia Water Project

a) Raw Water Mains

- Laying of additional 7.8km OD 280 mm raw water main

b) Treatment Works

- Construction of additional 3000m3 treatment works

c) Transmission Main

- 0.3 Km DN 300 pipes from T.works to Rwegetha .
- 7.7 km DN 200 pipes from Rwegetha to Gatanga
- 8.1 km DN 150 pipes from Gatanga to Laini and Kigio

d) Storage Tanks

- Construction of new storage /break pressure tank along the transmission main

e) Distribution Networks

- 30km of distribution networks

2.6.2 Schematic Diagram of the Existing and proposed Chomo Karia Water Project

The figure below shows the schematic diagram of the existing and the proposed system in Chomo Karia water project

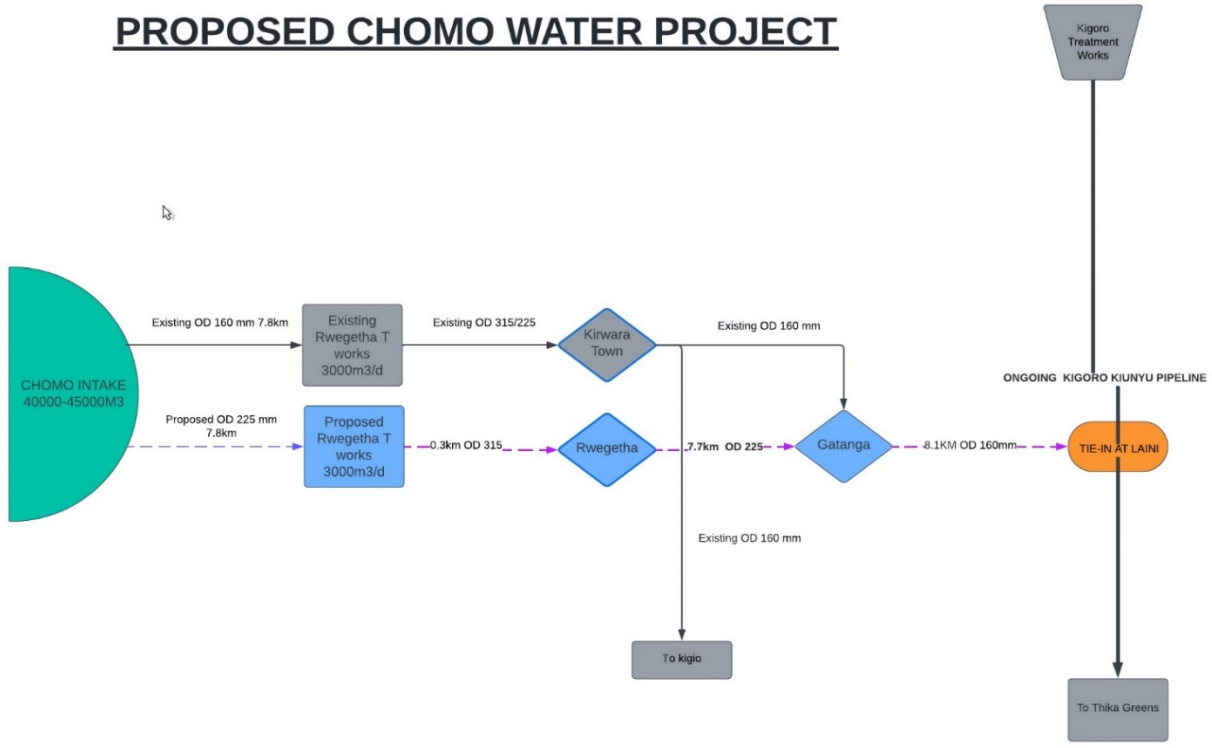


Figure 2-2: Schematic of Chomo Laini water scheme

2.6.3 Proposed Interventions Thithi-Githingiri Project

The following interventions have been proposed for Thithi-Githingiri Water Project

a) Raw Water Mains

- Laying of additional 0.2km OD 315 mm raw water main

b) Treatment Works

- Construction of additional 3000m^3 treatment works

c) Transmission Main

- 4 Km DN 250 pipes from Works to Mureke.
- 6 km DN 200 pipes from Mureke to Proposed Kiawahiga tank
- 0.5 km DN 200 pipes from kiawahiga tank to Gaturo
- 12 km DN 150 pipes from Gaturo to Kahaini-Githingiri-Thika greens

d) Storage Tanks

- Construction of 5000m^3 new storage /break pressure tank along the transmission main

e) Distribution Networks

- 50km of distribution networks

2.6.4 Schematic Diagram of the proposed Thithi Githingiri Water Project

The figure below shows the schematic diagram of the proposed system in Thithi Githingiri water project

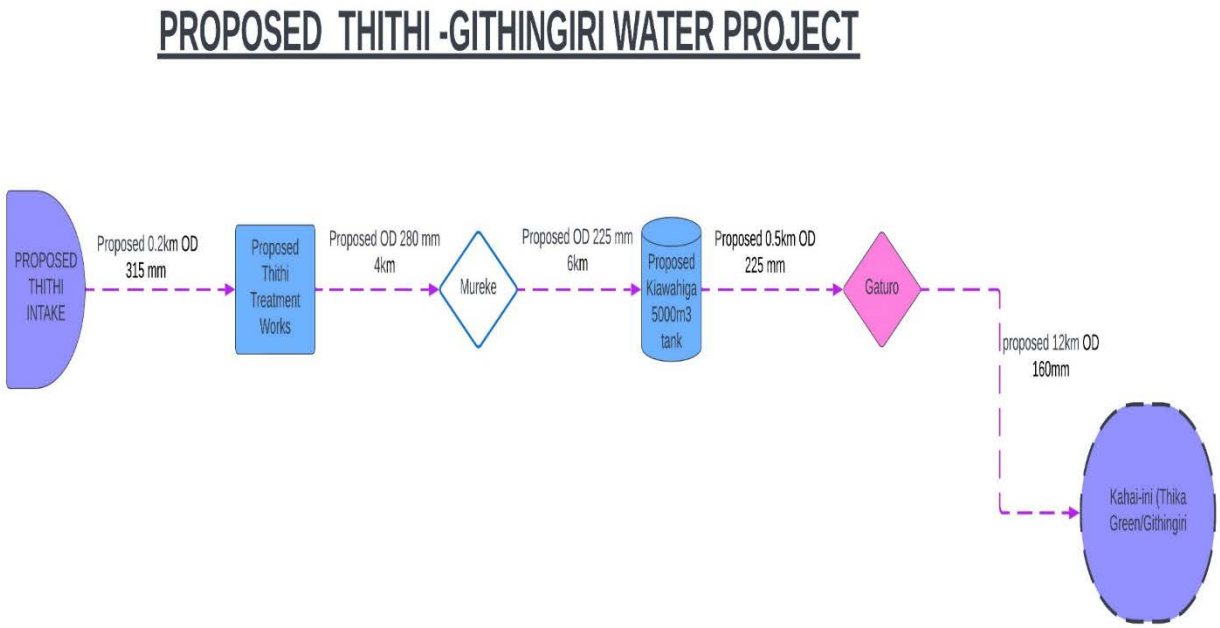


Figure 2-3: Schematic of Thithi-Githingiri water Project

2.7 Proposed interventions in Murang'a South Water and Sanitation Jurisdiction Area

2.7.1 Proposed Interventions Chathanda Water Project

The following interventions have been proposed for Chomo Karia Water Project

a) Raw Water Mains

a) Design review and rehabilitation of OD 280 mm raw water main

b) Treatment Works

b) Construction of additional 3000m3 treatment works at Mariira farm

c) Transmission Main

c) Interconnection to newly laid DN 200 mm Mariira Kenol line

d) Storage Tanks

d) Construction of 250m3 and 1250 m3 new storage /break pressure tank along the transmission main at Mutheru and Machegecha

e) Distribution Networks

e) 30km of distribution networks

2.7.1.1 Schematic Diagram of the Existing and proposed Chathanda Water Project

The figure below shows the schematic diagram of the existing and the proposed system in Chathanda water project;

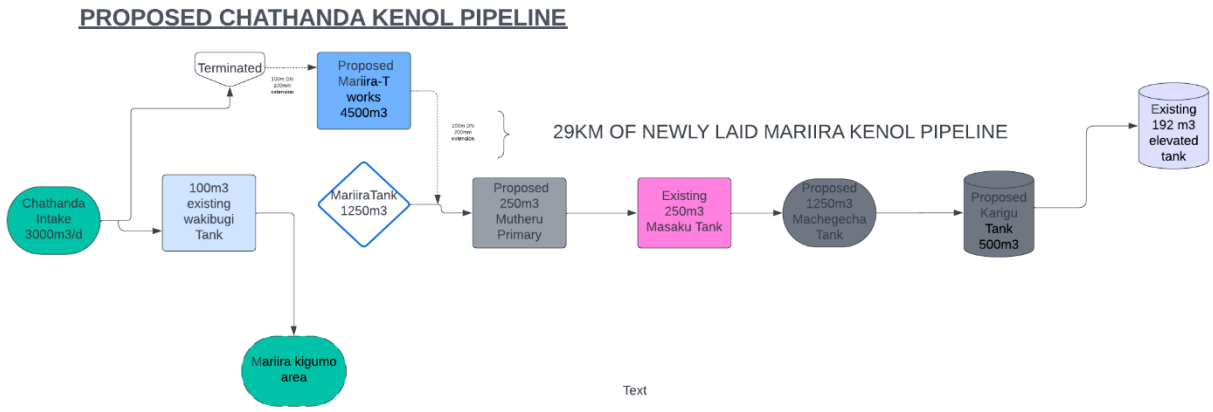


Figure 2-4: Schematic of Chathanda -Kenol water scheme

2.8 Proposed project interventions Murang'a Water and Sanitation Jurisdiction Area

Water Source

The water source for this system is river Maragua which is a perennial river. Water quality deteriorates during the rainy spells due to high turbidity caused by increased human activities upstream. There is an existing water treatment plant to resolve this challenge

Water Treatment Works

The existing water treatment plant is designed for a capacity of 8,000 m^3/d.

Transmission Water mains

The proposed water main is a 14.28 km long, OD 225 mm, HDPE pipeline (pressure ratings PN 12.5 to PN 16). Below is a summary of the pipeline design:

Table 2-6: Summary of the pipeline design

Item	Description	Design Details
1.	Length (m)	14280

2.	Internal Diameter (mm)	200
3.	Material	HDPE
4.	Design flow (m3/d))	2100
5.	Velocity (m/s)	0.75
6.	Total headloss, HL (m)	20
7.	Start Elevation (masl)	1397
8.	End Elevation (masl)	1203
9.	Available Static Head	194
10.	Max pressure head (m)	133
11.	Min pressure head (m)	8.96
12.	Recommended pipe	10.36 km of OD 225, HDPE PN 12.5 3.92 km of OD 280, HDPE PN 16

The figure that follows shows the seler Gakoigo – Kambiti pipeline and ground profile

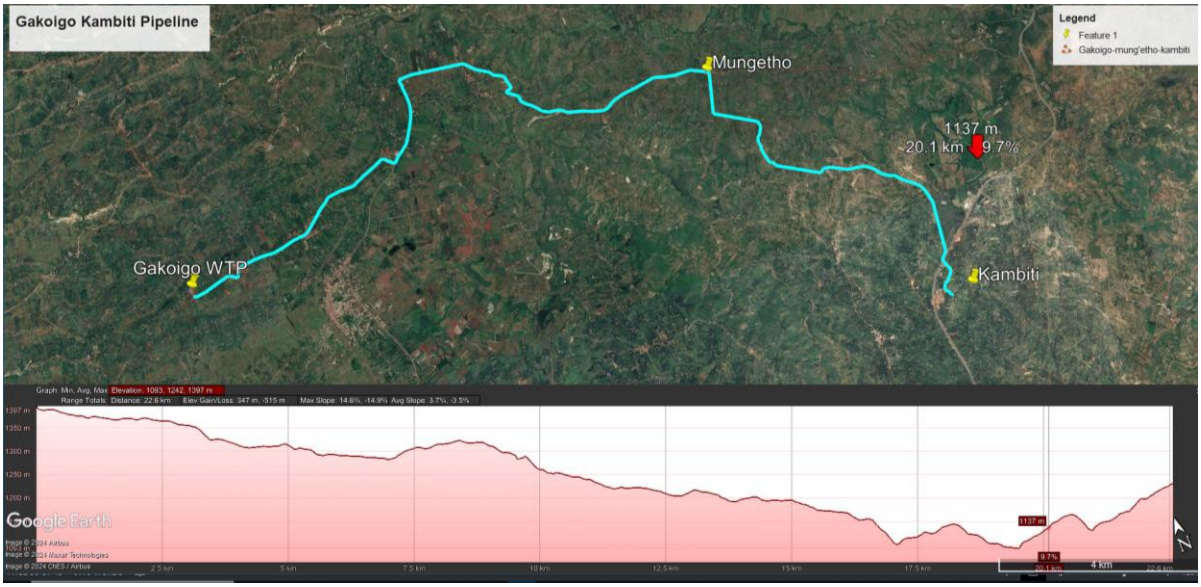


Figure 2-5: Layout and ground profile for the Gakoigo Kambiti Pipieline

Appurtenances

A summary of the proposed new valves for this system is as tabulated below:

Table 2-7:Details of pipeline valves

Valve Type	Quantity	Details
Air valves	Large orifice 4No. Double acting Small orifice 2No near the start	All air valves shall be anti-surge type, orifice of 50 mm and fitted with isolating valves to ease of maintenance
Washout (scour) valves	3 No.	80 mm opening – near the river
Sluice valves	2No.	Intermediary control/section valve

2.9 Proposed interventions in Muranga West Water and Sanitation Company jurisdiction area

2.9.1 Improvement of Tuthu and Rwathia Water Supply Systems

The existing Tuthu system does not have a treatment plant. Turbidity levels in the raw water increases during the wet season. The proposed works include a new intake weir, a raw water main and treatment plant. Improvement works for Rwathia system involve construction of a water storage tank and a by-pass pipeline to serve this tank.

Design details of these interventions are presented in sections below.

2.9.1.1 Intake Works

The proposed new intake works will source water from South Mathioya River which is perennial in nature. The Intake is located 1km upstream of the existing intake to allow for gravity flow of raw water to the proposed treatment plant. The intake is designed to abstract 4000m3/d. a summary of the design details is presented below

Table 2-8:Summary of new Tuthu Intake Weir Design details

Item	Item	Value
1	Crest Level	2010.5 m
2	River Level	2009.0 m
3	Effective height of Weir	1.5 m
4	Depth to foundation	1.5 m
5	Free board	Nil
6	Total height of dam	3 m
7	Total length of weir/ spillway	38 m
8	Minimum draw-off level	
9	Weir material	

2.9.1.2 ***Raw Water mains***

The raw water main will draw water from the proposed intake to a proposed treatment works 1000 m downstream. A summary of design details is presented below:

Table 2-9:Summary of design details for the proposed Raw water main

Item	Description	Design Details
1.	Length (m)	1000
2.	Internal Diameter (mm)	250
3.	Material	HDPE/ Steel
4.	Velocity (m/s)	0.94
5.	Total head loss, HL (m)	1.3m
6.	Start Elevation (masl)	2213
7.	End Elevation (masl)	2186
8.	Elevation difference (m)	27
9.	Recommended pipe	1000 m, OD280 mm, HDPE, PN 12.5 and Steel for the rocky sections

Treatment Works

The water treatment plant is designed for a capacity of 4,000 m^3/d. A summary of the design details is presented in the sections below:

a) Coagulation

Coagulation will be achieved by dosing with chemicals followed by rapid mixing as follows.

Coagulant chemical - Alum

pH adjustment - Lime (Soda ash)

Rapid mix - Hydraulic jump generated by flow over a v-notch

Dosing-At the weir nappe

Figure 2-6: :Layout of the Proposed Tuthu Treatment Plant

b) Flocculation Basin

Flocculation will be carried out using baffle flocculators with a detention time of 20 min to provide a G value of 30 – 60 s^{-1} and G_t value in the range 30,000 – 100,000. The channel velocity is maintained between 0.1 to 0.3 m/s and the slot velocity between 0.5 to 0.6 m/s for the first 2/3 of the basin and 0.3 to 0.4 m/s for the last 1/3 of the basin.

No. of units = 4

Size of each unit = 3.95 x 6.52 m

No. of channels = 30

Width of channels = 120, 140 and 160 mm

Width of baffles = 75 mm

Depth of flow = approx. 0.7 m (varies)

c) Sedimentation Basin

The design horizontal sedimentation tanks for treating 4,000 m^3/d is summarized in table below.

Table 2-10: Design of Sedimentation Basins

Item	Value
No. of units	4
Total Capacity (m^3/d)	4000
Overflow rate ($m^3/m^2/hr$)	1.0
Dimensions per unit (m)	3.95 x 12
Depth (m)	2
Detention Time (hrs)	2

d) Filtration

Rapid sand filters are provided. Backwash water will be provided from an elevated pressed steel backwash tank. Sizing of the filters is based on the following criteria.

i) Design flow: 4,000 m^3/d

iii) No. of filters 5

iv) Filter size: 2.45 x 2.55 m

vi) Backwash period 8 min

e) Chlorination

Required contact time: 30 minutes. For treatment capacity of 4,000 m^3/d:
Required contact tank volume = 83.3 m^3

Tank provided = 1000 m^3 (also acting as storage tank)

f) Pumping

Two pumps are provided to pump water to the backwash tank – one duty and one stand-by. Each pump has capacity to fill the backwash tank within 2 hour pumping period which is adequate for the expected backwashing intervals (2 days for each filter bed).

g) Site works and Utility buildings

A chemical house, Laboratory administration building, staff house and other site works will be provided for efficient operation of the plant.

Transmission mains

The proposed works for rehabilitation of existing mains are as follows:

- 2000 m of OD 225mm damaged by road Contractor
- 2000 m of OD 280mm extension of Rwathia transmission main s to proposed 2500m^3 Weithaga tank

2.10 Project Resources

This coordinated effort with ample resources will ensure the successful implementation of the project, adhering to quality and safety standards while meeting the infrastructure needs for the Project.

Construction Phase:

1. **Construction Materials**:
    - Concrete: Used for constructing water pipelines, manholes, water storage tanks, and other structures.

- Steel: Utilized in the reinforcement of concrete structures, fabrication of support frames, and installation of equipment.
- High-Density Polyethylene (HDPE) Pipes: Employed for water mains due to their durability, corrosion resistance, and flexibility.
- PVC Pipes: Used for smaller diameter water distribution networks.
- Aggregates: Including sand, gravel, and crushed stone for concrete production and backfilling.
- Bricks or Blocks: For constructing manholes, chambers, and other infrastructure components.
- Asphalt: Used for road reinstatement and paving associated with trenching activities.

2. **Equipment and Machinery**:
    - Excavators, bulldozers, and trenchers: For excavation and trenching of pipelines and utility corridors.
    - Cranes: Used for lifting heavy materials and equipment during installation.
    - Dump trucks and haulers: Transporting construction materials, soil, and excavated materials.
    - Concrete mixers and pumps: Mixing and transporting concrete for construction activities.
    - Welding machines: For joining and welding of steel structures and pipes.
3. **Labor and Human Resources**:
    - Skilled labor: Including engineers, plumbers, electricians, welders, technicians, and surveyors.
    - Unskilled labor: Such as construction workers, helpers, and general laborers.
    - Supervisory and managerial staff: Overseeing project execution, quality control, and safety compliance.

Operation Phase:

1. **Utilities and Consumables**:

- Electricity: Powering pumps, motors, and control systems for water treatment and distribution.
- Chemicals: Including disinfectants, coagulants, and flocculants for water treatment processes.
- Lubricants and oils: For maintenance of pumps, valves, and other mechanical equipment.
- Replacement parts: Spare parts for pumps, valves, meters, and other equipment.

2. **Human Resources**:
    - Operation and maintenance staff: Technicians, operators, and engineers responsible for monitoring, maintaining, and repairing infrastructure.
    - Administrative and support staff: Handling customer service, billing, and administrative tasks related to operation and maintenance.
3. **Safety and Protective Equipment**:
    - Personal protective equipment (PPE): Including helmets, gloves, safety boots, and safety vests for workers.
    - Safety signage and barriers: To ensure the safety of workers and the public around operational facilities.
    - Emergency response equipment: Such as first aid kits, fire extinguishers, and emergency showers.

The following table represents the estimated number of workers to be employed during the Project implementation phase;

Table 2-11: Project workers

Worker Description	Number	Name
Skilled	49	• Civil Engineers • Plumbers and Pipefitters • Electricians • Heavy Equipment Operators • Welders • Technicians • Surveyors

Unskilled	100	• Laborers • Helpers • Security Personnel • Cleaners and Sweepers

2.11 Land requirement and ownership

The proposed construction of the distribution water lines will be laid within the road reserves, however for the construction of intakes and treatment works, the parcels of land are privately owned and compensation of this parcels of land is required.

Table 2-12:Land Requirement and Ownership

No	Water Service Provider	Prioritized Project Area	Description Of Scope	LAND TENURE
1.	Gatanga Water and Sanitation Company (GATAWASCO)	Proposed Thithi Githingiri Water Project	1. Construction of 3000m3/day intake 2. Laying of 0.2-0.3 km raw water mains (OD 315 mm) 3. Construction of Proposed treatment works 3000m3/day 4. Laying of proposed OD 280mm 4km transmission mains 5. Laying of proposed OD 225 mm 6.5km transmission mains 6. Laying of proposed OD 160 mm 12km transmission mains 7. Construction of 5000m3 Kiawahiga tank	Wayleave Wayleave Private Wayleave Wayleave Private

No	Water Service Provider	Prioritized Project Area	Description Of Scope	LAND TENURE
		Proposed Chomo –Rwegetha Laini Water Project	1. Laying of 7.8 km raw water mains (OD 280 mm) 2. Construction of Proposed treatment works 3000m3/day 3. Laying of proposed OD 315mm 0.3km transmission mains 4. Laying of proposed OD 225 mm 7.7km transmission mains 5. Laying of proposed OD 160 mm 8.1km transmission mains	Wayleave Wayleave Wayleave Wayleave Wayleave
2.	Murang'a South Water and Sanitation Company (MUSWASCO)	Proposed Chathanda Kenol Pipeline	1. Rehabilitation of intake 2. Rehabilitation of Raw Main 10.5km 3. Construction of 4500m3/day Treatment works 4. Extension of OD 200 pipeline 0.5km 5. Construction of tank 250m3 at Mutheru 6. Construction of tank 1250m3 at Machegecha	Riparian land Kigumo Sub-County land Wayleaves private land Wayleave Public Private
3.	Murang'a West Water and Sanitation Company (MWEWASCO)	Proposed Tuthu rehabilitation project	1. Rehabilitation of the Tuthu Intake works 2. Construction of new Tuthu treatment works 3. Construction 3000m3 tank at Kanyenyaini sec	KFS Land KFS Land School land

No	Water Service Provider	Prioritized Project Area	Description Of Scope	LAND TENURE
			4. Construction of 2000m3 tank at Kawariua 5. 2km of rehabilitation of Tuthu raw water mains 6. 2km of extension of OD 280 mm Rwathia Transmission mains	Private Land KFS Land Wayleave
4	Murang'a Water and Sanitation Company (MUWASCO)	Proposed Gakoigo – Kambiti pipeline	1. The proposed water main is a 14.28 km long, OD 225 mm, HDPE pipeline (pressure ratings PN12.5 to PN 16).	Wayleave and private land

CHAPTER 3 ENVIRONMENTAL AND SOCIAL BASELINE CONDITION

3.1 Introduction

Baseline conditions entail the sum-total of all biophysical and geo-physical condition of the project area. Gathering of baseline data is necessary to meet the following objectives:

- To understand key social, cultural, economic, and political conditions in areas potentially affected by the proposed project;
- To provide data to predict, explain and substantiate possible impacts;
- To understand the expectations and concerns of a range of stakeholders on the proposed development;
- To inform the development of mitigation measures; and
- To benchmark future socio-economic changes/impacts and assess the effectiveness of mitigation measures.

3.2 Geographical characteristic of the project area

3.2.1 Location of the Project

The project area is located within Murang'a County. Murang'a County is one of the five counties in the former Central Province and has its headquarters in Murang'a Town. It is bordered by Kiambu County to the South, Nyandarua County to the West, Nyeri County to the North, Kirinyaga County to the North-East, Embu County to the East and Machakos County to the South East.

Murang'a South Water and Sanitation Company Ltd (MUSWASCO) Kangema water and sanitation Company and Gatanga Water and Sanitation Company, are the WSP mandated to provide water and sewerage services in the Project areas. The figure below indicates the targeted project areas under the jurisdiction of the two WSPs;

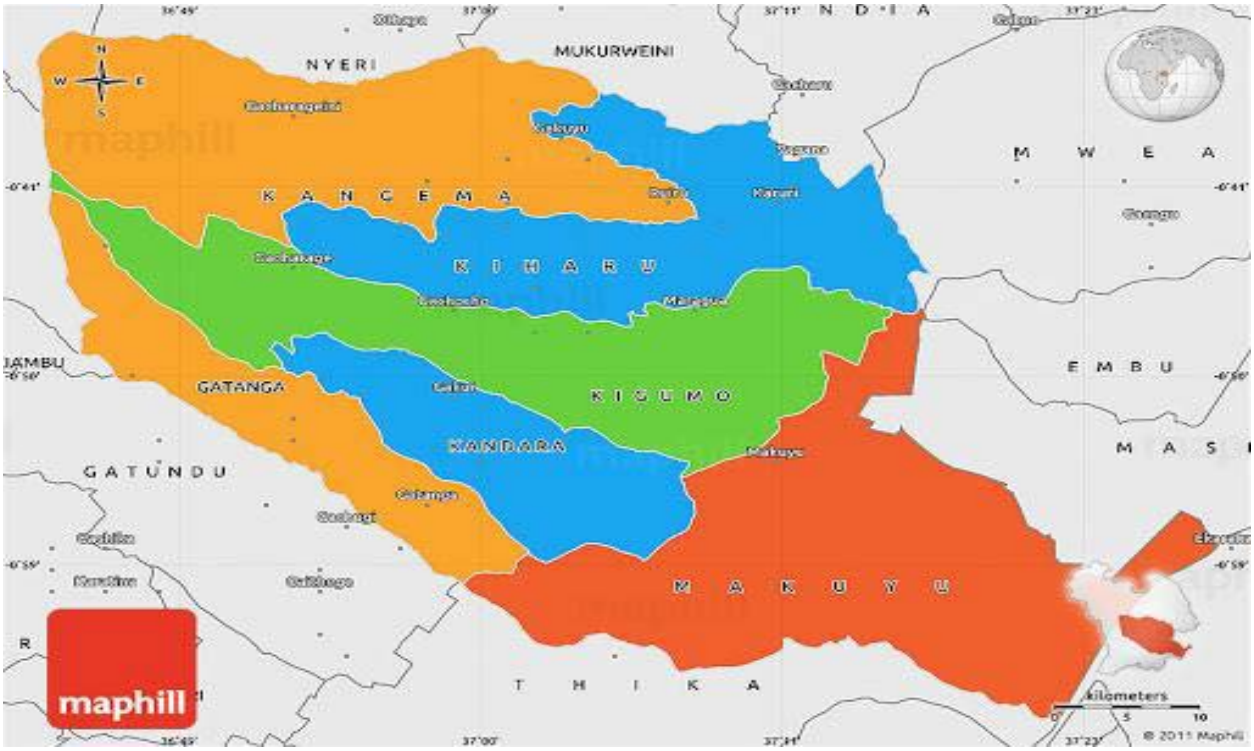


Figure 3-1: Murang'a County Map Highlighting The 7 Sub Counties

The proposed project components are geographically spread out as tabulated below:

Table 3-1 : Proposed Project components are geographically spread out in Murang'a county

Target Town	Sub-County	Location/ Ward	Nature of Proposed Intervention	Area WSP
Gatanga	Gatanga	Gatanga	Water	GATAWASCO
	Chomo	Chomo		
Kenol	Maragua	Kimorori, Wempa	Water	MUSWASCO
		Kagaa		
	Kandara	Kagundu-ini		
Kangari	Kigumo	Kangari	Water	
Kangema	Kangema	Muguru	Water	MWEWASCO

Target Town	Sub-County	Location/ Ward	Nature of Proposed Intervention	Area WSP
		Koimbi		
	Wangu	Weithaga	Water	
		Gatheru		
		Muguru		
		Kahuro	Water	
		Kahatia		

3.2.2 Climate and Rainfall

The annual rainfall in the county ranges from 1280.1 mm to 2214.1 mm per year. The rainfall pattern is evenly distributed all year round with March and July receiving heavy rains while December and February receive light rains. The temperatures range from 180 C to 290 C. January, February and March are the hottest months with other months having relatively similar temperatures except for July and August which have relatively cold spells. The county has an average humidity of 67 percent.

3.2.3 Geology and Ecological Conditions

The geology of this area comprises of basement systems which are mainly grits, sandstones, shales and limestones that have been metamorphosed by heat and pressure or by impregnation by pervading fluids. Other types are derived from lavas and volcanic fragmental rocks. The variety of rocks is extensive and includes mica and mica hornblende gneisses and schists, pyrexinite, granulites, quartzites and marbles. There is also a considerable development of migmatites.

3.2.4 Topography

The Project area lies between 3,353m above sea level, in the West along the slopes of Aberdare Mountains and 914m ASL in the East. The western highlands have deep dissected topography and drain into various rivers. These rivers flow from Aberdare ranges to the West, South Eastward and drain into Tana River. The County's geology and basement system comprises of volcanic rocks of the Pleistocene age and Achaean rock type respectively. The western part of the County bordering Aberdares is characterized by volcanic rocks while Eastern part is composed of the rocks of the basement system. Porous beds and disconformities within the volcanic rock system

form important aquifers, collecting and moving ground water, thus regulating water supply from wells and boreholes. The County's rugged, dissected topography and geology is both an asset and liability to the County's development. The highest parts bordering Aberdares form the rain catchment areas, from where most of the rivers passing through the county originate. The volcanic rocks hence fertile soils result in thriving agricultural activities. The ecological conditions in the high areas provide a suitable environment for tea and coffee farming. However, this dissected topography causes gulley erosion and landslides hence construction and maintenance of bridges and roads are very expensive.

3.2.5 Water Sources

The main source of water for the project areas in Makuyu and Kagundu-ini is the Murang'a Bulk Water Supply which was developed between 2011 and 2013. The Murang'a Bulk Water Supply System sources its water from the Irati River, via the Gachocho intake. The raw water is transmitted through a 14'' (DN350 mm) pipe to the Kiawambeu Water Treatment Plant which has a capacity of 10,000m3/day. The system serves an area of 140km2.

The water source for Kangari area is the Kigumo Water Supply scheme. The scheme derives water from Irati River at the Kinyona intake located at the edge of Aberdare Forest adjacent to the Kinyona track that leads to Gatare Forest Station. The water is then treated at Kinyona treatment works which has an output capacity of 13,000m3/day.

3.3 Socio-economic characteristics

3.3.1 Population and Settlement

Table 3-2:Project areas and population

Location	Populations			Households	Area (km2)	Density
	Male	Female	Total			
Gatanga	94,437	93,548	187,989	46,997	532.3	353.2
Kenol	14,075	14,772	28,847	7,871	38.3	754
Kangari	14,468	14,727	29,195	8,046	63.8	458

Kangema	39,582	40,862	80,447	20,111	174	463

3.3.2 Education Institutions

The Project areas have a total of 1000 ECDs, 512 primary schools, 306 secondary schools, 65 youth polytechnics, 127 adult learning centers, 1 science and technology institution and 2 universities.

3.3.3 Health Access

The Project area has 272 health facilities serving a population of 959,701. It has one County referral hospitals and six sub-county hospitals, three mission and one private hospital. There are 26 public health centres, 114 dispensaries (89 public and 25 mission/NGO) and 137 private clinics. The County has 1250 medical personnel working in government health facilities.

3.3.4 Solid Waste Management

Currently, there is no robust solid waste management facility in the County. However, there is a proposed sanitary landfill facility at Mitubiri, Maragua Constituency co-funded by Murang'a County Government and Nairobi Metropolitan Authority (NAMATA). Solid wastes include plastic and polythene papers (banned), glass, human waste, animal waste, organic plant matter, synthetic materials, rubber and medical waste. Dumping and management of solid waste to the environment remains a major challenge for the County.

3.3.5 Housing

In the project area, about 40 per cent of the households live in stone/brick walled houses, 24.3 per cent in mud/wood walled houses while 2.19 per cent live in grass straw/tin walled houses (*Murang'a County CIDP, 2013*). Most housing units in the county are roofed with corrugated iron sheets (94.38 per cent), while Makuti and grass roof constitute 0.18per cent of the households. Most of these housing units have earth floor (60.04 per cent), followed by cement floor at 38.85per cent. The county has 1,924 Low Grade, 232 Middle Grade, and 184 High Grade government housing units which are not adequate for the government officers deployed in the county.

3.3.6 Land tenure and Ownership

Land tenure in the Project area is classified into freehold or leasehold land. Freehold land is held by an individual for an unspecified period of time while leasehold land is given by the government

to and individual or organization over a specified period of time and is expected to remit rent to the government. There are incidences of landlessness in Maranjau area in Kambiti Location of Maragua constituency but the County Government is addressing the issue. In Murang'a County, land ownership is classified as public, community

or private. According to the constitution, public land is Land which at the effective date was alienated government land as defined by an Act of Parliament in force at the effective date, land lawfully held, used or occupied by any State organ, land transferred to the State by way of sale, reversion or surrender, land in respect of which no individual or community ownership can be established by any legal process or land in respect of which no heir can be identified.

Public land shall vest in and be held by a county government in trust for the people resident in the county, and shall be administered on their behalf by the National Land Commission. Community land is land held by communities identified on the basis of ethnicity, culture or similar community of interest. It consists of: land lawfully registered in the name of group representatives under the provisions of any law, land lawfully transferred to a specific community by any process of law, any other land declared to be community land by an Act of Parliament; and land that is used by the community as community forests, grazing areas or shrines, ancestral lands or land lawfully held as trust land by the county governments. Private land is registered land held by any person under any freehold tenure or any other land declared private land under an Act of Parliament.

3.3.7 Biological environment

3.3.7.1 Vegetation

The project areas are common with most of their land under agriculture production. The locals farm produce entails coffee, tea bushes, mangoes, avocadoes, bananas, maize and beans. Farmlands have significantly changed the vegetation types in the project area. Only small pockets of natural vegetation still exist in the project. Some of the tree species notable within the project area are as shown in the table below;

Table 3-3:Tree species in the Project areas

No.	Scientific name	Local name
1.	*Podocarpus falcutus/latifolias*	Muthengera

No.	Scientific name	Local name
2.	*Makaranga kilimadscharica*	Mukuhakuha
3.	*Markhamia lutea*	Muu
4.	*Prunus africanum*	Muiri
5.	*Tabernaemotanas stapfianas*	Mwerere
6.	*Croton macrostacheus*	Mutundu
7.	*Olea europaea*	Mukinduri
8.	*Millettia dura*	Muhatia
9.	*Ocotea usambarensis*	Muthaiti
10.	*Teclea nobilis*	Munderendu
11.	*Ficus sycamores*	Mukuyu
12.	*Ficus natalensis*	Mugumo
13.	*Prunus africana*	Mukurwe
14.	*Bridelia micrantha*	Mukoigo
15.	*Syzygium* guinense	Muriru
16.	*Acacia Mearnsii*	Mukima
17.	*Eucalyptus spp*	Mubau/Blue gum
18.	*Moringa oleifera*	Muringa
19.	*Grivellia Robusta*	Silky Oak

No.	Scientific name	Local name
20.	*Mangifera indica*	Mango tree
21.	*Persea americana*	Avocado tree
22.	*Musa acuminata*	Banana tree

The above tree species are found both in the forest and farm lands. Tree nurseries have been established in the study area. These nurseries are categorized as Groups, Individual, Schools, Companies and Departmental nurseries. The main tree-planting season is April-May whereas tree planting is a continuous process as long as plant survival is assured.

3.3.7.2 Fauna

Wildlife animals are found in the forests, rivers and farmland. The changed land use allows for the thriving of very limited wildlife species such as mongooses, insects, rats, squirrels and numerous birds species. There are a lot of birds in the study area of various species ranging from domestic to the wild ones. Wildlife in the study area is a resource that has not yet been tapped.

Vervet monkeys for example are very common in farm land. They cause a lot of havoc to people's crops. Animals like elephants used to cause havoc to the forest neighboring community by breaking into people's farms which resulted to human wildlife conflict. There are few wild animals in the study area that are found in the rivers. The river systems are home to species such as monitor lizards, geckos, crocodiles, snakes, hippopotamus and fish species such as the common carp and catfish. Livestock rearing is also practiced in the project area with species such as cattle (dairy and non-dairy), sheep, poultry and goats being common.

3.4 Project sensitive Receptors

The assessment identified several receptors located within close proximity of 200m to 500m to the proposed water lines that might be affected by project activities at the time of construction.

The receptors might suffer damage associated with the activities, for instance, if the receptor is a school the impact could be related to Health and Safety of pupils or if the receptor is a market associated impacts could be disruption of business and demolition of structures. If the receptor is a communal water body, the associated impact could be pollution of the water resource.

Table 3-4:Sensitive Receptors

Type of Receptor	Component	GPS coordinates of the Receptor	Name of Receptor	Impacts	Mitigation Measures
Schools & Religious Institutions	Proposed Water Treatment	-0.796642, 36.933030,	Mariira University	Noise and Vibration Dust Emission	**Noise and Vibration**: Implementing quiet construction techniques and using noise-reducing equipment to minimize noise levels during construction activities. Scheduling noisy activities during off-peak hours to reduce disruption to nearby residents and businesses. Erecting sound barriers or enclosures around noisy equipment and work areas to contain noise within the construction site. Providing ear protection for workers who are exposed to high levels of noise. Conducting regular monitoring of noise levels to ensure compliance with regulatory standards and promptly addressing any exceedances. **Dust Emission:** Implementing water spraying and dust suppression techniques to minimize dust generation from construction activities. Covering materials and stockpiles to prevent wind erosion and minimize dust emissions.

					Using dust control measures such as dust collectors, filters, and barriers to capture airborne dust particles. Implementing speed limits for vehicles on unpaved roads within the construction site to reduce dust generation from vehicle movement. Conducting regular watering of access roads and construction areas to minimize dust accumulation and dispersion. Providing respiratory protection for workers who are exposed to high levels of dust. Monitoring air quality to assess dust levels and implementing corrective actions as necessary to mitigate potential health and environmental impacts.

CHAPTER 4 ANALYSIS OF PROJECT ALTERNATIVES

4.1 Project Alternatives

Regulation 18(1) of Legal Notice 101 specifies the basic content of an Environmental Impact Assessment Study / Project Report subsequent to which, subsection (i) requires an analysis of alternatives. Analysis of project Alternatives requires comparison of feasible alternatives for the proposed project in terms of: project site, project technology, Potential Environmental and Social Impacts, capital and recurrent costs, suitability under local conditions, and acceptability by neighboring land users.

This chapter describes and examines the various alternatives considered during the design of the project. The consideration of alternatives is one of the proactive sides of environmental and social assessment required to enhance project design. This is achieved through examining options instead of only focusing on the more defensive task of reducing adverse impacts of a single design option. The alternative that was considered for the project was focused on:

- Analysis of project location/sites
- Analysis of Alternative Materials
- Analysis of project design and technology
- Proposed Project Option
- No Project Alternative

4.2 Analysis of project location/sites

No alternative project locations were availed by the developer during the environmental assessment exercise; however, the proposed sites are adequate and appropriate to accommodate the proposed water treatment unit, water transmission lines, and the tanks. Consultations with the sub county officials, town council officials and the neighbouring local communities to the project areas revealed no complaints regarding the land where the water treatment plant is located and the associated project component locations

4.3 Analysis of Alternative Materials

The proposed project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. Equipment that saves energy and water will be given first priority without compromising on cost

or availability factors. The use of local stones, cement, sand (washed and clean), metal bars, pipes and fittings that meet the Kenya Bureau of Standards requirements is recommended. Concrete, Double walled corrugated (DWC) and uPVC pipes are acceptable for use in the reticulation systems. DWC pipe have been proposed for use in this project due to ease of construction and superior hydraulic performance.

As part of our commitment to promoting climate resilience and sustainability in infrastructure development, the design of the Infrastructural Projects has been done in alignment with existing design standards and codes, factoring in Climate Resilience aspects. These parameters are engineered to enhance the low carbon footprint while addressing the unique environmental, economic, and social challenges of the region.

4.4 Analysis of alternative design and technology

The proposal is to lay the new transmission lines in the shoulders along the road reserves. This will help to minimize compensation costs as the land belongs to the government and meant for utilities.

4.5 No Project Alternative.

Opting for the "No Project" alternative would mean halting project designs and maintaining the site in its current state. This choice is the most environmentally sound alternative as it ensures no disruption to the existing conditions. However, from an economic perspective, this option would result in significant losses for the proponent, as well as the local and national economies.

If the site remains undeveloped, the proponent would incur financial losses from the funds already invested in project design and planning, including fees paid to engineers and other experts. Additionally, the option would lead to the loss of job opportunities that the project was expected to create. Consequently, the water and sanitation conditions for the residents of Murang'a would continue to be inadequate.

Moreover, both the local and central governments would miss potential tax revenue that the project would generate if it were implemented. Furthermore, this alternative would further strain the already limited water supply in the area, given the increasing demand. Based on the analysis above, it is evident that the "No Project" alternative is not a feasible option for the community.

4.6 Proposed Project Sites

The impacts and mitigation measures for this alternative are discussed in detail throughout this report. The positive impacts have been identified. This alternative will have minimal impacts on the physical environment and has considered the necessary measures to eliminate the identified issues of concern. The alternative is likely to have the greatest implications on socio-economic environment of the area and surrounding communities. Due to the proposed quality of the development, it is anticipated that it would provide a major opportunity for area development, employment opportunities via business environment and accessibility to services to both the residents and non-residents of the area. In addition, a development of this caliber will add to the locality's ability to fuel the growth and development of the wider environment.

CHAPTER 5 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

5.1 Overview

This chapter outlines the policy, legal, regulatory and institutional framework in Kenya particularly for environmental management, protection and assessment applicable to the proposed Project.

The development of infrastructure projects involves various laws, by-laws, regulations, Acts of parliament, and policy documents. These statutes cannot be encompassed under a single heading.

The project will be subject to laws, regulations, guidelines and standards of the Government of Kenya the African Development Bank (sectoral Intervention Framework on water and sanitation 2014-2018). Note that wherever any of the laws contradict each other, the Environmental Management and Coordination Act (EMCA) prevail.

5.2 Environmental Policy Framework

The proposed investments will be implemented within provisions of various government policies as summarized in **Table 5-1** below

Table 5-1: Environmental Policy Framework

No	Policy	Applicability
1.	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 the high quality or clean and safe water but also adequate quantities to all people that they will serve. In addition, 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. **Relevance** 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.
2.	Kenya Vision 2030	This is the current national development blueprint for the period 2008 to 2030. The vision has three pillars – economic, social, and political. It is recognized that Kenya is a water-scarce country but stated (Kenya, 2007:

No	Policy	Applicability
		115) that the Vision for the water and sanitation sector is "to ensure water and improved sanitation services availability. **Relevance** The project will directly contribute towards the achievement of the objectives of the vision under the environment and social pillar through the provision of the planned water and sanitation services.
3.	National Land Policy 2003,	Chapter 2 of the policy is linked to constitutional reforms; regulation of property rights is vested in the government by the Constitution with powers to regulate how private land is used to protect the public interest. The Government exercises these powers through compulsory acquisition and development control. Compulsory acquisition is the power of the State to take over land owned privately for a public purpose. However, the Government must make prompt payment of compensation. Chapter 4 of the land policy under Environmental Management Principles, the policy provides actions for addressing environmental problems such as the degradation of natural resources, soil erosion, and pollution. For the management of the urban environment, it provides guidelines to prohibit the discharge of untreated waste into water sources by industries and local authorities; it also recommends appropriate waste management systems and procedures, including waste and waste water treatment, reuse, and recycling. The policy goes further to advocate for environmental assessment and audit as a land management tool to ensure environmental impact assessments and audits are carried out on all land developments that may degrade the environment and take appropriate actions to correct the situation. Public participation has been indicated as key in the monitoring and protection of the environment. Chapter 4 further advocates for the

No	Policy	Applicability
		Implementation of the polluter pays principle which ensures that polluters meet the cost of cleaning up the pollution they cause, and encourages industries to use cleaner production technologies. **Relevance** The project proponent shall implement the ESMP to ensure that the environment within the project area and adjacent areas are not polluted by the subsequent activities during the construction and operational phases. Health and safety measures will have to be maintained with the proximity to affected rivers. The proponent will also ensure that any affected land owner is promptly compensated
4.	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). **Relevance** These principles will also apply to the sanitation initiatives discussed in this ESIA.
5.	The National Environment Policy, 2013	The goal of the policy is to ensure a better quality of life for present and future generations through sustainable management and the use of the environment and natural resources. The objectives of the Policy are *inter alia*:

No	Policy	Applicability
		• Provide a framework for an integrated approach to planning and sustainable management of Kenya's environment and natural resources; • Strengthen the legal and institutional framework for good governance, effective coordination, and management of the environment and natural resources; and • Ensure sustainable management of the environment and natural resources, such as unique terrestrial and aquatic ecosystems, for national economic growth and improved livelihoods. • Some of the guiding principles in the implementation of the policy include: • **Environmental Right**: Every person in Kenya has a right to a clean and healthy environment and a duty to safeguard and enhance the environment; • **Right to Development**: The right to development will be exercised taking into consideration sustainability, resource efficiency, and economic, social, and environmental needs; • **Sustainable Resource Use**: Environmental resources will be utilized in a manner that does not compromise the quality and value of the resource or decrease the carrying capacity of supporting ecosystems; and • **Public Participation**: A coordinated and participatory approach to environmental protection and management will be enhanced to ensure that the relevant government agencies, county governments, private sector, civil society, and communities are involved in planning, implementation, and decision-making processes.

No	Policy	Applicability
		Relevance In chapter 8 an ESMMP is provided, the proponent and contractor should ensure it is implemented to ensure that the ecosystems are not destabilized by the subsequent Project activities.
6.	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. ***Relevance*** Proposed Sanitation Projects will provide direct employment to the youth as required by the Policy.
7.	The National Environmental Sanitation and Hygiene Policy-2016-2030	The Policy envisions a clean, healthy and economically prosperous Kenya free from sanitation and hygiene related diseases and seeks to ensure universal access to improved sanitation, clean and healthy environment by 2030. It is the outcome of reviews to address limitations of the National Environmental Sanitation and Hygiene Policy published in 2007. The Policy takes a rights-based approach and redirects efforts of the government at national and county level towards achieving the Kenya Vision 2030 and the global Sustainable Development Goals (SDGs). The strategy developed in the Policy that will not only enable all in Kenya to enjoy their right to highest attainable standards of sanitation but also to a clean and healthy environment as guaranteed by the Constitution of Kenya 2010. It puts emphasis on increasing public and private sector investment through public-private partnerships. The Policy is divided into seven Chapters: Introduction and

No	Policy	Applicability
		Background (1); Situation Analysis (2); The Policy Context (3); Policy Direction and Principles (4); Policy Strategies and Measures (5); Institutional Framework (6); Implementation Framework (7). The Policy articulates and clarifies the roles and responsibilities of the many stakeholders and agencies involved in the sanitation sector, spelling out the national and county Governments commitments to increasing investment in sanitation and creating an enabling environment. To address institutional fragmentation and financing bottlenecks, the Policy provides for the establishment of the National Environmental Sanitation Coordination and Regulatory Authority (NESCRA) and the National Sanitation Fund (NASF). To ensure its effective implementation, a national environmental sanitation and hygiene strategy (NESHS), National Environmental Health and Sanitation Bill and county environmental sanitation and hygiene strategic and investment plans (CESHSIPs) will be prepared. ***Relevance*** Implementing the Project will directly contribute to the achievement of the Policy

5.3 Overview of the relevant Legislation

The Legislation are presented in the Table below:

Table 5-2: Overview of the Legislation

No	Policy	Applicability
1.	The Environmental Management and Coordination Act Amendment 2015	The Act provides for the establishment of a legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto. Just as in the new constitution, Part II of EMCA confers to every person the right to a clean and healthy environment and to its judicial enforcement. The new Constitution and EMCA therefore obligates the project's Executing Agency and Contractor to work in a clean environment and not to contravene the right of any person within its zone of influence, to this entitlement. EMCA has provided for the development of several subsidiary legislations and guidelines which govern environmental management and are relevant to the project implementation. These include: **The Environmental (Impact Assessment and Audit) Regulations, 2009 Legal Notice No. 101** The Environmental Impact Assessment and Audit Regulations state in Regulation 3 states that "*the Regulations should apply to all policies, plans, programmes, projects and activities specified in Part IV, Part V and the Second Schedule of the Act*. Part III of the Regulations indicates the procedures to be taken during preparation, submission and approval of the environmental project report. Part 4(1) of the Regulation further states that: "no Proponent shall implement a project")Likely to have a negative environmental impact; or)For which an environmental impact assessment is required under the Act or these Regulations, unless an environmental impact assessment has been concluded and approved in accordance with these Regulation.

No	Policy	Applicability
		Relevance This EIA report has been compiled to comply with EMCA and the Environmental (Impact Assessment and Audit) Regulations, 2003. **The Environmental Management and Coordination (Waste Management) Regulations, 2006 Legal Notice No. 121** These Regulations were published in the Kenya Gazette Supplement No. 69, Legislative Supplement No. 37, and Legal Notice No. 121 of 29th September, 2006. The regulations provide details on management (handling, storage, transportation, treatment and disposal) of various waste streams including: • Domestic waste; • Industrial waste; • Hazardous and toxic waste; • Pesticides and toxic substances; • Biomedical wastes; and • Radioactive waste. Regulation No. 4 (1) makes it an offence for any person to dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle. Regulation 5 (1) provides categories of cleaner production methods that should be adopted by waste generators in order to minimize the amount of waste generated and they include:

No	Policy	Applicability
		• Improvement of production process through o Conserving raw materials and energy; o Eliminating the use of toxic raw materials and wastes; o Reducing toxic emissions and wastes. • Monitoring the product cycle from beginning to end by o Identifying and eliminating potential negative impacts of the product; o Enabling the recovery and re-use of the product where possible, o Reclamation and recycling and o Incorporating environmental concerns in the design and disposal of a product. Regulation 6 requires waste generators to segregate waste by separating hazardous waste from non-hazardous waste for appropriate disposal. Regulation 15 prohibits any industry from discharging or disposing of any untreated waste in any state into the environment. Regulation 17 (1) makes it an offence for any person to engage in any activity likely to generate any hazardous waste without a valid Environmental Impact Assessment license issued by NEMA. **Relevance**

No	Policy	Applicability
		The proposed project, during construction phases will generate wastes, which will need to be disposed of as per the guidelines in the regulations. **The Environmental Management and Coordination (Water Quality) Regulations, 2006 Legal Notice No. 120** These Regulations were published in the Kenya Gazette Supplement No. 68, Legislative Supplement No. 36, and Legal Notice No. 120 of 29th September 2006. The Regulations provides for sustainable management of water resources including prevention of water pollution and protection of water sources (lakes, rivers, streams, springs, wells and other water sources). It is an offence under Regulation No. 4 (2), for any person to throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution. Regulation No. 11 further makes it an offence for any person to discharge or apply any poison, toxic, noxious or obstructing matter, radioactive waste or other pollutants or permit the dumping or discharge of such matter into the aquatic environment unless such discharge, poison, toxic, noxious or obstructing matter, radioactive waste or pollutant complies with the standards for effluent discharge into the environment. **Relevance** The proponent should ensure that waste is handled, stored, transported and disposed as per this regulation.

No	Policy	Applicability
		The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Legal Notice No. 61 These regulations were published as legal Notice No. 61 being a subsidiary legislation to the Environmental Management and Co-ordination Act, 1999. The regulations provide information on the following: • Prohibition of excessive noise and vibration; • Provisions relating to noise from certain sources; • Provisions relating to licensing procedures for certain activities with a potential of emitting excessive noise and/or vibrations and • Noise and excessive vibrations mapping. According to regulation 3 (1), no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. Regulation 4 prohibits any person to (a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or (b) cause to be made excessive vibrations which exceed 0.5 centimeters per second beyond any source property boundary or 30 meters from any moving source. Regulation 5 further makes it an offence for any person to make, continue or cause to be made or continued any noise in excess of the noise levels set in the First Schedule to these Regulations, unless such noise is reasonably necessary to the preservation of life, health, safety or property.

No	Policy	Applicability
		Regulation 12 (1) makes it an offence for any person to operate a motor vehicle which (a) produces any loud and unusual sound; and (b) exceeds 84 dB(A) when accelerating. According to sub-regulation 2 of this regulation, No person shall at any time sound the horn or other warning device of a vehicle except when necessary to prevent an accident or an incident. Regulation 13 (1) provides that except for the purposes specified in sub-Regulation (2) there under, no person shall operate construction equipment (including but not limited to any pile driver, steam shovel, pneumatic hammer, derrick or steam or electric hoist) or perform any outside construction or repair work so as to emit noise in excess of the permissible levels as set out in the Second Schedule to these Regulations. Regulation 19 (1) prohibits any person to carry out activities relating to fireworks, demolitions, firing ranges or specific heavy industry without a valid permit issued by the Authority. According to sub-regulation 4, such permit shall be valid for a period not exceeding three months. **Relevance** The contractor for civil works will be required to ensure compliance with the above regulations in order to promote a healthy and safe working environment throughout the construction phase. This shall include regular inspection and maintenance of equipment and prohibition of unnecessary hooting of vehicles. **The Environmental Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006 Legal Notice No. 160** Part II of Regulations, section 4 states that no person shall engage in any activity that may have adverse impacts on ecosystems, lead to introduction of exotic species or lead to unsustainable use of natural

No	Policy	Applicability
		resources without an EIA license. The regulation puts in place measures to control and regulate access and utilization of biological diversity that include among others banning and restricting access to threatened species for regeneration purposes. It also provides for protection of land, sea. Lake or river declared to be a protected natural environmental system in accordance to section 54 of EMCA, 1999. **Relevance** During the construction phase of proposed project, there will be removal of the existing natural vegetation. For this to occur, the relevant authority, NEMA in this case, will require a detailed EIA on the proposed project and projected impacts before issuing a license for commencement. **Other relevant EMCA 1999 to be considered during construction and operation of the project are;** • Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, 2009. • Environmental Management and Coordination (Fossil Fuel Emission Control) Regulations, 2006 • The Environmental Management and Coordination (Controlled Substances) Regulations, 2007 Legal Notice No. 73. **Relevance to the Project** EMCA 2015 and above listed regulations shall form the main statutory instruments which will guide the implementation of the project so that any likely adverse impacts that could be caused by the project are

No	Policy	Applicability
		promptly mitigated as recommended in this assessment. This report is also in compliance with the requirement of the EIA/EA regulations.
2.	Water Act 2016	The Act vests the responsibility of developing water and Sanitation infrastructure (sewerage and water supply) to Water Works Development Agency, in this case represented by Athi Water Works Development Agency. Section 73 of the Act allows a person with a license to supply water (licensee) to make regulations for purposes of protecting against degradation of sources of water, which he is authorized to take. Under the Act, the licensee could be a local authority, a private Trust or an individual and the law will apply accordingly under the supervision of the Regulatory Board. Section 75 and sub-section 1 allows a licensee for water supply to construct and maintain drains and other works for intercepting, treating or disposing of any foul water arising or flowing upon land for preventing water belonging to the licensee or which the is authorized to take for supply from being polluted. However, if the proposed works will affect or is likely to affect any body of water in the catchment, the licensee shall obtain consent from the Water Resources Management Authority. **Relevance to the Project** This Act shall be relevant during both construction and operation phases of the project whereby the contractor and proponent shall ensure that all relevant water resources are not polluted from both liquid and solid wastes.

No	Policy	Applicability
3.	Water Resources Regulations, 2021	The regulation has set prescription of water use activities; issue of approvals, permits and authorizations for water use and waterworks; guidelines on surface water, including declaration of a watercourse, wetlands, land reclamation, water use for irrigation and Works Associated for protection and control of fish; groundwater development, including borehole and issue of specific permits and authorizations; water quality monitoring and liquid waste disposal, including control of water pollution, water quality monitoring; inspection and controls concerning waterworks; water use charges, including penalties for misuse or for over-abstraction; roles and powers of water resource users associations and basin water resources committees; identification of protected and designated groundwater conservation areas; composition of reserve; categories of water sector professionals and contractors and issue of related permits and licenses. A water resource user association shall have a gender mainstreaming and environmental approach. **Relevance** The project will ensure that the river riparian areas are respected and are not interfered with.
4.	County Government Act No. 17 of 2012	Part II of the Act empowers the county government to be in charge of functions described in Article 186 of the constitution, (county roads, water and Sanitation, Health). Part XI of the Act vest the responsibility of planning and development facilitation to the county government with collaboration with national government. This arrangement has been adopted for interventions in order not to conflict with provisions of the Kenyan Constitution. **Relevance**

No	Policy	Applicability
		The project once commissioned shall be handed over to WSPS which is a water utility company.
6.	Occupational Health and Safety Act (OSHA 2007)	This legislation provides for protection of workers during construction and operation phases. It is tailored at implementation of the EHS plan in compliance with the relevant sections of this Act. The EMP prepared under this assessment has provided for specific health and safety aspects to be complied with during implementation of the project. **Subsection 18 - Sanitary conveniences** Sufficient and suitable sanitary conveniences for persons employed in the factory/ work places shall be provided, maintained and kept clean, and effective provision shall be made for lighting the conveniences and where persons of both sexes are, such conveniences shall afford proper separate accommodation for persons of each sex. **Subsection 21 – Prime movers** Every flywheel directly connected to any prime mover and every moving part of any prime mover, shall be securely fenced, whether the flywheel or prime mover is to be situated in an engine –house or not . Head and tailrace of every water wheel and of every water turbine shall be securely fenced. Every part of electric generators, motors and rotary converters and every flywheel directly connected thereto shall be securely fenced unless it is in such a position or of such construction as to be safe to every person employed or working in the premises as it would be if securely fenced. **Subsection 22 -Transmission Machinery**

No	Policy	Applicability
		Every part of transmission machinery shall be securely fenced unless it is in such a position or of such construction as to be safe to every person employed or working in the premises, as it would be if securely fenced. Efficient devices or appliances shall be provided and maintained in every room or place where work is carried on by which the power can promptly be cut-off from transmission machinery in that room or place. Every machine intended to be driven by mechanical power shall be provided with an efficient starting and stopping appliance, the control of which shall be in such a position as to be readily and conveniently operated by the person operating the machine. **Subsection 25 - Construction and maintenance of fencing** All fencing or other safeguards provided in pursuance of the foregoing provisions shall be of substantial construction, constantly maintained, and kept in position while the parts required to be fenced or safe guarded are in motion or in use except when any such parts are necessarily exposed for examination and for any lubrication or adjustments shown by such examination to be immediately necessary. **Subsection 13 – Cleanliness** Every factory/work place shall be kept in a clean state and free from effluent arising from any drain, sanitary convenience or nuisance. **Subsection 14 – Overcrowding**

No	Policy	Applicability
		A factory/ work place shall not while work is carried on be so overcrowded as to cause risk of injury to the health of the persons employed therein. Standard cubic space allowed for every person in a workroom should not be less than three hundred and fifty cubic feet. **Section 51- Air pollution** Preventive measures shall be put in place during operation of the project to prevent fumes and exhaust gases from entering into the atmosphere. **Relevance to the Project** The Act provides Occupational Health and Safety guidelines which shall be followed by both the contractor and supervising consultant during implementation of the project in order to avoid injuries and even loss of life to workers and neighboring community.
7.	The Public Health Act (Cap.242)	Part IX section 115 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires Local Authorities to take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 and include nuisances caused by accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbor rats or other vermin. **Relevance to the Project**

No	Policy	Applicability
		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 1999 for utmost compliance. The Act also shall be applied to ensure that the food that is provided to the workers during construction of the project meets the safety requirements.
8.	The Penal Code (Cap. 63)	Section 191 of the Penal Code makes it an offence for any person or institution that voluntarily corrupts, or foils water for public springs or reservoirs rendering it less fit for its ordinary use. Similarly, section 192 of the same act prohibits making the atmosphere in any place to make it noxious to health of persons/institution in dwellings or business premises in the neighborhood or those passing along a public way. **Relevance** The Contractor and the project proponent will be required to ensure strict adherence to the Environmental Management Plan throughout the project cycle in order to mitigate against any possible negative impacts associated with dust, noise and effluent discharge. This code is also applicable during the operation phase of the project.
9.	Employment Act	This is an Act of parliament that applies to all employees employed by any employer under a contract of service. The Act came in operation in June 2008. Employment of children in the following forms is prohibited in the following sections of the Act:

No	Policy	Applicability
		53. (1) notwithstanding any provision of any written law, no person shall employ a child in any activity that constitutes worst form of child labour. 56. (1) No person shall employ a child who has not attained the age of thirteen years whether gainfully or otherwise in any undertaking. (2) A child of between thirteen years of age and sixteen years of age may be employed to perform light work which is Not likely to be harmful to the child's health or development; and Not such as to prejudice the child's attendance at school, his participation in vocational orientation or training Programs approved by Minister or his capacity to benefit from the instructions received. **Relevance** AWWDA and the contractor will need to understand the requirements of the Act during employment. Equal opportunity should be given to all both men and women so as to ensure equity.
10.	Work Injury Benefits Act (WIBA)	It is an act of Parliament to provide for compensation to workers for injuries suffered in the course of their employment. It outlines the following: • Employer's liability for compensation for death or incapacity resulting from accident; • Compensation in fatal cases; • Compensation in case of permanent partial incapacity;

No	Policy	Applicability
		• Compensation in case of temporary incapacity; • Persons entitled to compensation and methods of calculating the earnings; • No compensation shall be payable under this Act in respect of any incapacity or death resulting from a deliberate self-injury; • Notice of an accident, causing injury to a workman, of such a nature as would entitle him for compensation shall be given in the prescribed form to the director. **Relevance** The Contractor will need to abide by all the provisions of WIBA.
11.	Sustainable Waste Management Act, 2022	The Act aims at fulfilling the following; • **Promote Sustainable Waste Management:** The primary goal of the act is to establish a framework for waste management that is environmentally sustainable and socially responsible, ensuring the proper handling and disposal of waste. • **Improve Public Health:** By ensuring a clean and healthy environment, the act seeks to enhance the overall health and well-being of all Kenyan citizens. Proper waste management reduces the risk of diseases and environmental contamination. • **Reduce Pollution:** The act targets the reduction of pollution in various forms, including air, land, freshwater, and marine pollution. This helps protect natural ecosystems and preserves the quality of air, water, and soil.

No	Policy	Applicability
		• **Effective Waste Service Delivery:** It aims to promote and ensure efficient and effective delivery of waste services to all Kenyan communities, making waste management more accessible and reliable. • **Green Economy and Employment:** By creating an enabling environment for employment in the green economy related to waste management, recycling, and recovery, the act contributes to job creation and economic growth in these sectors. • **Environmentally Sound Infrastructure:** It establishes an environmentally sound infrastructure and system for sustainable waste management, which includes the development of waste disposal facilities and recycling centers with minimal negative impacts on the environment. • **Circular Economy Practices:** The act promotes circular economy practices, which emphasize recycling, reusing, and reducing waste, leading to more sustainable and resource-efficient methods of production and consumption. • **Resource Efficiency:** By mainstreaming resource efficiency principles in sustainable consumption and production practices, the act encourages responsible and efficient use of resources, reducing waste and conserving raw materials. • **Responsible Public Behavior:** Finally, the act seeks to inculcate responsible public behavior in waste management and environmental stewardship. It emphasizes the importance of individual and community responsibility in ensuring a cleaner and more sustainable environment.

No	Policy	Applicability
		The Sustainable Waste Management Act of 2022 in Kenya is a comprehensive policy framework that aims to transform the waste management landscape in the country. It focuses on sustainability, public health, pollution reduction, economic growth, and environmental responsibility to create a cleaner, healthier, and more sustainable future for all Kenyan citizens. **Relevance to the Project** 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 1999 for utmost compliance.

5.4 African Development Bank Integrated Safeguards System

5.4.1 African Development Bank Polices on Environment and Social Operational Safeguards

The African Development Bank's environmental policy framework is strongly anchored in the concept of sustainable development. This concept defines sustainability as "development that meets the needs of the present without compromising the needs of the future".

The AfDB Operational Safeguards (OS) include:

5.4.2 OS 1: Environmental and Social Assessment.

This OS governs the process of determining a project 's environmental and social category and the resulting Environmental and Social Assessment requirements. The requirements cover the scope of application, categorization, use of Strategic Environmental and Social Assessment (SESA) and Environmental and Social Impact Assessment (ESIA) where appropriate, Environmental and Social Management Plans, climate- change vulnerability, public consultation, community impacts, treatment of vulnerable groups, including indigenous peoples, and grievance procedures.

The OS requires:

- Screening of the project for environmental and social impacts including climate change impacts, potential adaptation and mitigation measures, and the vulnerability of populations and their livelihoods—to determine the specific type and level of environmental and social assessment;
- Scoping of the project's components, including delineating the project's geographic and temporal area of influence, consideration of alternatives, and assessment of cumulative impacts, where relevant. Scoping activities also determine the range of likely potential risks and impacts and also determines whether specific requirements of the Bank's OSs apply. All relevant direct and indirect environmental and social risks and impacts, including those specifically covered the other Operational Safeguards would be addressed in an integrated manner;
- Consideration of real alternatives to the project's location and/or design to avoid adverse impacts. The mitigation hierarchy to be applied includes: if avoidance is not possible, reduce and minimize potential adverse impacts; if reduction or

minimization is not sufficient, mitigate and/or restore; and as a last resort compensate for and offset;

- Assessment to comply with the relevant legislation and standards applicable in the local jurisdiction, bearing in mind the equivalence of standards with those of the Bank. Assessment to also take into consideration national or regional- level programming documents that are under implementation or in preparation;
- Assessment process to support and strengthen existing country systems for environmental, climate, and social risk management, including those specifically related to OSs 2-5, such as systems and institutions covering resettlement, biodiversity protection, pollution control, and labor standards;
- The assessment to be conducted according to the principles of proportionality and adaptive management. The level of assessment and management required should be proportionate to the level of risk that the project poses as identified during categorization and scoping—and the management measures adopted should be capable of being adapted to changing circumstances during the full project cycle;
- Assessment to include the development of a comprehensive and implementable ESMP with a realistic timeframe, incorporating the necessary organizational capacity (including further training requirements) and financial resources to address and manage the environmental and social risks that may occur during the full project cycle;
- Categorization of projects following the principle of using the appropriate type and level of environmental and social assessment for the type of operation. The categories include:
  - ✓ **Category 1-** projects likely to induce significant and/or irreversible adverse environmental and/or social impacts, or to significantly affect environmental or social components that the Bank or the borrowing country considers sensitive
  - ✓ **Category 2:** Projects likely to have detrimental site-specific environmental and/or social impacts that are less adverse than those of Category 1 projects. Likely impacts are few in number, site specific, largely reversible, and readily minimized by applying appropriate management and mitigation measures or incorporating internationally recognized design criteria and standards

- ✓ **Category 3:** Projects which do not directly or indirectly affect the environment adversely and are unlikely to induce adverse social impacts. They do not require an environmental and social assessment. Beyond categorization, no action is required.
- ✓ **Category 4:** Projects which involve Bank lending to financial intermediaries that on-lend or invest in subprojects that may produce adverse environmental and social impacts

The Proposed Project component will trigger this safeguard. The Project is Category 1 due to the interaction with the physical, biological and social setting within the immediate surroundings. It also leads to resettlement.

5.4.3 OS 2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation.

This safeguard consolidates the policy commitments and requirements set out in the Bank's policy on involuntary resettlement, and incorporates a number of refinements designed to improve the operational effectiveness of those requirements. In particular, the OS embraces comprehensive and forward-looking notions of livelihood and assets, to account for their social and cultural dimensions, as well as their economic ones. It also adopts a progressive understanding of community and common property that emphasizes the crucial need to maintain social cohesion, community structures and the social inter- linkages that common property provides.

The Proposed Project will utilize existing road reserves and riparian land for trunk and reticulation sewers as much as possible. However, the STP proposed site and sections of trunk and laterals are on private owned and would be acquired prior to commencement of work. This policy is therefore triggered.

5.4.4 OS 3: Biodiversity and ecosystem services

This safeguard aims to conserve biological diversity and promote the sustainable use of natural resources. It also translates the commitments in the Bank's policy on integrated water resources management into operational requirements. It reflects the importance of biodiversity in the African continent and the value to the population of key ecosystems. Its content has benefited from recent joint work among the MDBs to improve their approach to assessing how the potential impacts of projects on different types of habitats can be avoided, minimized or offset.

Project activities have no direct linkage to biological diversity and ecosystem services. OS 3 shall be applied in isolated minor cases of biodiversity and ecosystem services.

5.4.5 OS 4: Pollution prevention and control, hazardous materials and resource efficiency.

This safeguard covers the range of key impacts of pollution, waste, and hazardous materials for which there are agreed international conventions, as well as comprehensive industry-specific and regional standards, including greenhouse gas accounting, that other multilateral development banks follow. It also introduces a GHG emission threshold for projects to trigger a detailed analysis of feasible reduction or offset measures and reporting on emission levels. Borrowers or clients are required to consider measures to improve 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. Project activities shall not result to significant amount of greenhouse gases. The EMSP has proposed measures of ensuring that any greenhouse gas generated shall be collected and flared appropriately. The project triggers OS 4.

5.4.6 OS 5: Labour conditions, health and safety

This safeguard establishes the Bank's requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation. It also ensures greater harmonization with most other multilateral development. It also covers workers' organizations, and avoidance of child or forced labour and occupational health and safety.

The Project shall involve workers both during construction and operation phases of the project. This policy reads together with OSHA 2007 and IFC Performance Standards. Labour and Working Conditions shall form integral instruments to be used in ensuring that health, safety and working conditions of both workers and community is maintained. The project triggers OS 5.

The following table summarizes the project activities checked against the operational safeguards, and how the project activities are likely to trigger each of the operational safeguards.

Table 5-3: Project Activities Triggering AfDB Operational Safeguards

Policy	Criteria in the Project	Discussions
OS 1: Environmental and Social Assessment.	Yes	Applicable : The Project components will trigger EA safeguards and is Category 1 due to the interaction with the physical, biological and social setting within the immediate surroundings
OS 2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation	Yes	Applicable: The Project shall be constructed within existing public land, road reserves and river riparian, however, isolated cases on encroachment to public land was identified which implies that RAP has to be prepared as part of this assessment. In some cases sections of private land shall be acquired along the pipeline route as well the site for construction of the pumping stations whereby 2 acres will be acquired.
OS 3: Biodiversity and Ecosystem Services.	No	Not Applicable : Project activities have no direct linkage to biological diversity and ecosystem services OS 1 shall be applied in isolated minor cases of biodiversity and ecosystem services.
OS 4: Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency	Yes	Applicable: The Projects shall utilize raw materials both during construction and operation phase that could result to pollution of biophysical environment if not handled appropriately. Project activities shall not result to significant amount of greenhouse gases, EMSP has proposed measures of ensuring that methane gas generated from the anaerobic ponds is collected and flared appropriately The Project design has ensured that the both clean water and sewer flows through the distribution lines by gravity hence reducing the need for pumping

Policy	Criteria in the Project	Discussions
OS 5: Labour Conditions, Health and Safety.	Yes	Applicable: The Project shall involve workers both during construction and operation phases of the project. this policy read together with OSHA 2007 and IFC Performance Standards 2 on Labour and Working Conditions shall form integral instruments to be used in ensuring that health, safety and working conditions of both works and community is safeguards

CHAPTER 6 STAKEHOLDER CONSULTATION

6.1 Introduction

Public consultation is useful for gathering environmental data, understanding likely impacts, determining community and individual preferences, selecting project alternatives and designing viable and sustainable mitigation and compensation plans.

Public consultation process for the Project took place at the scoping stage and the ESIA stage. The main objective for the consultation process was to involve the community at the very early stages so as to identify likely negative impacts and find ways to minimize negative impacts and enhance positive impacts of the project.

6.2 AfDB Operational Safeguard 1 – Environmental and social assessment

The AfDB Environmental and Social Assessment safeguard policy, provides for stakeholders' participation during the consultation process so that affected communities and stakeholders have timely access to information in suitable forms about the Bank operations, and are consulted meaningfully about issues that may affect them. In line with this, the ESIA for the project is mandatory and it is regulated in line with the Banks policy OS 1.

6.3 Benefits of Public Consultation

6.3.1 Benefit to the Developer

- The developer is likely to benefit from local knowledge
- Costs may be saved as key issues are identified by the public and studies are focused on key issues as opposed to a broad range of issues;
- Measures to reduce adverse impacts and enhance benefits will be identified with stakeholders;
- Relations with the communities in the vicinity of the development are likely to be improved;
- Delays in decision making may be reduced because of good participation early in the process;
- The public are unlikely to raise objections to the project; and

- The developer's image and reputation is likely to be enhanced.

6.3.2 Benefit to Public

- Capacity is built through people playing an active role during the process. The skills learnt can be used in other community projects;
- Public rights are exercised and protected in participating; and
- Inputs are likely to influence the form and nature of the development and are likely to lead to better development that takes society's needs into account.

6.3.3 Benefit to Decision Makers

- Public participation is likely to improve decisions since there is access to a broader range of perspectives and opinion on the proposed rehabilitation/augmentation;
- The development is likely to be more sustainable as it takes people's needs and views into account; and
- The legitimacy of project commencement and implementation is likely to be improved.

6.3.4 Approach to Public Participation and Consultation

The Public consultation process involved visiting the project area and its environs. Project stakeholders were identified and consulted with the aim of informing them about the proposed project, collect their views on anticipated positive and/or negative impacts, get recommendations on how the adverse impacts can be mitigated or avoided, and gather local knowledge that would be useful to the proposed project.

6.3.5 Aims and Objectives of Stakeholders Consultation and Public Participation (CPP)

The aims and objectives of public involvement and consultation include:

- Informing stakeholders and members of public
- Gaining their views, concerns and values
- Taking account of public inputs in decision making
- Influencing project design
- Obtaining local knowledge
- Increasing public confidence

- Improving transparency and accountability in decision making
- Reducing conflict in the community

6.4 Stakeholder and Public Consultation

The main Key informants targeted in the consultations were both Government and private Institutions operating within the project area. Listening to stakeholder concerns and feedback is a valuable source of information that can improve project design and outcomes and help in identifying any impacts. Consultations and interviews are still in progress with various stakeholders in the proposed project areas. The stakeholders were grouped into Primary and Secondary groups as shown in the Table 6-1 below

Table 6-1: Stakeholder Categories

No.	Name	Category
Primary Stakeholders		
	GATAWSCO, MUSWASCO & MWEWASCO	Water Service Provider
	Kenya Forest Service-County Forest Conservator	Kenya Forest Service
	National Government Administrative Office Deputy County Commissioners (DCC), Chiefs/ Assistant chiefs	National Government
	Murang'a County Government, Ward Administrator	County Government
	Kigumo Sub- County Officials	Sub- County
	Water Resources Authority	Water Regulatory Body
	Water Resource Users Association	Water Regulatory Body
	Public Health Officer	National Government

	Village Elders	Community Representatives
	Area Residents	Community
	Community Groups	Community
Secondary Stakeholders		
	Physical Planning Officer	National/County Government Agencies and Ministries
	Sub-county Lands Registrar	

The key stakeholders included the Chiefs, DCCs and ACCS, Public sensitization meetings were held within the project area between February 13 2024 to February 15 2024 with the help of the respective local administration more so the area chiefs and assistant chiefs. A total of 3 meetings were held as shown in Table 6-1 below. The attendance lists and minutes of meetings are presented in Annex 3. Interviews using standard questionnaires were also conducted (sample-filled questionnaires Annex 5). A Grievance Redress Mechanism has been formulated and is attached at Annex 4.

Table 6-2: Summary of Public Meetings Held

No.	Date	Venue	Location	No. of Participants
1.	13.02.2024	Kiriani-Ndunyu Chege	Gatanga- Thithi	16
2.	14.02.2024	Kiawahiga Grounds	Gatanga -Kiawahiga	38
3.	15.02.2024	Chomo Grounds	Gatanga-Chomo	15
4.	26.02.2024	Mariira Farm	Mariira- Kigumo	19
5.	04.03.2024	Gwa Kibugi	Mariira - Kigumo	40

The following stakeholders were present in the meetings;

- Area chiefs
- Area assistant chiefs
- Village Elders
- Area Residents

6.4.1 Summary of Comments and Responses from the Public Sensitization Meetings and KII Meetings

Tables below present comments/ concerns that were raised during the public meetings and the responses that were given.

Table 6-3: Comments/ concerns raised during public meetings and the responses given

Location	Comments	Response
Kiriani-Ndunyu Chege	The community members inquired whether the community members affected will be compensated	Consultant representative, emphasized to the participants that PAPs (Project Affected Persons) facing land disruption due to the construction of Intake and treatment works would be duly compensated. Nevertheless, he specified that individuals situated within riparian areas and engaged in farming activities would solely be eligible for compensation pertaining to the crops affected, with no provision for land compensation.
	The Community members inquired how will the riparian be established from the river.	The Consultant representative, responded to the community members' query regarding the establishment of riparian

		boundaries from the river. He explained that the Water Resources Authority (WRA) oversees all matters concerning rivers. According to WRA protocols, riparian zones are determined based on the size of the river, with assistance from hydrologists who assess various factors to establish the boundaries
	The community members wanted to know whether they will still draw water from the river.	The consultant conveyed to the attendees that they would still be permitted to draw water from the area, albeit from a distance away from the newly constructed Intake.
	The community inquired on when the Project will commence	The consultant stated that the commencement date of the project would be communicated once all the necessary documentation and approvals from the Government have been cleared
	The community inquired on how much they will be paid and the compensation channels that will be used	The consultant stated that the valuation of the affected lands would be carried out by the National Land Commissioners, aligning with current market prices. Subsequently, negotiations and agreements regarding compensation would be reached with the Project Affected Persons (PAPs).

		The community members recommended for continuous public participation in future, this would help to continuously get opinions from the community members and ensure the success of the Project
Kiawahiga	The community members enquired whether the Project will supply sufficient water to the Residents of Kiawahiga	The consultant articulated that the project's objective is to enhance water supply in the area by building a Water storage tank and increasing the water intake.
	The community members enquired about the water charges	Gatanga Water and Sanitation officials communicated that upon the completion of the project, residents are encouraged to visit the Gatanga Water and Sanitation Company to gain information about the applicable charges. He further clarified that these charges constitute a modest percentage relative to the amount of water consumed
	The community members wanted to know whether the Project will affect private land	The Consultant stated that the water lines will be constructed in road existing wayleaves and the PAPs that will be affected at the intakes and water treatment works will be eligible for compensation
Chomo grounds	The community members asked whether the residents of Chomo	The consultant clarified that the project's scope encompasses the

	will be provided with water by the Project	construction of water lines from Chomo intake, the water will benefit the residents of Chomo.
	The community members wanted to know whether the youths of Chomo will be considered for employment during the Project implementation Phase	The consultant explained that the in line with the Labor laws the local residents should be given a 70% stake in employment opportunities.
	The community members wanted to know whether the Project will provide water for irrigation	The consultant explained that, the project was not allocated for irrigation but rather providing clean and adequate water for drinking.
	The community wanted to know what measures will be put in place to prevent water pipe bursts.	The consultant stated that will be used for waterlines construction will be HDPE, which are prone to bursts.
Mariira Farm & Wa Kibugi	The Community requested for an explanation on rehabilitation and what it entails	The Consultant explained to the meeting that rehabilitation is majorly replacing damaged water infrastructure. This includes water pipes. The water pipes are damaged due to the roots.
	The Community was in agreement that they are the main causes of pipes damage by the roots.	The Consultant stated that people need to take good care of the existing water pipes. This includes no construction of permanent structures and no planting of trees on the land above the water lines. Residents need to adhere to the

		measures to ensure they get water and to protect the infrastructure.
	The Community inquired on quality of water pipes to be laid. The existing water pipes block easily due to waste collected from the intake works at Chathanda.	The Assistant Engineer informed the residents that the proposed water pipes would last for 25 years and the pipes would not block.
	The Community requested for provision of work to the residents.	The Sociologist informed the resident that the local community would be the ones to provide the unskilled labour and will be recruited through the Chief's office.

6.4.2 Photo log

Below are the Photographs taken during the preceding of the meetings and land owners engagements

Meeting in progress with Administration, Consultant, GATAWASCO and village elders at Ndunyu-Chege.

Meeting in progress with Administration, GATAWASCO and Consultant at Ndunyu-Chege.

 Meeting in progress with Administration, Consultant, GATAWASCO and village elders at Chomo.	 Meeting in progress with Administration, Consultant, GATAWASCO and village elders at Chomo.
 Meeting in progress with Administration, Consultant, GATAWASCO and village elders at Kiawahiga.	 Meeting in progress with Administration, Consultant, GATAWASCO and village elders at Kiawahiga.

Meeting in progress at Mariira Farm with Administration, Consultant, MUSWASCO, Mariira School administration and residents

Meeting in progress at Mariira Farm with Administration, Consultant, MUSWASCO, Mariira School administration and residents

Meeting in progress at Gwa – Kibugi Mariira with local Administration, Consultant, MUSWASCO and residents

Meeting in progress at Gwa – Kibugi Mariira with local Administration, Consultant, MUSWASCO and residents

Consultations and engagements with PAP for Weithaga tank by Consultant and MWEWASCO

PAP during consultation at Kawariua tank by Consultant and MWEWASCO

Figure 6-1: Public participation meetings and PAP engagement meetings

Source Consultant taken on dates from February 13 2024 to March 07 2024

6.4.3 Interviews

A structured questionnaire was also administered to solicit views regarding the project as well as its design. The respondents included;

- Deputy County Commissioners (DCC), Chiefs/ Assistant chiefs
- Ward Administrator
- Village Elders
- Area Residents
- Community Groups (Community water users)

The questionnaire initially gave introduction and created awareness to the respondents regarding the project. Afterwards, questionnaire enquired on acceptance of the project and rating of the current water supply and anticipated negative impacts and suggested mitigation measures as well as any suggestions and recommendations. The questionnaire had a total of 10No. of respondent's representation 100% response rate.

Below is a summary of the analysis.

a) Status of Water

Majority (56%) of the respondents indicated that the water status in the areas was fair, thirty three percent (33%) stated that the status of water in the areas was poor while the rest (11%) stated that the water status was good. The distribution is shown in the figure below.

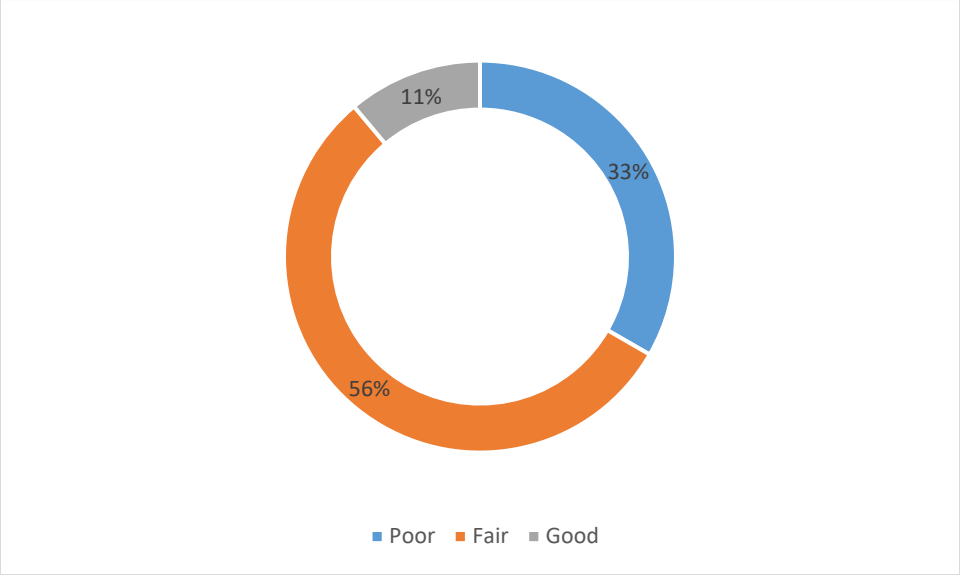


Figure 6-2: Status of Water

b) Status of Sanitation

Majority (95%) of the respondents showed that the sanitation status in the area was poor, five percent (5%) stated that the status of sanitation in the Proposed Project was fair while none of the respondent stated that the water status was good. The distribution is shown in the figure below.

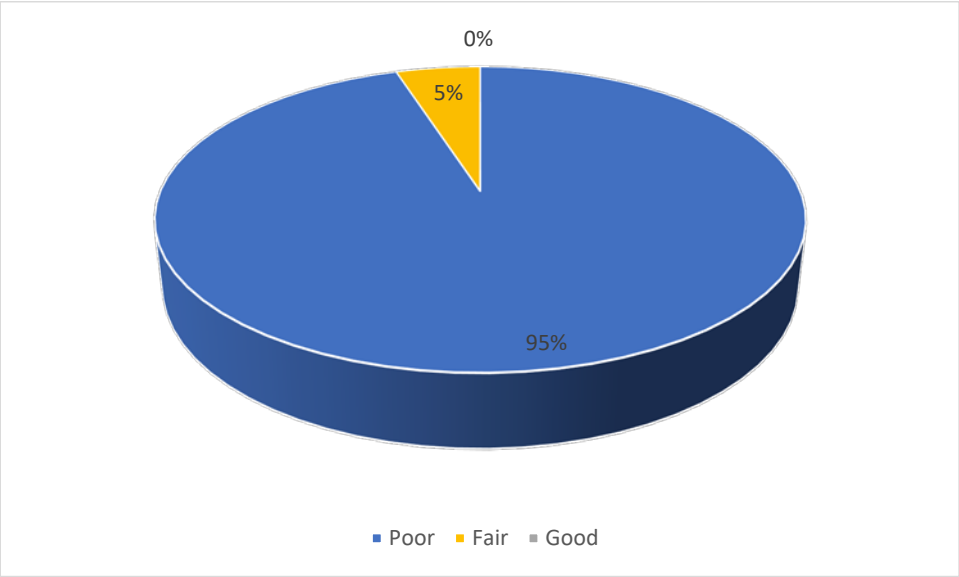


Figure 6-3: Status of Sanitation

c) Anticipated Positive impacts;

A significance portion of twenty-six percent (26%) of the questionnaires highlighted that the Project would not only ensure clean and sufficient water but also create employment opportunities for the Project area residents. Approximately a quarter (20%) of the responses emphasized the anticipated enhancement of sanitation in the area due to the project. A minority (8%) of the respondents suggested that the Project could have a positive impact on the local economy, as money circulates from employment and food vending around the Project area. Similarly, a small fraction (8%) believed that the Project might contribute to reducing waterborne diseases like Diarrhoea. The distribution is shown in the figure below.

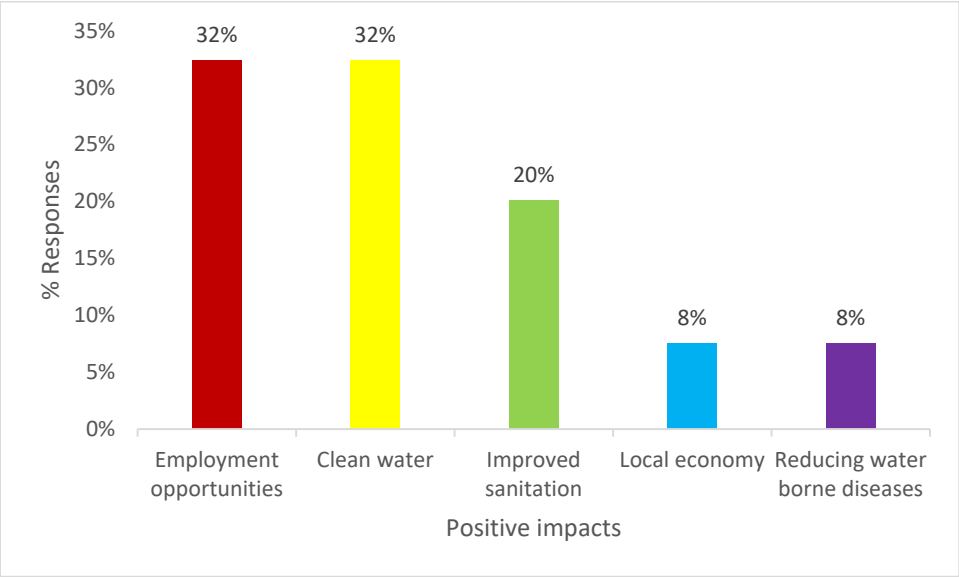


Figure 6-4: Positive Impacts

d) Anticipated Negative Impacts

Fifty percent (50%) of the respondent said that blockage of water pipes was the major challenge. Additionally, twelve percent (12%) respondents highlighted concerns about the failure to compensate for the impact on business that will be affected during Project Implementation, ten percent (10%) of the respondents expressed worries regarding the size of pipe used for the water pipes leading to blockages. Twenty-eight (28%) respondents did not identify any negative impacts. The distribution of these findings is illustrated in the figure provided below.

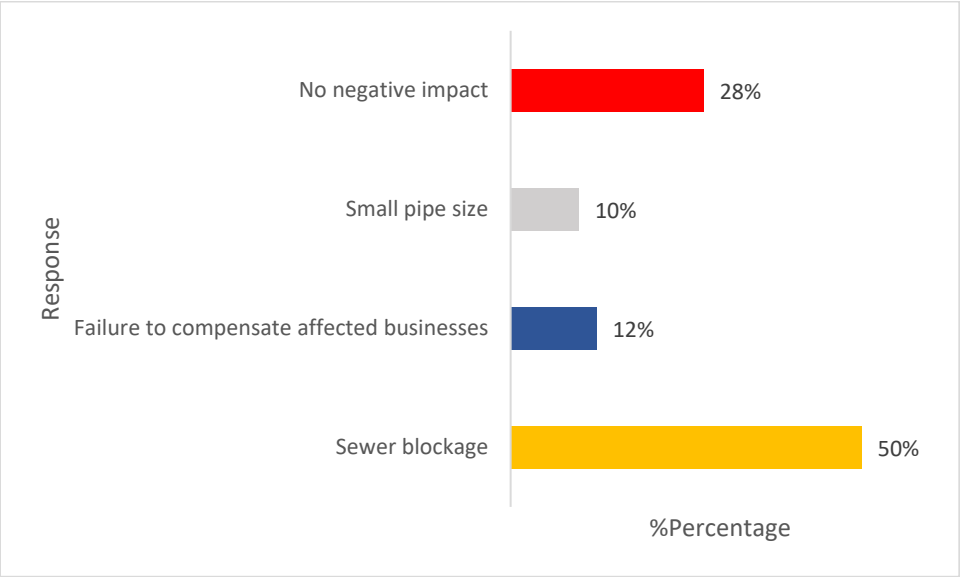


Figure 6-5: Negative Impacts

e) Mitigation measures for the negative impacts

For addressing the concerns raised by the respondents, the following mitigation measures can be considered:

1. **Compensation for affected land parcels:**
   - Develop a transparent and fair compensation mechanism in consultation with affected landowners and relevant authorities.
   - Establish clear communication channels to address concerns and grievances related to compensation promptly.
   - Conduct regular meetings with stakeholders to ensure that their concerns are heard and addressed adequately.
2. **Non-Identification of Negative Impacts:**
   - Continue engaging with the Key Informant Interviews who did not identify any negative impacts to ensure their perspectives are consistently taken into account.
   - Monitor the situation and gather ongoing feedback from these interviewees to proactively address any emerging concerns.

These mitigation measures aim to address the specific concerns identified during the residents who participated in the public participation meeting and create a more positive and effective environment for the implementation of the Project.

f) Project Support and Awareness

Every respondent acknowledged their awareness of the water and sanitation Project and expressed their commitment to supporting the Project throughout its implementation phase.

The implementation of the project received unanimous support from all the residents. The analysis is shown in the figure below;

Figure 6-6: Project Support and awareness

Recommendations

All the respondents expressed a positive perspective on the Project, emphasizing its positive impact on the water and sanitation situation in the Project area.

CHAPTER 7 ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT AND MITIGATION MEASURES

7.1 Introduction

This chapter identifies the potential environmental impacts as a result of the proposed project. Once the potential impacts of the proposed project were identified, the team went further to predict the nature of the impacts. Predictions are normally based on explicit assumptions about environmental processes, professional judgment and different value judgments expressed by various stakeholders during consultations. Determination of the significance of the potential impacts was based on the three broad categories of determining impact significance. Environmental impacts manifest at all stages of a project. This is because of the different project activities that inform particular actions which in turn act on environmental factors. The significance of these impacts is also varied. Impacts are categorized into;

- Impacts on biophysical environment;
- Health and safety impacts; and
- Social-economic impacts.

7.2 Definition and Classification of Environmental Impact

An environmental or social impact is any change to the existing condition of the environment caused by human activity or an external influence. Impacts may be:

- Positive (beneficial) or negative (adverse);
- Direct or indirect, long-term or short-term in duration, and widespread or local in the extent of their effect.

Impacts are termed cumulative when they add incrementally to existing impacts. In the case of the Project, potential environmental impacts would arise during the construction and operation phases of the Project and at both stages positive and negative impacts would occur.

7.3 Impact Significance

The purpose of this ESIA Comprehensive Project Report (CPR)is to identify the significant impacts related to the project under consideration and then to determine the appropriate means to avoid or mitigate those which are negative. Significant impacts are defined, not necessarily in order of importance, as being those which:

- Relate to protected areas or to historically and culturally important areas;
- Area of public concern and importance.
- Trigger subsequent secondary impacts.
- Elevate the risk to life threatening circumstances.
- Affect sensitive environmental factors and parameters.

7.4 Impact Scoring and Rating Criteria

Precautionary principle was used to establish the significance of impacts and their management and mitigation i.e., where there is uncertainty or insufficient information, the Environmentalist opted to err on the side of caution.

		Likelihood				
		1 Rare	2 Unlikely	3 Possible	4 Likely	5 Almost Certain
Consequences	5 Catastrophic	5 Moderate	10 High	15 Extreme	20 Extreme	25 Extreme
	4 Major	4 Moderate	8 High	12 High	16 Extreme	20 Extreme
	3 Moderate	3 Low	6 Moderate	9 High	12 High	15 Extreme
	2 Minor	2 Low	2 Moderate	6 Moderate	8 High	10 High
	1 Negligible	1 Low	2 Low	3 Low	4 Moderate	5 Moderate

Figure 7-1: Impact Scoring and Rating Criteria

7.5 Pre-construction phase positive impacts

7.5.1 Documentation and publicity

The project area will benefit significantly in terms of the intensive information gathering during the pre-project feasibility study and the pre-project EIA which will generate useful reports that will create important reference points for the area both for scientific research and planning activities.

7.5.2 Employment

Employment opportunities will be created in the construction of camp sites by the contractor

7.6 Pre-Construction Phase Negative impacts

7.6.1 Influx of workers from other areas

The project area might experience an influx of construction workers from other areas.

Mitigation Measures:

- Effective community engagement and strong grievance mechanisms on matters related to labor

7.7 Construction Phase Positive Impacts

The following are the positive impacts during construction phase of the proposed Project:

7.7.1 Employment opportunities

The implementation of the proposed Project will create job opportunities for both skilled and unskilled workers, leading to improved living standards through increased earnings. The workforce will comprise casual labourers, plumbers, and engineers who will be engaged on-site for a specific duration. Additionally, semi-skilled, unskilled labourers, and formal employees will also find gainful employment during the construction phase. The adoption of labour-intensive construction techniques will not only provide employment opportunities for the youth but also align with the government's initiatives aimed at job creation.

7.7.2 Creation of Wealth

The proposed development brings many opportunities in investment and procurement where the youth and people of Murang'a can compete to provide different goods and services to the proponent during construction of the distribution pipelines. This in turn creates opportunities for entrepreneurship and wealth creation for the residents. The construction phase will attract temporary business such as food vendors who will benefit from the trade by selling the food to the construction workers. This will improve their living standards from their earnings**.**

7.7.3 Creation of a market for construction materials

The project will require materials, some of which will be sourced locally and some internationally. These include plant steel and plastic pipes, valves, cement, sand, hardcore and chemicals. This will provide a ready market for suppliers in and outside the project area.

7.7.4 Increased local incomes

The local community may get extra income from the sale of construction materials from their firms and also renting spaces for camp sites.

7.7.5 Economic growth

Through the use of locally available materials during the construction phase for example pipes and others; the project will contribute towards growth of the country 's economy by contributing to the gross domestic product. The consumption of these materials, oil, fuel and others will attract taxes.

7.7.6 Injection of money into the local economy

A large sum of the Project money shall be released into the local economy due to the construction activities. It is envisaged that during construction a large number of downstream activities shall take place including but not limited to the following:

- Payments for skilled and unskilled labour;
- Purchases of construction materials; and
- Payments for local provisions including fuel, foods and accommodation.

7.8 Construction Phase Negative impacts

7.8.1 Noise & vibration

The site preparation and construction phases of the development may likely have the most negative impact to the ambient noise and vibration in the development area. A number of measures may be undertaken by the Contractors to reduce the impact of noise on the existing and potential residents as well as the workers involved in the project. This is temporary, however, and the aim at this point is to make the increase in noise minimal as possible until this phase is complete. The cumulative impact of the construction activities occurring simultaneously may increase the noise and vibration levels in the area significantly.

Mitigation Measures:

- A baseline survey to evaluate noise levels shall be conducted to guide if there is future need for monitoring
- Where possible silenced machinery and instruments should be employed to reduce the impact of noise on the existing residents and workers.

- Machinery, vehicles and instruments that emit high levels of noise should be used on a phased basis to reduce the overall impact. These pieces of equipment such as drills, graders and cement mixers should also be used when the least number of residents can be expected to be affected, for example during periods where most residents are at work or school.
- Construction hours should be limited to the hours of 8:00 a.m. and 6:00 p.m. daily.
- The delivery of raw materials must be limited to 8:00 a.m. and 6:00 p.m. daily.
- Provision of appropriate personnel protective equipment to the workers.

7.8.2 Air pollution and Dust Emissions

Dust will be emitted during excavation and related earthworks. Air borne particulate matter pollution is likely to occur during the route clearance, excavation and during the transport of construction materials. This is likely to affect site workers and the residents, in extreme situations leading to respiratory problems.

Mitigation Measures:

- Wet all active construction areas as and when necessary to lay dust;
- A baseline survey to evaluate air quality in the project areas shall be conducted to guide if there is future need for monitoring
- Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles,
- Ensure that all trucks carrying aggregate and sand are covered during delivery to the site.
- Earth moving be done under dump conditions as much as possible to prevent emission of dust into the air.
- Strict measures are to be applied for the handling of construction materials in powder form such as cement, lime, concrete additives, etc. and for the disposal of the packaging
- Excavation, handling and transport of erodible materials shall be avoided under high wind conditions or when a visible dust plume is present.
- Minimizing the number of motorized vehicles on use;

7.8.3 Vegetation Clearing, Soil Erosion and Sedimentation

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) and soil quality degradation is also likely to occur during construction as a result of disposal of construction materials on the adjacent lands. It is worth noting that the potential significant impact on flora in the area will be short term and reversible. No rare, threatened, critically endangered or endemic plant or animal species were observed.

Mitigation Measures

- Only clear vegetation that is absolutely necessary for the construction activities;
- Retain all mature trees (> 25 cm diameter at breast height during this phase of the development if possible;
- Avoid the use of Invasive Alien Species in the landscaping activities
- Determine access roads which are to be used by machinery in the construction and site clearance phase of the development to avoid the unnecessary trampling of vegetation that will be maintained within the development area.
- 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;
- Re-vegetation of exposed areas around the site should be carried out rapidly in order to mitigate against erosion of soil through surface water runoff and wind erosion.

7.8.4 Solid Waste Generation

Solid waste generated during construction include papers used for packing, plastics, cuttings and trimmings off materials among others. Dumping around the site will interfere with the aesthetic status on the surrounding environment. This impact is short term. However, the disposal mechanism of the waste can have long term consequences. It is expected that the Contractor should ensure full compliance with the EMCA Waste Management Regulations of 2006 as well as the following measures: -

Mitigation measures

- All solid waste will be collected at a central location at each site and will be stored temporarily until removal to an NEMA designated disposal site in the vicinity of the site.

- No dumping within the surrounding area is to be permitted. Where potentially hazardous substances are being disposed of, a chain of custody document should be kept with the environmental register as proof of final disposal.
- Waste generated at the site should be segregated and disposed of in NEMA designated dumping site
- Wherever possible reusing and recycling should be carried out.
- A site waste management plan should be prepared by the contractor prior to commencement of construction works. This should include designation of appropriate waste storage areas, collection and removal schedule and identification of approved disposal site;
- Proper solid waste receptacles and storage containers should be provided, particularly for the disposal of lunch and drink boxes so as to prevent littering of the site.

7.8.5 Occupational safety and health impacts

Labour camps including workers' living and eating areas; grounds where equipment will be stored and serviced; and where construction materials will be stockpiled is likely to bring a temporary influx of migrant workers. This may stimulate business in the project area and also propagate the spread of STI's including, HIV/AIDS. There could also be cases of unwanted pregnancies as the migrant workers interact and get into relationships with the local communities. Local services such as medical, water supplies sanitation and waste disposal can be over stretched by the sudden increase in population. Improper sanitation arrangements at the camps can cause contamination of groundwater and pose a major health hazard, and outbreaks of diseases such as diarrhoea, cholera and typhoid.

Mitigation measures

Minimizing spread of the HIV/AIDS and other STI's due to the presence of migrant workers is meant to reduce the increase of HIV among the host community and among the project workers. The following measures should be put in place

7.8.6 Site Related Oil Spills

During construction, oil spills may result from construction site equipment and storage, which may affect the flora, fauna, soils, and surface as well as underground water ways in the area after being swept by rain water into water courses and seeping into the soil.

If the machinery yard, workshops and labour camps are not properly protected, the roaming animals and birds could be poisoned if they drink contaminated water caused by accidental spillage of oil, petroleum products, solvents and similar category of materials.

Mitigation measures

- The Contractor should ensure that the employees on site are aware of the company procedures for dealing with spills and leaks e.g. using dispersants or adding biological agents to speed up the oil breakdown for the construction machinery though induction and safety training (the contractor will propose a method of clean-up which will be subject to approval);
- All vehicles and equipment should be kept in good working order, serviced regularly in accordance to the manufacturers specifications and stored in an area approved by the Resident Engineer/Supervising Consultant;
- Ensure spill kits are provided at the construction sites
- Ensure fuels, oils, lubricants and chemicals are stored are stored in impermeable containers and away from surface drains

7.8.7 Soil Related Impacts

Accidental oil spills, and petroleum products (amongst other liquid waste) particularly in areas of concentrated activities, may infiltrate into soils and cause soil pollution. This is only possible during the construction phase of the project and the impact is expected to be minor and highly localized, hence the impact is considered insignificant.

All construction activities have some minor impacts on the soil. It is expected that these impacts are also short-lived during construction and mitigation measures are recommended. The key impacts will revolve around soil erosion, contamination, disturbance of the natural soil structure and thus reducing the ecological function of the soil

Mitigation measures

- The valuable top soil containing organic material, nutrients as well as seeds and the soil fauna should be excavated separately and piled in an adequate manner for re-use where applicable.
- Minimise compaction during stockpiling by working with the soil in a dry state. The stockpiling should be done in specific locations subject to the engineer's approval.

- Plan emergency response measures in case of accidental oil spills.
- In cases where it is identified that during construction there is a danger of increased run-off or at the project site, drainage channels with stone pitching or holding ponds can be employed
- After completion of the construction works, restoration of the ground by sowing adequate grass cover and planting of trees will be followed, therefore the impact is temporary and reversible.
- In areas prone to erosion, provision of soil stabilization in form of a retaining wall or planting of trees, subject to approval by the Resident Engineer

7.8.8 Impact on Existing Water Resources (Water Quality)

Oil spills, bitumen and grease generation by construction traffic as well as traffic during operation could lead to pollution by altering the chemical and biological characteristics of surface and ground water resources. This may occur when spilled compounds are swept by rain water from the construction sites, traffic routes and contractor's camp and into water courses.

There is potential for contamination of water resources as a result of improper disposal of liquid and solid waste from construction activities and construction camps. The impacts on water sources are therefore expected to be minimal.

Mitigation measure

- Areas dedicated for hazardous material storage shall provide spill containment and facilitate clean up through measures such as: maximum separation from sensitive features (water bodies); clear identification of the materials present; access restricted to authorized personnel and vehicles only and dedicated spill response equipment
- Provide solid and liquid waste disposal system - a waste collector, NEMA recommended waste disposal manual and a waste collection bin for each housing unit, workshop, plant, structural shelter.
- Ensure fuels, oils, lubricants and chemicals are stored are stored in impermeable containers and away from surface drains
- Ensure that the machines are serviced in specific locations off-site to avoid spillage of oils and grease into the surface runoff channels.

7.8.9 Fire outbreak

Fire outbreak in the construction camp or in the machinery being used is always a risk. This is because there are flammable substances in use. Depending on the severity, fire can cause loss of life, disability, or property damage. Thus, precautions are necessary.

Mitigation measures

- Label all inflammable materials and store them appropriately
- Provision of adequate firefighting equipment capable of fighting all classes of fire
- Put — 'No Smoking' Signs in areas where inflammable are stored
- Train workers on the use of firefighting equipment

7.9 Social conflicts and community risks

7.9.1 Demolition of Structures and Loss of livelihood

There is a likelihood of displacement of trading activities at the proposed distribution route. As structures will be removed to allow for excavation, pipe laying and backfilling hence displacement will occur and steps have to be taken to minimise the impacts of the demolition of the structures and to provide for the restoration of livelihoods.

Mitigation Measure

- Implement RAP before commencement of civil works at the affected sites
- Limit damage to property by observing construction area limits
- The contractor to communicate with the owners of the potential structures to be demolished that are within the project sites.
- Ensure that solid waste generated from the demolitions is properly disposed to suitable locations.
- Provide training, skills development, work experience, and employment opportunities, with first preference being extended to project-affected persons.
- Consult local and higher-level government officers in the implementation of the RAP and its monitoring.
- Coordinate closely with local and higher levels of government. Many aspects of livelihood restoration overlap with responsibilities of government, and interaction with government is key.

- Train affected persons in skills that relate to real opportunities outside of the employment provided on the construction sites. This is a transitional support measure not a sustainable livelihood activity. It is meant to equip affected person with skills beyond the temporary construction jobs provided by the project

7.9.2 Liability for loss of life, injury to private property

Some of the Construction activities may lead to accidents that may be mild or fatal depending on various factors. During the implementation of the proposed project, accidents could be due to negligence on part of the workers, machine failure or breakdown or accidental falls from elevated points of the structure. These incidents can be reduced through proper work safety procedures.

In addition, during Construction, there may be damage to private property that may not be foreseen.

Mitigation Measure

- Develop a site safety action plan detailing safety equipment to be used, emergency procedures, restriction on site, frequency and personnel responsible for safety inspections and controls.
- Provision of requisite PPE as established from risk assessment in the safety action plan and enforcing their usage.
- The workers should receive requisite training especially on the operation of the machinery and equipment.
- There should be adequate warning and directional signs.
- Ensuring that the prepared code of conduct for staff is followed to prevent accidents.
- Provide First Aid Kit within the construction sites and ensure that at any moment during the works, there is a trained first aider on site. The ration of trained first aiders to worker will be as per defined by the OSHA First Aid Rules.
- Recording of all injuries that occur on site in the incident register, corrective actions for their prevention are instigated as appropriate.
- Contractor to ensure compliance with the Workmen's Compensation Act, ordinance regulations and union agreements and maintain insurance cover throughout the construction period.

- The Contractor to promptly repair any damage done to private property.
- Limit damage to property by observing construction area limits by clear demarcation

7.9.3 Spread of HIV and AIDS

Big projects like the proposed sanitation project do attract migrant workers. These men and women away from their partners can get into sexual liaisons with the host community. Thus, being exposed to HIV/AIDS and other sexually transmitted infections.

Mitigation measures:

- Develop HIV/AIDS awareness programs or initiatives to target the construction workers, community, institutions and the general members of the community, particularly the youth; with the objective of reducing the risks of exposure and the spread of HIV/AIDS within the project area.
- Sensitize the migrant workers on risky sexual behaviour.
- Provide VCT services on site and encourage workers to undergo the same.
- Provision of protective devices such as condoms.
- Maximize hiring skilled and unskilled workers from the host community

7.9.4 Disturbance of traffic and difficulty of access

The main impact on road traffic will be during possible laying of water lines along, or across main roads. Longitudinal excavation will cause narrowing of the road for relatively long periods, while lateral crossing of roads may cause blocking of the road but for a relatively short period, probably few hours. Excavation in residential areas will cause access problems to pedestrians, and possibly to riders of bicycles and motorcycles. This access difficulty will have more impact on elderly people, handicapped and children, who may accidentally fall in open trenches or make tedious long cycles before they reach their targeted locations.

Mitigation measures

- Provide diversion routes where possible.
- Give a construction itinerary in advance so that the potentially affected population can use alternative routes and start early to get to their destinations on time.
- Erect warning signs of on-going works.

- Expedite construction works so as to reduce the times where roads are blocked.
- Traffic department should approve crossing plan prior to construction, and should approve obstruction times during construction.
- Access of residents should be facilitated by installing appropriate temporary bridges over trenches.
- Suitable warning signs should be placed at near locations and should be visible at night.
- A guard should be available 24 hours to help people access across excavated trenches.
- Alternatives access ways should be communicated to the community.

7.9.5 Interruption of existing installations on the specified construction sites

There are various installations which cross on the project sites, among them are underground utilities e.g. electricity, telephone links, data cables and water distribution lines.

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

Mitigation Measures:

Formal request for permission should be sought and the relevant institutions such as Kenya Power, data network companies and WSPS;

- Ensure dissemination of relevant information to each of the affected parties;
- A work plan with clear responsibilities for each party should be developed to ensure smooth execution of the construction.

7.9.6 Labour influx

Large construction projects often require labour force and associated goods and services cannot be fully supplied locally for reasons such as worker unavailability and lack of technical skills and capacity. In such cases, the labour force (total or partial) needs to be brought in from outside the project area. This influx is compounded by an influx of other people who follow the incoming workforce with the aim of selling them goods and services, or in pursuit of job or business opportunities. The influx of workers can have adverse social and environmental impacts on local communities, particularly if the communities are rural, remote or small.

Adverse effects include;

- Increased demand and competition for local social and health services, as well as for goods and services, which can lead to price hikes and crowding out of local consumers.
- Increased volume of traffic and higher risk of accidents
- Higher demands on the ecosystem and natural resources
- Increased risk of spread of communicable diseases
- Increase in illicit behaviour and crime.
- Social conflicts within and between communities

Mitigation measures

- Reduce labour influx by tapping into the local workforce. Depending on the size and the skill level of the local workforce, a share of the workers required for the project may be recruited locally. This may be easier for unskilled workmen. Specialised workmen may be hired from elsewhere. Local workers may also be trained especially if they are required for the operation of the project.
- Effective contractual obligations for the contractor to adhere to the mitigation of risks against labour influx. Depending on the risk factor, appropriate mitigation measures may be deployed. These may range from engagement with a local community liaison to the use of the local elders.
- The works contractor should be required, under its contract, to prepare and enforce a No Sexual Harassment and Non-Discrimination Policy, in accordance with national law as well as to the AfDB Code of Conduct guidelines where applicable.
- The contractor should prepare and implement a gender action plan, to include at minimum:
- Gender mainstreaming in employment at the worksite with opportunities provided for females to work, in consonance with local laws and customs
- Gender sensitization of workers (this could be done by the HIV/AIDS services provider; see above)
- Provision of gender disaggregated bathing, changing, sanitation facilities
- Grievance redress mechanisms including non-retaliation.

- Effective community engagement and strong grievance mechanisms on matters related to labour
- All workers to sign employment contract including Code of Conduct
- Sensitize workers on community based social behaviour and conduct.
- Efforts to be geared toward instilling attitudes of tolerance, support and understanding of labour immigrates by the local communities

7.9.7 Child labour and protection

The Children Act of Kenya prohibits contractors from "employing children in a manner that is economically exploitative, hazardous, and detrimental to the child's education, harmful to the child's health or physical, mental, spiritual, moral, or social development. It is also important to be vigilant towards potential sexual exploitation of children, especially young girls. The contractor should adopt a 'Child Protection Code of Conduct'; that all staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour

Mitigation measure

- Ensure no children are employed on site in accordance with national labour laws.
- Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police.

7.9.8 Social Exclusion, Gender-Based Violence (GBV), Sexual Exploitation And Abuse And Sexual Harassment (SEA/SH) And Violence Against Children (VAC)

Projects with a minor labour influx of workers may increase the demand for sex work, including the risk of trafficking of women for sex work; or the risk of forced early marriage for girls. Furthermore, higher wages for workers in a community can lead to an increase in transactional sex.

The risk of incidents of sex between workers and minors, even when it is not transactional, can also increase during the project implementation. Risk of SEA/SH by project personnel, e.g., officials who may ask for sexual favors from women and girls to be included in the project's economically supported activities, women groups, and other beneficiary groups or to receive cash for compensation. Additionally, project support can create a backlash and unintentionally

heighten the risk of GBV amongst female participants, especially given the existing high gender inequality and norms that do not promote women's economic independence.

Mitigation measures

- Ensure project workers are sourced from the local population as far as possible. This will benefit the local community in terms of income generation and will also reduce the influx of transient workers to the host community, which will result in SEA/SH.
- Monitor changes in women's status and the project's potential impacts on them by conducting regular focus group consultations with women in a sample of villages (in small groups facilitated by a woman).
- Ensure a GRM fully includes mechanisms for reporting GBV and SEA/SH. In addition, GBV and SEA/SH will be regularly monitored on the project site and neighboring community.
- Ensure GRM will apply along transportation routes of the project and will be widely publicized to ensure coverage.
- Ensure the project site/construction camp management plan makes consideration of GBV and SEA/SH when planning the lighting on and around the site and along routes that workers may use to access and exit the site.
- Ensure that SEA/SH Action Plan is developed and implemented prior to the physical start of civil works. Develop and implement a complaint/grievance mechanism (GM) sensitive to GBV, SEA/SH, VAC, and other forms of discrimination with accessible entry points to submit complaints, referral to GBV service providers and confidential, survivor-centered procedures for verifying and managing complaints.
- Sensitization of both project workers and host community members on possible GBV and SEA/SH and its implications for the prosecution

7.10 Operation phase positive impacts

7.10.1 Creation of employment

During operational phase, there will be employment opportunities especially for those who will be employed to manage and maintain the water lines. This will improve the living standards of these employees. WSPS will also employ more staff to assist in connecting its customers to water system.

7.10.2 Creation of Wealth

The proposed project will ultimately provide revenues to the beneficiaries and expand the wealth base for the nation as a whole. It will pump both liquefied and tied up wealth hence making the nation gain. It will also go a long way in uplifting Murang'a County and its neighbourhood as a whole. Once the people will be empowered in the project area, some will invest and develop the nearby towns.

7.10.3 Improved Well-being of Women and Children

At the household level, women and children bear the burden of fetching water. Other than the time spent in getting water from long distances, these practices has far reached consequences on their health and wellbeing. Time saved thus would be invested in other engagements that could bring financial benefits to the family. Children also bear the brunt of water borne diseases while women are tied down to provide nursing care to the sick family members. With proximity of water all these negative impacts will be reversed in the project area.

7.10.4 Improved Accessibility to Clean and Reliable Water Supply

The proposed project is intended to improve the water quality and quantity in the project areas. Water reliability will improve and thus helping the community.

7.10.5 Improved revenue for Water and Sanitation Companies

Improved revenue to Water and Sanitation Companies from increased customer base as the proposed project will increase the number of residents being served by the water companies. It will also make the supply reliable thus increasing the revenue base. Further, this will improve sustainability of the company.

7.10.6 Reduced exposure to health risks and improved nutrition

Improved water and sanitation services will lead to reduced cases of water borne diseases associated with pollution of water resources and drinking water, this will also cause improved water, Health and Sanitation status.

7.11 Operation Phase Negative Impacts

7.11.1 Risk of illegal connection and Vandalism of the Pipeline

Illegal connections and vandalism of Water Pipelines is not a common practice Murang'a; but may occur ultimately resulting in loss of revenue to WSPS.

Mitigation measures

- Constant inspection by the WSPS 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 WSPS.

7.11.2 Increased domestic wastewater generation

The proposed project will result in increased wastewater generation through the introduction of more water in the system. This may lead pollution of the environment.

Mitigation measures

- All WSPs to encourage people to connect to the existing and proposed new sewer lines.
- WSPS to encourage people to connect to the existing and proposed new sewer lines

7.11.3 Risk of water pipeline bursts leading to water wastage

Pipeline bursts may occur as a result of interference with the pipelines during future construction activities e.g. road construction works in the project areas or due to lack of maintenance of the pipelines. Loss of water through such bursts will to revenue loss for WSPS

Mitigation measures

- The risk of pipeline bursts is low as the pipeline design, including the selection of pipe material and pipe pressure classes, has been carried out so as to minimize this risk.
- This risk will be further minimized through regular inspection, repair and maintenance of the pipeline by the Operator: GATAWASCO, MUSWASCO.MUWASCO & MWEWASCO
- Regular check, repair and maintenance of the water pipeline
- Activate a community watch group for information sharing on the status of the water line
- Implement a leak detection and repair program (including records of past leaks and unaccounted- for water to identify potential problem areas)

7.11.4 Risk of Encroachment and Construction of Structures on the Pipeline Way Leave

Encroachment and construction of structures on water pipelines is common in many areas across the county, however, this impact is less significant due to the fact most of the pipework will involve replacement of the already existing pipe on the way leaves

Mitigation measures

- Arrest and prosecution of encroachers as required by Murang'a County Bylaws on Way Leaves and Road Reserves
- WSPs to undertake awareness campaigns aimed at preventing encroachment.

7.12 Decommissioning Phase Positive Impacts

7.12.1 Employment opportunities

Temporary employment opportunities will be created for the demolition of laid and constructed structures during the decommissioning works.

7.12.2 Environmental rehabilitation

Rehabilitation of site to ensure the site is left as natural as possible close or better than before

7.13 Decommissioning Phase Negative Impacts

7.13.1 Loss of jobs and income

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

Mitigation measures

- 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 and alternative skills for alternative activities;
- Employer should find alternative means of livelihood for the staff who were employed to operate and maintain water pipelines and facilities.

7.13.2 Noise Pollution

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

Mitigation measures:

- Schedule noisy activities during the day time period;
- Use silencers on machines where possible;

- Ensure machinery is well maintained to reduce noise emitted.

7.13.3 Solid Waste Material

It is expected that large amounts of solid waste material arising during decommissioning will include: glass panels, stones, pipes, wood, metal, paper, plastic, equipment, vegetation, etc. The proper disposal of these materials is critical. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment.

Mitigation measures:

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

7.13.4 Occupational health and safety

If not handled with care the demolition may lead to exposure of hazardous chemicals to workers and surrounding communities which poses as health risks to them. Machinery and equipment used for the same also possess as danger to the workers if not handled well and with the correct PPE.

Mitigation measures:

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

Table 7-1: Environmental and Social Management Plan

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
18	Excessive Vibration and Noise Pollution	Access roads should be cut that are exclusively used for the transportation of workers, goods and materials. These roads should be sited in such a way that the noise from this movement affects as few of the existing residents as possible. Where possible silenced machinery	Depending with the opened site this should implemented during the entire construction period.	500,000 Kshs	Noise surveys/Monitoring Reports, Grievance book on grievances on Noise and Vibrations	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		and instruments should be employed to reduce the impact of noise on the existing residents and workers. Machinery, vehicles and instruments that emit high levels of noise should be used on a phased basis to reduce the overall impact. These pieces of equipment such as drills, graders and cement mixers should also be used when the least					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		number of residents can be expected to be affected, for example during periods where most residents are at work or school. Construction hours should be limited to the hours of 8:00 a.m. and 6:00 p.m. daily. The delivery of raw materials must be limited to 8:00 a.m. and 6:00 p.m. daily. Provision of appropriate					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		personnel protective equipment to the workers.					
19	Dust Emission	Wet all active construction areas as and when necessary to lay dust; Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls, including air extraction and treatment through a	Depending with the opened site this should implemented during the entire construction period.	200,000	Amount of water used for sprinkling, Photo logs	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		bug house or cyclone for material handling sources, such as conveyors and bins. Ensure that all material (sand and aggregate) stockpiled on the site to be used in construction activities are regularly sprayed to reduce the effects of wind whipping Ensure that all trucks carrying aggregate and sand are covered					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		during delivery to the site. Earth moving be done under dump conditions as much as possible to prevent emission of dust into the air. Strict measures are to be applied for the handling of construction materials in powder form such as cement, lime, concrete additives, etc. and for the disposal of the packaging					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		Excavation, handling and transport of erodible materials shall be avoided under high wind conditions or when a visible dust plume is present. Minimizing the number of motorized vehicles on use.					
20	Vegetation Clearing	Only clear vegetation that is absolutely necessary for the construction activities; Retain all mature trees (> 25 cm	Depending with the opened site this should implemented during the entire	KShs. 50,000	Records of vegetation reinstatements Photo logs	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		diameter at breast height during this phase of the development if possible; Avoid the use of Invasive Alien Species in the landscaping activities Determine access roads which are to be used by machinery used in the construction and site clearance phase of the development to avoid the unnecessary	construction period.				

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		trampling of vegetation that will be maintained within the development area. 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;					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		Re-vegetation of exposed areas around the site should be carried out rapidly in order to mitigate against erosion of soil through surface water runoff and wind erosion.					
21	Risks of solid waste mismanagement leading to pollution	All solid waste will be collected at a central location at each site and will be stored temporarily until removal to an appropriately permitted disposal	Depending with the opened site this should implemented during the entire	400,000	Availability of a contract between the contractor and a NEMA licensed waste handler Waste collection records	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		site in the vicinity of the site. No dumping within the surrounding area is to be permitted. Where potentially hazardous substances are being disposed of, a chain of custody document should be kept with the environmental register as proof of final disposal. Waste generated at the site should be segregated and disposed of in NEMA	construction period.		House keeping records Number of waste bins available and in use		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		designated dumping site Wherever possible reusing and recycling should be carried out. A site waste management plan should be prepared by the contractor prior to commencement of construction works. This should include designation of appropriate waste storage areas, collection and					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		removal schedule and identification of approved disposal site; Proper solid waste receptacles and storage containers should be provided, particularly for the disposal of lunch and drink boxes so as to prevent littering of the site.					
22	Occupation safety and health impact	Sensitize the migrant workers on risky sexual behaviour. Have VCT services on site and encourage	During the entire construction period.	Kshs.500,000	Records for all the trainings conducted Records for PPE issuance	All work areas	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		workers to undergo the same. Provision of protective devices such as condoms. Provision of appropriate personal protective equipment Provision of hand washing points/ sanitizers Encourage wearing of masks Keeping social distance as recommended by the ministry of health of			Worker's induction records Signed code of conducts		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		safety gear and enforcement of application					
23	Site Related Oil Spills	The Contractor should ensure that the employees on site are aware of the company procedures for dealing with spills and leaks; All vehicles and equipment should be kept in good working order, serviced regularly in accordance to the manufacturers specifications and	Depending with the opened site this should implemented during the entire construction period.	Ksh 100,000	Availability of a contract between the contractor and a NEMA licensed waste handler Waste collection records Photo logs for the garage/where machines are being serviced Service records for machineries	All work areas <u>Responsibility</u> Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		stored in an area approved by the Resident Engineer/Supervising Consultant; Ensure spill kits are provided at the construction sites Ensure fuels, oils, lubricants and chemicals are stored are stored in impermeable containers and away from surface drains					
24	Impact on existing water Resources	Areas dedicated for hazardous material storage shall provide	Depending with the opened site	Kshs 1,000,000	Availability of a contract between the	All work areas Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		spill containment and facilitate clean up through measures such as: maximum separation from sensitive features (water bodies); clear identification of the materials present; access restricted to authorized personnel and vehicles only and dedicated spill response equipment Provide solid and liquid waste disposal system - a waste collector, NEMA	this should implemented during the entire construction period.		contractor and a NEMA licensed waste handler Waste collection records Photo logs for the garage/where machines are being serviced Service records for machineries		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		recommended waste disposal manual and a waste collection bin for each housing unit, workshop, plant, structural shelter. Ensure fuels, oils, lubricants and chemicals are stored are stored in impermeable containers and away from surface drains Ensure that the machines are serviced in specific locations off-site to					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		avoid spillage of oils and grease into the surface runoff channels.					
25	Soil related Impacts	The valuable top soil containing organic material, nutrients as well as seeds and the soil fauna should be excavated separately and piled in an adequate manner for re-use where applicable. Minimise compaction during stockpiling by working with the soil	Depending with the opened site this should implemented during the entire construction period.	Ksh 500,000	Records of completed works Reinstatement records Photo Logs Grievances recorded	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		in a dry state. The stockpiling should be done in specific locations subject to the engineer's approval. Plan emergency response measures in case of accidental oil spills. In cases where it is identified that during construction there is a danger of increased run-off or at the project site, drainage channels with stone pitching or holding					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		ponds can be employed After completion of the construction works, restoration of the ground by sowing adequate grass cover and planting of trees will be followed, therefore the impact is temporary and reversible. In areas prone to erosion, provision of soil stabilization in form of a retaining wall or planting of trees, subject to					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		approval by the Resident Engineer					
26	Fire outbreak	Label all inflammable materials and store them appropriately Provision of adequate firefighting equipment capable of fighting all classes of fire Put — 'No Smoking' Signs in areas where inflammables are stored Train workers on the use of fire fighting equipment	Depending with the opened site this should implemented during the entire construction period.	500,000	Number of Fire drills conducted Records for the trainings conducted Number of serviced fire extinguishers available and in use Number of the engaged first aiders	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
27	Demolition of Structures and Loss of livelihood	Implement RAP before commencement of civil works at the affected sites Limit damage to property by observing construction area limits The contractor to communicate with the owners of the potential structures to be demolished that are within the project sites.		As per the RAP/lrp	Stakeholder engagement records Reinstatement records Notification records to residents for carrying out works Records of incidents and accidents Updated grievance logs	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		Ensure that solid waste generated from the demolitions is properly disposed to suitable locations. Provide training, skills development, work experience, and employment opportunities, with first preference being extended to project-affected persons. Consult local and higher-level government officers in the					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		implementation of the RAP and its monitoring. Coordinate closely with local and higher levels of government. Many aspects of livelihood restoration overlap with responsibilities of government, and interaction with government is key. Train affected persons in skills that relate to real opportunities outside of the					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		employment provided on the construction sites. This is a transitional support measure not a sustainable livelihood activity. It is meant to equip affected person with skills beyond the temporary construction jobs provided by the project					
28	Liability for loss of life, injury to	Develop a site safety action plan detailing safety equipment to be used, emergency	Depending with the opened site this should	Kshs 2,000,000	Stakeholder engagement meeting minutes,	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
	private property	procedures, restriction on site, frequency and personnel responsible for safety inspections and controls. Provision of requisite PPE as established from risk assessment in the safety action plan and enforcing their usage. The workers should receive requisite training especially on the operation of the	implemented during the entire construction period.		Records for toolbox talks Records of PPE issuance Number of signages available and in use Worker induction records Notifications done to residents Reinstatement records Signed code of conducts		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		machinery and equipment. There should be adequate warning and directional signs. Ensuring that the prepared code of conduct for staff is followed to prevent accidents. Provide First Aid Kit within the construction sites and ensure that at any moment during the works, there is a trained first aider on site. The ration of			Records of incidents and accidents Number of the engaged first aiders		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		trained first aiders to worker will be as per defined by the OSHA First Aid Rules. Recording of all injuries that occur on site in the incident register, corrective actions for their prevention are instigated as appropriate. Contractor to ensure compliance with the Workmen's Compensation Act, ordinance regulations and					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		union agreements and maintain insurance cover throughout the construction period. The Contractor to promptly repair any damage done to private property. Limit damage to property by observing construction area limits by clear demarcation					
29	Spread of HIV and AIDS	Develop HIV/AIDS awareness programs or initiatives to target	During the entire	Ksh 250,000	Records of trainings conducted	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		the construction workers, community, institutions and the general members of the community, particularly the youth; with the objective of reducing the risks of exposure and the spread of HIV/AIDS within the project area. Sensitize the migrant workers on risky sexual behaviour. Provide VCT services on site and	construction period.		Number of signages available and in use		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		encourage workers to undergo the same. Provision of protective devices such as condoms. Maximize hiring skilled and unskilled workers from the host community					
30	Traffic and access	Provide diversion routes where possible. Give a construction itinerary in advance so that the potentially affected population can use alternative routes	Depending with the opened site this should implemented during the entire construction period.	Ksh 300,000	Records of trainings conducted, Records of traffic marshals on site Number of traffic signages available and in use	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		and start early to get to their destinations on time. Erect warning signs of on-going works. Expedite construction works so as to reduce the times where roads are blocked. Traffic department should approve crossing plan prior to construction, and should approve obstruction times during construction.			Photo logs		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		Access of residents should be facilitated by installing appropriate temporary bridges over trenches. Suitable warning signs should be placed at near locations and should be visible at night. A guard should be available 24 hours to help people access across sewer trenches. Alternatives access ways should be					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		communicated to the community.					
31	Interruption of existing amenities	Ensure dissemination of relevant information to each of the affected parties; A work plan with clear responsibilities for each party should be developed to ensure smooth execution of the construction	Depending with the opened site this should implemented during the entire construction period.	Kshs 100,000	Reinstatement records, Photo logs	Contractor(s)	AWWDA / Supervising Consultants
32	Labour Influx	Reduce labour influx by tapping into the local workforce. Depending on the	Depending with the opened site this should	Kshs 50,000	Records of workers and their ID Numbers	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		size and the skill level of the local workforce, a share of the workers required for the project may be recruited locally. This may be easier for unskilled workmen. Specialised workmen may be hired from elsewhere. Local workers may also be trained especially if they are required for the operation of the project.	implemented during the entire construction period.		Worker inductions records Where possible provision of certificates, work permits and licenses		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		Effective contractual obligations for the contractor to adhere to the mitigation of risks against labour influx. Depending on the risk factor, appropriate mitigation measures may be deployed. These may range from engagement with a local community liaison to the use of the local elders. The works contractor should be required,					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		under its contract, to prepare and enforce a No Sexual Harassment and Non-Discrimination Policy, in accordance with national law as well as to the World Bank Code of Conduct guidelines where applicable. The contractor should prepare and implement a gender action plan					
33	Child labour and Protection	Ensure no children are employed on site	During the entire	No additional cost	Records of workers and their ID Numbers	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		in accordance with national labour laws. Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police.	construction period.		Worker inductions records		
34	Social Exclusion, Gender-Based Violence (GBV), Sexual Exploitation And Abuse And Sexual Harassment	• Ensure project workers are sourced from the local population as far as possible. This will benefit the local community in terms of income	During the entire construction period.	No additional cost	Recordings of trainings conducted, Topics of discussion during the Toolbox Talks,	Contractor(s)	AWWDA / Supervising Consultants

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
	(SEA/SH) And Violence Against Children (VAC)	generation and will also reduce the influx of transient workers to the host community, which will result in SEA/SH. • Monitor changes in women's status and the project's potential impacts on them by conducting regular focus group consultations			Availability and use of signages for sensitization Signed code of conducts Worker inductions records		

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		with women in a sample of villages (in small groups facilitated by a woman). • Ensure a GRM fully includes mechanisms for reporting GBV and SEA/SH. In addition, GBV and SEA/SH will be regularly monitored on the project site and neighboring community.					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		• Ensure GRM will apply along transportation routes of the project and will be widely publicized to ensure coverage. • Ensure the project site/construction camp management plan makes consideration of GBV and SEA/SH when planning the lighting on					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		and around the site and along routes that workers may use to access and exit the site. • Ensure that SEA/SH Action Plan is developed and implemented prior to the physical start of civil works. Develop and implement a complaint/grievance mechanism					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		(GM) sensitive to GBV, SEA/SH, VAC, and other forms of discrimination with accessible entry points to submit complaints, referral to GBV service providers and confidential, survivor-centered procedures for verifying and managing complaints.					

Code	Impact	Measures,	Deadline for the completion of the measure	Cost	Key performance indicator	Implementation responsibility	Monitoring/oversight
		• Sensitization of both project workers and host community members on possible GBV and SEA/SH and its implications for the prosecution					

CHAPTER 8 ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMP)

8.1 Introduction

The aim of the environmental and social management and monitoring plan (ESMMP) is to detail the actions required to effectively implement the mitigation measures identified and recommended in the ESIA. These actions are required to minimize negative impacts and enhance positive impacts associated with the proposed water projects in Murang'a. The ESMP actions present the commitments made by the proponent, for addressing the impacts of the project. It is important to note that an ESMMP is a living document since it is to be updated and amended as new information (e.g., environmental data), policies, authority guidelines and technologies develop. The ESMP identifies management actions that need to be implemented in various phases of the proposed water for Murang'a as follows:

8.2 Planning and design phase

Refers to the stage when the feasibility studies are being undertaken, the project description is being developed and proposed water for Murang'a is being designed. During this phase, the ESIA is completed and license is applied for.

8.3 Construction phase

This will commence after the proposed water supply project in Murang'a County license has been issued and AWWDA has taken the decision to implement the project. The construction phase involves the development and construction of the project infrastructure.

8.4 Operations

This is the phase during which the proposed water and sanitation works will be operated. AWWDA will hand over the project to WSPs for operation

8.5 Decommissioning Phase

The decommissioning phase of a project includes restoring the environment to its original form once all the operational activities of the project have ceased. The project has been designed to operate effectively for over 20 years. The necessary activities, mitigation measures, allocation of responsibilities, time frames and costs pertaining to prevention, minimization and monitoring of

all potential impacts associated with the decommissioning and closure phase of the project are outlined in the table below.

Table 8-1: Steps to follow in case of an overhaul for project structures

	Action	Actor
Step 1	**Initiation** • Development of an Objective Worksheet and checklist incorporating references, legal, stakeholder engagement and policies • Undertake decommissioning audit	**Proponent**
Step 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**
Step 3	**Prepare and Award Contract** • Prepare a contract that incorporates validated project information and award to a contractor as per the Procurement rules.	**Proponent**
Step 4	**Execute Decommission Works** • Implement design elements and criteria on the Project in accordance with specifications and drawings. • Inspect during decommissioning and at Project completion to ensure that all design elements are implemented according to design specifications.	**Contractor**
Step 5	**Non-Conformance, Corrective/Preventive Action** • Determine root cause • Propose corrective measures • Propose future preventive measures	**Proponent**

8.6 Auditing of ESMP

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

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

8.7 Management Responsibility of ESMP

In order 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 which will be involved in the project. The following entities should be involved in the implementation of this ESMMP as presented in the table below:

Table 8-2: Institutional Framework for ESMP

Nos	Name of Institution	Role of Institution
1.	Athi Water Works Development Agency	• Ensuring that the proposed development has been put up in an environmentally sound manner. AWWDA has a safety team consisting of environmentalist, sociologists and project engineers. This can be enhanced by inclusion of environmental specifications in the tender specifications, selection of renowned environmentally conscious contractors and supervision to ensure that the objectives of this ESMMP are met.

Nos	Name of Institution	Role of Institution
. 2.	County Government of Murang'a	• The relevant departmental officers in the above local authorities should be called upon where necessary during project implementation to provide the necessary permits and advisory services to the project implementers.
. 3.	MUSWASCO, MWEWASCO, MUWASCO GATAWASCO	• Responsible for day-to-day coordination and implementation of the project. • Assist in the establishment of the SCRCC and LRCCs. • Establish the SCRCC and LRCCs operations. • Ensure the grievance committees are established and working. • Monitor the ESMP implementation.
. 4.	Resettlement and Compensation Committee	• Ensure effective flow of information between the Contractor and public • Coordinate, validate inventories of PAPs and affected assets; monitor the disbursement of compensation funds; guide and monitor the implementation of relocation • Coordinate activities between the various organizations involved in relocation; facilitate grievance and conflict resolution; and provide support and assistance to vulnerable groups. • Conducting extensive public awareness and consultations with the affected people so that they can air their concerns, interests and grievances. • Resolve disputes that may arise relating to resettlement process. If it is unable to resolve any such problems, will channel them through the appropriate formal grievance procedures laid out in this ESIA.

Nos	Name of Institution	Role of Institution
5.	NEMA	• Provide approval of the ESIA report • Escalate unsolvable grievances to the tribunal. • 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.
6.	Contractor	• Implementing the project • To ensure strict compliance environmental specifications of this ESMP • The persons/firms contracted to put up the proposed sanitation project interventions will be required to comply with the requirements of the ESMMP within this report. • To ensure strict compliance, environmental specifications of this ESMMP shall form part of the contract documents. The contractor will prepare the specific ESMP.
7.	Supervision Consultant	• Ensure that the proposed ESMP is up to date and is being used by the contractor. • Periodic audits of the ESMP will have to be done to ensure that its performance is as expected..
8.	KERRA & KURA	• Provide approval to allow laying pipes along the road reserve

8.8 Institutional Structure of the Water Sector

The National Policy on Water Resources Management and Development and the Water Act 2016, presently guides water resources management. The Water Act 2016 has realigned this

arrangement slightly to comply with the requirements of the new constitution 2010.The overall goal of the National Water Development Policy is to facilitate the provision of water in sufficient quantity and quality and within a reasonable distance to meet all competing uses in a sustainable, rational and economical way.

The Ministry of Water & Sanitation and Irrigation is responsible for policy development, sector co-ordination, monitoring and supervision to ensure effective Water and Sewerage Services in the Country, sustainability of Water Resources and development of Water resources for domestic, irrigation, commercial, industrial, power generation and other uses. The Ministry executes its mandate through the following sector institutions:

8.8.1 Water Services Regulatory Board (WASREB)

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

- Regulating the provision of water and sewerage services including licensing, quality assurance, and issuance of guidelines for tariffs, prices and disputes resolution.
- Overseeing the implementation of policies and strategies relating to provision of water services licensing of Water Services Boards and approving their appointed Water Services Providers,
- Monitoring the performance of the Water Services Boards and Water Services Providers,
- Establish the procedure of customer complaints,
- Inform the public on the sector performance,
- Gives advice to the Minister in charge of water affairs.

8.8.2 Water Resources Authority (WRA)

The authority is responsible for sustainable management of the Nations Water Resources:

- Implementation of policies and strategies relating to management of water resources, Develop principles, guidelines and procedures for the allocation of water,
- Development of Catchments level management strategies including appointment of catchments area advisory committees,
- Regulate and protect water resources quality from adverse impact

- Classify, monitor and allocate water resources.

8.8.3 Water Sector Trust Fund (WSTF)

This body assists in the financing of the provision of Water Services to areas of Kenya which are without adequate water services. This shall include providing financing support to improved water services towards:

- Capital investment to community water schemes in underserved areas
- Capacity building activities and initiative among communities
- Water services activities outlined in the Water Services Strategic Plan as prioritized by the Government
- Awareness creation and information dissemination regarding community management of water services
- Active community participation in the management of water service

8.8.4 Water Works Development Agencies

The WWDAs are responsible for the efficient and economical provision of water services in their areas of jurisdiction. AWWDA is among the eight catchment Boards established under the Water Act, 2016 and is mandated to:

- Plan and develop National Public Water Works for bulk water supply;
- Formulate Development and Investment Plans in liaison with county governments;
- Provide input to the national development and financing plan; and
- Provide technical assistance to Water Service Providers for county asset development AWWDA is the implementing Agency in this proposed project.

8.8.5 Water Services Providers

Water Service Providers are the utilities or water companies. They are state owned but have been commercialized to improve performance and run like business within a context of efficiency, operational and financial autonomy, accountability and strategic, but minor investment. MUSWASCO is the WSP that will be in charge of the proposed project.

8.8.6 National Environment Management Authority (NEMA)

The government established the National Environmental Management Authority (NEMA) as the supreme regulatory and advisory bodies on environmental management in Kenya under EMCA 1999. NEMA is charged with the responsibility of coordinating and supervising the various environmental management activities being undertaken by other statutory organs. NEMA also ensures that environmental management is integrated into development policies, programs, plans and projects.

8.9 Emergency procedure during construction and operation phases of the project

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

1. Alert other persons exposed to danger;
2. Inform the OSHA coordinator;
3. Do a quick assessment on the nature of emergency;
4. 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 services.

The proponent has already put measures to respond to emergencies in their premises like alarms and a fire assembly point. The proponent also has trained first aiders and fire marshals who can assist in case of emergencies.

8.10 Environmental Social Management and Monitoring Plan

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts for the proposed water for Murang'a is provided below for the;

a) Preconstruction stage,

b) construction

c) operational stage, and

d) decommissioning stage respectively

Table 8-3: Construction Environmental and Social Monitoring Plan

Code	Impact	Monitoring	Method	Frequency	Responsibility	Performance indicator	Cost
1.	Soil related impacts	Visual inspection of any erosion from the construction area and transport of sediments and contaminants	Interview of workers and communities on and around project sites	Quarterly	Contractor Environmental Safeguard and Social Specialists	• Restoration od site after construction • Availability of drainage channels	Ksh 5,000
2.	Air Quality Pollution	Emissions from vehicles and equipment Dust generated from construction activities, construction vehicle movement, stockpiles, storage of construction materials, etc.	Visual monitoring o Interview of workers and communities on and around project sites	Quarterly	Contractor Environmental Safeguard and Social Specialists	• Complete records of monitoring activities • Regular vehicle maintenance records. • No visible dust plumes originating from	Ksh1 5,000

Code	Impact	Monitoring	Method	Frequency	Responsibility	Performance indicator	Cost
						construction sites. • No of irregular exhaust (heavy black or white smoke) from equipment and vehicles.	
3.	Excessive Vibration and Noise Pollution				Contractor Environmental Safeguard and Social Specialists	• Reported complaints from neighbor community and institutions	Ksh 15,000
4.	Risks of solid waste mismanagement leading to pollution	Site clean and proper storage and handling of (hazardous) waste and sewage. Segregated waste disposal or storage areas are marked.	Visual monitoring	Daily throughout project implementation phase	Contractor Environmental Safeguard and Social Specialists	• Current and complete records of regular waste collection and disposal.	Ksh 10,,000

Code	Impact	Monitoring	Method	Frequency	Responsibility	Performance indicator	Cost
		Toilet facilities are readily available near the construction site for all workers				• Records of workers attending follow up health and safety training on a monthly basis. • Compliance with applicable regulations, • Regulation of Harmful and Hazardous Waste Management	
5.	Impact on existing water Resources	Visual inspection of any erosion from the construction area and transport of	Visual monitoring	On demand run-off after heavy rainfall events	Contractor Environmental Safeguard and Social Specialists	• Number of complaints from community not happy with	Ksh 5,000

Code	Impact	Monitoring	Method	Frequency	Responsibility	Performance indicator	Cost
		sediments and contaminants (e.g., oil, grease).				waste management of spoil material	
6.	Gender-based Violence (GBV) and Sexual Exploitation and Abuse/Harassment (SEA/SH)	Monitor the existence of workplace Violence, Sexual Exploitation, and Abuse/Harassment (SEA/SH)	Interview with the workers o Interview with the local community	Monthly	Contractor Environmental Safeguard and Social Specialists	• Whether cases of discrimination, GBV, and indiscipline are reported • Number of grievances addressed • All workers to comply to the Code of Conduct	Ksh 5,000
7.	Occupation safety and health impact	Visual inspection of compliance with health and safety procedures	Visual Check training records Visual o	Monthly	Contractor Environmental Safeguard and	• No identified non-compliances with health and	Ksh 5,000

Code	Impact	Monitoring	Method	Frequency	Responsibility	Performance indicator	Cost
		Monitor working conditions: o H&S training provided o Use of personal protective equipment for workers o Accessibility of workers to a grievance mechanism	Grievance mechanism in place and grievances records		Social Specialists	safety procedures. • Regular training records of personnel on health & safety procedures on site. • Injuries or accidents to workers/personel on site are reported and traffic management plan on site • Availability of temporary bridges • Trained traffic marshals	

CHAPTER 9 : CONCLUSION AND RECOMMENDATIONS

9.1 Conclusion

In conclusion, the Environmental and Social Impact Assessment (ESIA) Comprehensive Project Report (CPR) for the Proposed Project underscores the project's commitment to environmental conservation. The identification of potential adverse impacts and the proposition of feasible mitigation measures demonstrate a thorough understanding of the environmental and social aspects associated with the project. The proposed Environmental and Social Management and Monitoring Plan (ESMMP) not only includes a robust Mitigation Plan but also outlines Monitoring and Enforcement Requirements, as well as the Responsible Persons/Organizations involved.

The project's emphasis on rehabilitating existing infrastructure within designated areas and the low impact on the biological environment aligns with sustainable development principles. Furthermore, the financial allocation of Kenya Shillings 2.25 million for implementing mitigation measures reflects a proactive approach to addressing potential negative environmental impacts. The project's alignment with the National Water Policy (2012) and its contribution to Kenya Vision 2030 goals, particularly universal access to water and sanitation services, positions it as a crucial initiative in the county.

On an international scale, the project aligns with the United Nations Sustainable Development Goal 6 (UNSDG-6) to ensure universal access to safe drinking water by 2030. The project's adherence to the Murang'a County Integrated Development Plan (2023-2027) demonstrates its alignment with local development strategies. Importantly, the ESIA process has confirmed that the project will not be implemented in environmentally sensitive areas (ESAs).

9.2 Recommendation

Based on the comprehensive evaluation of the Proposed Project, it is recommended that the project be approved by the National Environment Management Authority (NEMA). The project has been thoroughly assessed from social, economic, and environmental perspectives, demonstrating stable economic benefits and a strong anti-risk capacity. The alternatives analysis affirms the project's indispensability, and as such, it is deemed necessary and should be implemented expeditiously.

The development of a comprehensive Environmental and Social Management Plan (ESMP) and Environmental Monitoring Strategy underscores the proponent's commitment to minimizing environmental damage. The alignment of the project with the National Constitution, the National

Water Policy (2012), Kenya Vision 2030 goals, and the National Spatial Plan 2015-2045 further supports its approval.

In light of the environmentally sound nature of the proposed project, and the proponent's commitment to implementing disclosed mitigation measures, it is recommended that NEMA issue the project proponent with an Environmental Impact Assessment (EIA) license in accordance with Kenya's environmental laws. This approval will not only signify regulatory compliance but also affirm the project's positive contribution to sustainable development goals at local, national, and international levels.

in the project design will be effectively implemented. On the basis of these findings, it is recommended that the proposed project be approved. Further, NEMA should issue the proponent with an EIA license as required by Kenya 's environmental laws.

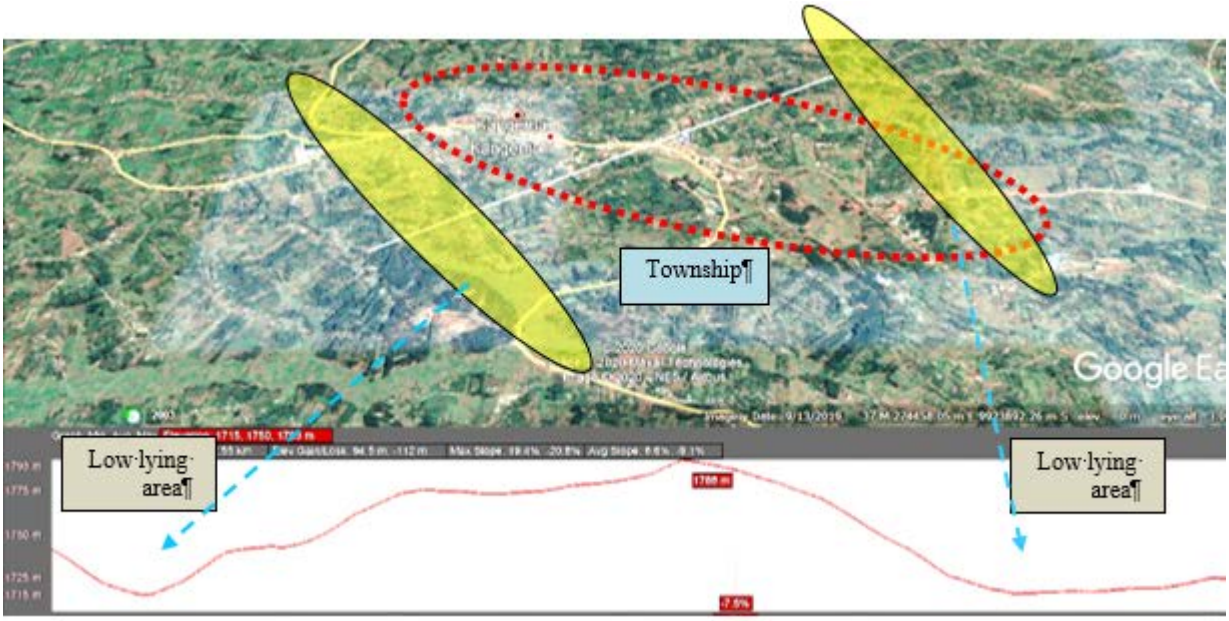
ANNEXES

Annex 1: Lead Expert NEMA License

NEMA LICENCE_2.pdf

Annex 2: Layout Plan of Proposed Interventions

Losai Management Limited


Township¶
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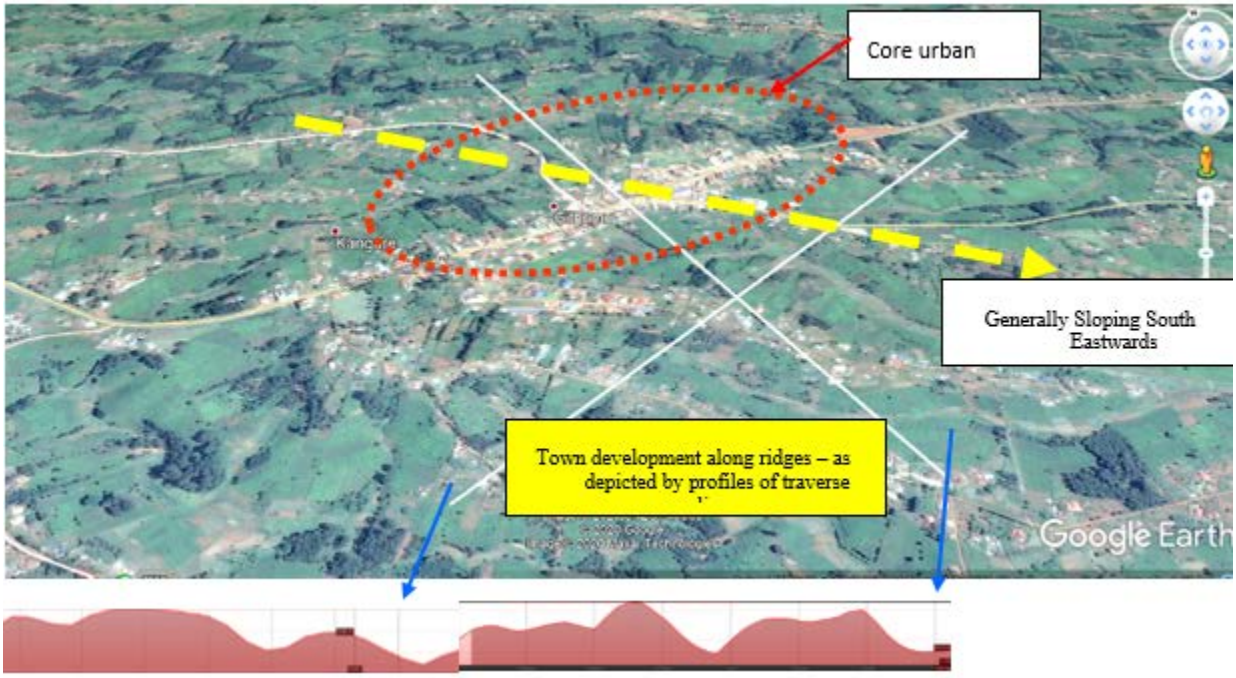

Core urban
Generally Sloping South Eastwards
Town development along ridges – as depicted by profiles of traverse

Annex 3: Minutes and Attendance Sheet

CONSULTANCY SERVICES FOR DESIGN AND CONSTRUCTION SUPERVISION OF MURANG'A CLUSTER WATER AND SEWERAGE WORKS

Minutes of RAP Public participation Meeting for Thithi Location held on February 13, 2024 at 11.20 AM-3:00 PM at Kiriani-Ndunyu Chege Gatanga Grounds.

Project:	CONSULTANCY SERVICES FOR DESIGN AND CONSTRUCTION SUPERVISION OF MURANG'A CLUSTER WATER AND SEWERAGE WORKS
Subject:	Minutes of RAP Public Participation
Date and Time:	February 13, 2024 at 11:20 AM-3.00PM
Venue:	Kiriani-Ndunyu Chege Gatanga Grounds

CONSULTANT

Losai Management Limited

Local Office: 15 Westland's Road, Office N° 09

P.O. Box 30337 – 00100 Nairobi, KENYA

Tel. +254 718 875 310, +254 788 352 533

Email: info@losaimanagement.com

MEMBERS PRESENT (The full is attached)

No.	Name	Designation	Organization
1.	Kelvin Mwangi	EHSS	Losai
2.	Benard Kiplangat	Technical Manager	Gatanga Water Company
3.	Evans Ngungi	Ass. Technical Manager	Gatanga Water Company
4.	Grace Mbuthia	Chief	Thithi
5.	Mathew Kabubi	Ass.Chief	Thithi
6.	Gilbert Kiarie Gachabu	Community member	Community member
7.	Peter Gichure	Community member	Community member
8.	James Mukora	Community member	Community member
9.	Johnson Kinyanjui	Community member	Community member
10.	Ezekiel Mwaura	Community member	Community member
11.	Joseph Ndungu	Community member	Community member
12.	David Chege	Community member	Community member
13.	John Kinyanjui	Community member	Community member
14.	John Maina	Community member	Community member
15.	John Mburu	Community member	Community member
16.	Joseph Mingwi	Community member	Community member
17.	Benerd Nganga	Community member	Community member
18.	Esther Wangari	Community member	Community member
19.	Grace Wanjiku	Community member	Community member
20.	Rachael Njoki	Community member	Community member

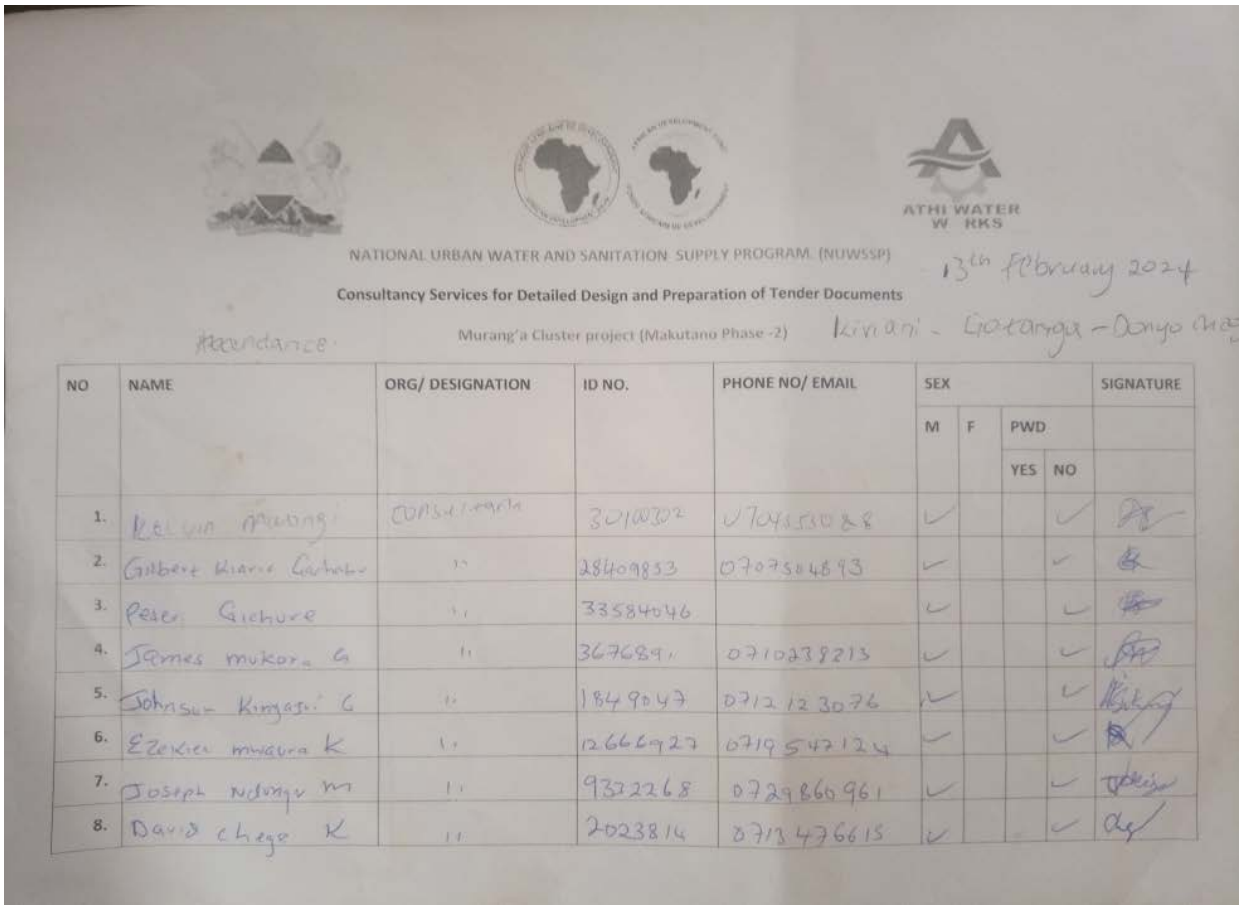
MINUTE No.	ITEM DESCRIPTION
Min 1 **13/02/2024**	**Introduction** The meeting began at 11:30 A.M. with a word of prayer from Mr. Joseph Ndungu. This was followed by self-introductions by all members. The Ass.Chief welcomed the attendees and handed over the meeting to the Consultant to take the community members through the agenda of the day.
Min 2 **13/02/2024**	**Meeting Agenda, project brief and scope** The Consultant explained that the meeting agenda was: **Educating About RAP**: The community members were told RAP stands for Resettlement Action Plan. It's a plan that outlines how people or communities affected by a project will be compensated or assisted if they need to be relocated or experience disruptions to their lives due to the project. **Communication of Impacts**: During the baraza, the community members were clearly communicated all the potential impacts of the project. This includes identifying the structures, livelihoods, trees, and land that will be affected or disrupted. **Details of Affected People**: A part of the community engagement process, the community members were told that details information about individuals or households that will be affected along the water wayleave. This information is crucial for implementing the Resettlement Action Plan effectively. **Cut-off Date**: A cut-off date will be communicated which signified the deadline for recording all affected properties and individuals. After this date, no more additions will be made to the list of affected properties or people. This is done to ensure that the planning and execution of the Resettlement Action Plan can proceed efficiently. **Project brief** The EHS Officer Kelvin Mwangi gave a brief introduction of the Project and stated that the Consulting agency as Losai Management Limited. He described the company as an engineering consulting firm contracted by Athi Water Works Development Agency (AWWDA) to oversee the implementation of a water and sanitation project in Murang'a. The EHS Kelvin Mwangi further explained that the Project was funded by African Development Bank. **Scope**

MINUTE No.	ITEM DESCRIPTION
	The Consultant outlined the planned actions of the project intervention, which would encompass the following initiatives for Thithi: The scope for the proposed project includes the following; **Water Components:** **Construction of Thithi Intake and water Treatment Works:** **Expansion of Raw Water Network:** Construction of 22.7 Km Raw water main from Thithi to Kaha-ini (Thika Greens). **Construction of Storage Tank:** Construct of storage tanks with a minimum combined capacity of 5,000m3 at Kiawahiga to bolster water reserve capacity and ensure a consistent and reliable water supply. **Extension of Water Network:** Extend the water network by 5.5km to expand the coverage area and ensure that more residents have access to a reliable water supply.
Min 3 **13/02/2024**	**Activities to be conducted during RAP** The EHS officer explained that RAP means Resettlement Action Plan. RAP stands for Resettlement Action Plan. He clarified that it is a crucial document associated with the project that outlines the measures to be taken to support individuals or communities affected by the construction. It was emphasized that the project will be constructed within the public wayleave, and this construction will impact structures situated in this area. Community members were informed that the project will have implications for the structures, livelihoods, and land in the wayleave area, and it is important to identify and assist those who will be affected. The cut-off date for recording affected properties and individuals will be communicated at a later date. This means that any properties or individuals affected by the project must be identified and documented before this date.

MINUTE No.	ITEM DESCRIPTION
Min 4 **13/02/2024**	**Project support** Prior to moving on to the comments and responses section, the Consultant EHS Officer, inquired whether the community members would express their support for the RAP activities by raising their hands. All community members raised their hands in favour of the RAP activities.
Min 5 **13/02/2024**	**Discussion/Comment & Responses** The EHS Officer, initiated the discussion by encouraging the attendees to ask questions. The following represents comments and responses of the discussions; **Comment:** The community members inquired whether the community members affected will be compensated **Response:** Consultant representative, emphasized to the participants that PAPs (Project Affected Persons) will be notified in advance before commencement of works to vacate. This is to avoid destruction of farm produce. **Comment**: The Community members inquired how will the riparian be established from the river. **Response**: The Consultant representative, responded to the community members' query regarding the establishment of riparian boundaries from the river. He explained that the Water Resources Authority (WRA) oversees all matters concerning rivers. According to WRA protocols, riparian zones are determined based on the size of the river, with assistance from hydrologists who assess various factors to establish the boundaries **Comment**: The community members wanted to know whether they will still draw water from the river. **Response**: The Consultant conveyed to the attendees that they would still be permitted to draw water from the area, albeit from a distance away from the newly constructed Intake. **Comment**: The community inquired on when the Project will commence. **Response**: The Consultant stated that the commencement date of the project would be communicated once all the necessary documentation and approvals from the Government have been cleared.

MINUTE No.	ITEM DESCRIPTION
	Comment: The community inquired on how much they will be paid and the compensation channels that will be used. **Response**: The Consultant stated that the valuation of the affected lands would be carried out by the National Land Commissioners, aligning with current market prices. Subsequently, negotiations and agreements regarding compensation would be reached with the Project Affected Persons (PAPs). The community members recommended for continuous public participation in future, this would help to continuously get opinions from the community members and ensure the success of the Project.
Min 6 **13/02/2024**	**Any Other Business** The Consultant thanked the attendees for taking their time to attend the meeting and assured them that their concerns would be put into consideration. Further, public engagement activities and information sharing about the project will be organized to keep the community informed about project developments The EHS Officer, assured the members of the community that the project would ensure water there is clean water for the community. He thanked all for attending the meeting.
Min 7 **13/02/2024**	**Meeting Closure** The meeting concluded at 3.00Pm. Community members and stakeholders were encouraged to reach out to the project team for any additional information or clarification. The importance of active community participation in the Resettlement Action Plan was highlighted, and the next steps for the project were discussed**.**

ANNEX 1: Attendance Sheet



ATHI WATER W KKS

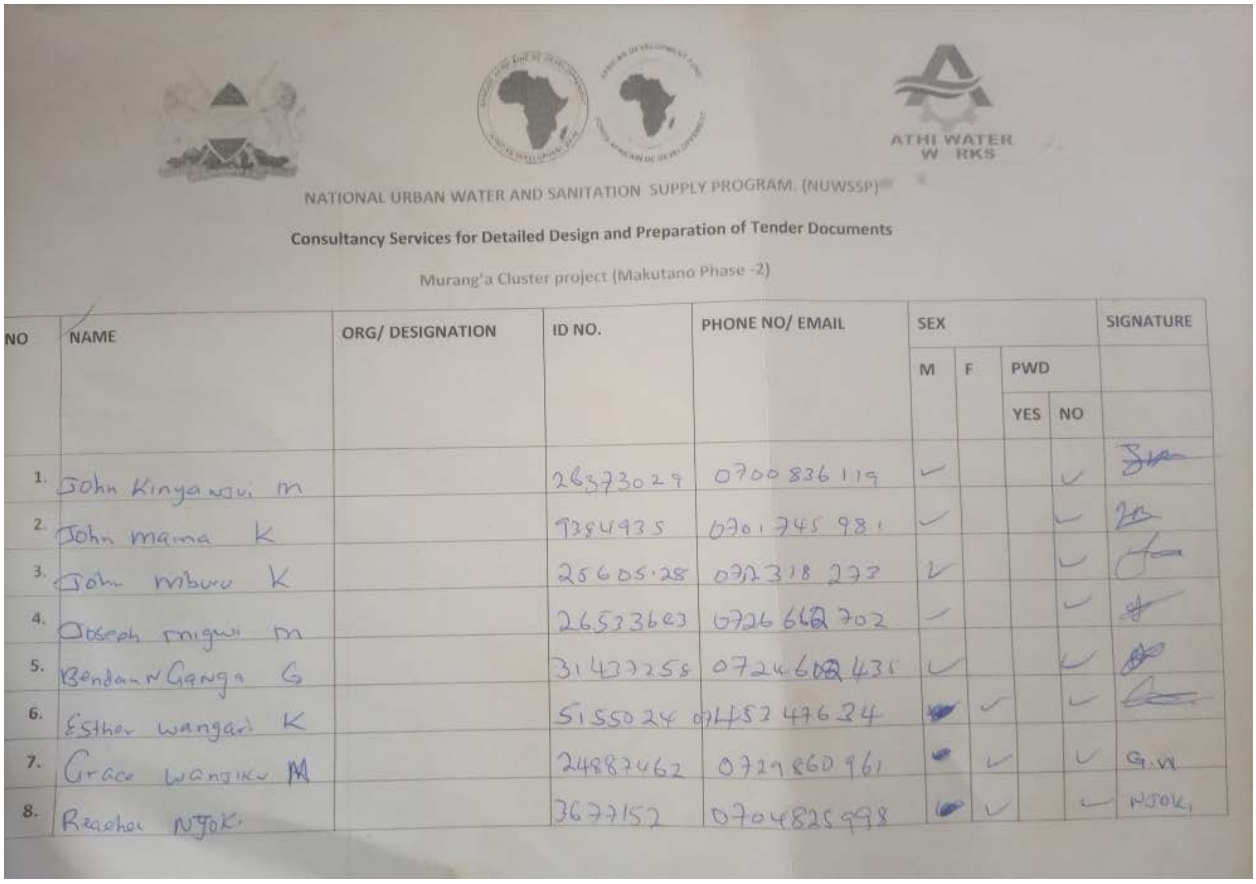
NATIONAL URBAN WATER AND SANITATION SUPPLY PROGRAM (NUWSSP)

13th February 2024

Consultancy Services for Detailed Design and Preparation of Tender Documents

Attendance Murang'a Cluster project (Makutano Phase -2) Kiriani - Gaitanga - Donyo Ma

NO	NAME	ORG/ DESIGNATION	ID NO.	PHONE NO/ EMAIL	SEX				SIGNATURE
					M	F	PWD		
							YES	NO	
1.	Kelvin Murungi	Consultants	30100302	0704530828	✓			✓	
2.	Gilbert Kiarie Gathaka	"	28409853	0707584893	✓			✓	
3.	Peter Gichure	"	33584046		✓			✓	
4.	James mukora G	"	3676891	0710238213	✓			✓	
5.	Johnson Kinyanjui G	"	1849047	0712123076	✓			✓	
6.	Ezekiel mwaura K	"	12666927	0719547124	✓			✓	
7.	Joseph Ndungu M	"	9322268	0729860961	✓			✓	
8.	David Chege K	"	20238114	0713476615	✓			✓	



ATHI WATER W RKS

NATIONAL URBAN WATER AND SANITATION SUPPLY PROGRAM. (NUWSSP)

Consultancy Services for Detailed Design and Preparation of Tender Documents

Murang'a Cluster project (Makutano Phase -2)

NO	NAME	ORG/ DESIGNATION	ID NO.	PHONE NO/ EMAIL	SEX				SIGNATURE
					M	F	PWD		
							YES	NO	
1.	John Kinyanjui m		26573029	0700836119	✓			✓	
2.	John maina K		7384935	0701745981	✓			✓	
3.	John mburu K		25605·28	0712318 273	✓			✓	
4.	Joseph migwi m		26533683	0726 662 702	✓			✓	
5.	Bendan N Ganga G		31437258	0724602431	✓			✓	
6.	Esther wangari K		51550 24	0745747624	✓	✓		✓	
7.	Grace Wanjiku M		24887462	0729860961	✓	✓		✓	G.W.
8.	Reuben NJOKI		3677152	0704825998	✓	✓		✓	NJOKI

ANNEX 2: Photo Logs

	
Meeting in progress with Administration, GATAWASCO, Consultant and members of the community.	Meeting in progress with Administration, GATAWASCO, Consultant and members of the community
	
Meeting in progress with Administration, GATAWASCO, Consultant and members of the community.	Meeting in progress with Administration, GATAWASCO, Consultant and members of the community.

Detailed Design, Tender Documentation, ESIA/RAP and Construction Supervision for Water and Sanitation Works in National Urban Water and Sanitation Supply Program

Minutes of Public participation Meeting for Mariira Farm Area held on February 26 2024 at 02.00 PM-5:00 PM at Mariira Farm -Kigumo.

Project:	**Detailed Design, Tender Documentation, ESIA/RAP and Construction Supervision for Water and Sanitation Works in National Urban Water and Sanitation Supply Program**
Subject:	**Minutes of Public Participation meeting Mariira Farm**
Date and Time:	**February 26 2024 at 02:00 PM-5.00PM**
Venue:	**Social Hall Mariira Farm**

CONSULTANT

Losai Management Limited

Local Office: 15 Westland's Road, Office N° 09

P.O. Box 30337 – 00100 Nairobi, KENYA

Tel. +254 718 875 310, +254 788 352 533

Email: info@losaimanagement.com

MEMBERS PRESENT (The attendance full list is attached)

S/No.	Name	Organization	Designation
1.	Beth Macharia	Mariira	NGAO - Chief
2.	Francis K. Njau	Mariira	NGAO – Assistant Chief
3.	Ndung'u Njagi	MUSWASCO	NRWM
4.	Kelvina Kamau	MUSWASCO	ADO
5.	Prof. Benson Mwangi	Murang'a University -Mariira Farm	Director
6.	James Nyaga	Murang'a University – Mariira Farm	Assistant Director
7.	Purity Mwaura	Losai	Sociologist
8.	Joseph Mwaura	Losai	Assistant Engineer
9.	Chege Mirara	Mariira	Resident
10.	Joseph Kinyanjui	Mariira	Resident
11.	John Maina	Mariira	Resident
12.	Rhoda Wanjiru Macharia	Mariira	Resident
13.	Veronicah Waithera Macharia	Mariira	Resident
14.	Rachael Wanjiku Kamau	Mariira	Resident
15.	Lucy Nduta	Mariira	Resident
16.	Josephine Wachera Kahuha	Mariira	Resident
17.	John Maina	Mariira	Resident
18.	Samuel Gitau	Mariira	Resident
19.	Lydiah Mwangi	Mariira	Resident

ABBREVIATIONS

AfDB	African Development Bank
AOB	Any other Business
AWWDA	Athi Water Works Development Agency
Consultant	Gath Consulting Engineers
CDS	Community Development Supervisor
ESIA	Environment Social Impact Assessment
GoK	Government of Kenya
MUSWASCO	Murang'a South Water and Sanitation Company
NGAO	National Government Administration Officer
RAP	Resettlement Action Plan

AGENDA

1. **Introduction.**
2. **Project brief and scope of works.**
3. **Meeting agenda & Project anticipated impacts**
4. **Discussions, Comments and Response section**
5. **Project support**
6. **A.O.B**
7. **Meeting Closure**

MINUTE No.	ITEM DESCRIPTION
Min 1 **02/26/2024**	**Introduction** The meeting began at 02:40 PM with a word of prayer from John Kinyanjui. This was followed by self-introductions by all members. The Area Chief welcomed the attendees and handed over the meeting to the Consultant to take the community members through the agenda of the day.
Min 2 **02/26/2023**	**Project Brief and Scope** The Assistant Engineer began by giving a brief introduction of the Project and stated that the Consulting agency as Losai Management Limited. He described it as engineering consulting firm contracted by Athi Water Works Development Agency (AWWDA) to oversee the implementation of water and sanitation works in the project. He further explained that the Project's financiers are African Development Bank. **SCOPE OF WATER SUPPLY AND SANITATION WORKS** The scope of construction works involves; **a) Raw Water Mains** g) Design review and rehabilitation of OD 280 mm raw water main **b) Treatment Works** h) Construction of additional 3000m3 treatment works at Mariira farm **c) Transmission Main** i) Interconnection to newly laid DN 200 mm Mariira Kenol line **d) Storage Tanks** j) Construction of 250m3 and 1250 m3 new storage /break pressure tank along the transmission main at Mutheru and Machegecha **e) Distribution Networks** k) 30km of distribution networks
Min 3 **02/26/2023**	**Agenda of the meeting** The Consultant explained that the meeting agenda as: **RAP and what it entails -** The community members were told RAP stands for Resettlement Action Plan. It's a plan that outlines how people or communities affected by a project will be compensated or assisted if they need to be relocated or experience disruptions to their lives due to the project. This includes recording of assets that are along the way of the

MINUTE No.	ITEM DESCRIPTION
	project. Details of the Project Affected Persons are also taken. Their details are crucial for implementing the Resettlement process. **A cut-**off date is also set and communicated to the community members through the Chief's Office. A cut-off date is the deadline for recording all affected properties and livelihood. Any additional affected property / livelihood is not considered after the deadline. This is done for planning and execution of the Resettlement Action Plan. **Project anticipated impacts** The Sociologist explained that ESIA means Environmental and Social Impact Assessment. She also explained that public participation meeting involves the whole community in decision-making that affect their lives and their environment. The meeting was important for the community to air out their views and understand the works to be done. She stated that the ESIA report will incorporate each member's input and responses through questionnaires filled during the meeting. Subsequently, these valuable insights the report will be submitted to different regulatory bodies for licensing purposes. She further emphasized that the Water Treatment Works and Proposed Waterlines will be constructed at the County's land Mariira Farm and road reserves to avoid interfering with private properties. The process will be done through the local administration's office. The anticipated impacts are as follows; • Access to adequate clean drinking water. • Access to improved clean sanitation facilities especially to Mariira University. • Creation of various job opportunities. The local community will be considered for employment and this will be done through the administration's office. The food vendors to the workers will also be from the local community. • Economic growth as the project will open up many businesses. • Empowerment and Community Participation: During the implementation phase, there will be community engagement and participation. Community members will be actively involved in decision-making, project planning, and sometimes even construction. This participatory approach fosters a sense of ownership, empowerment, and community cohesion, leading to long-term sustainability and success of the project.

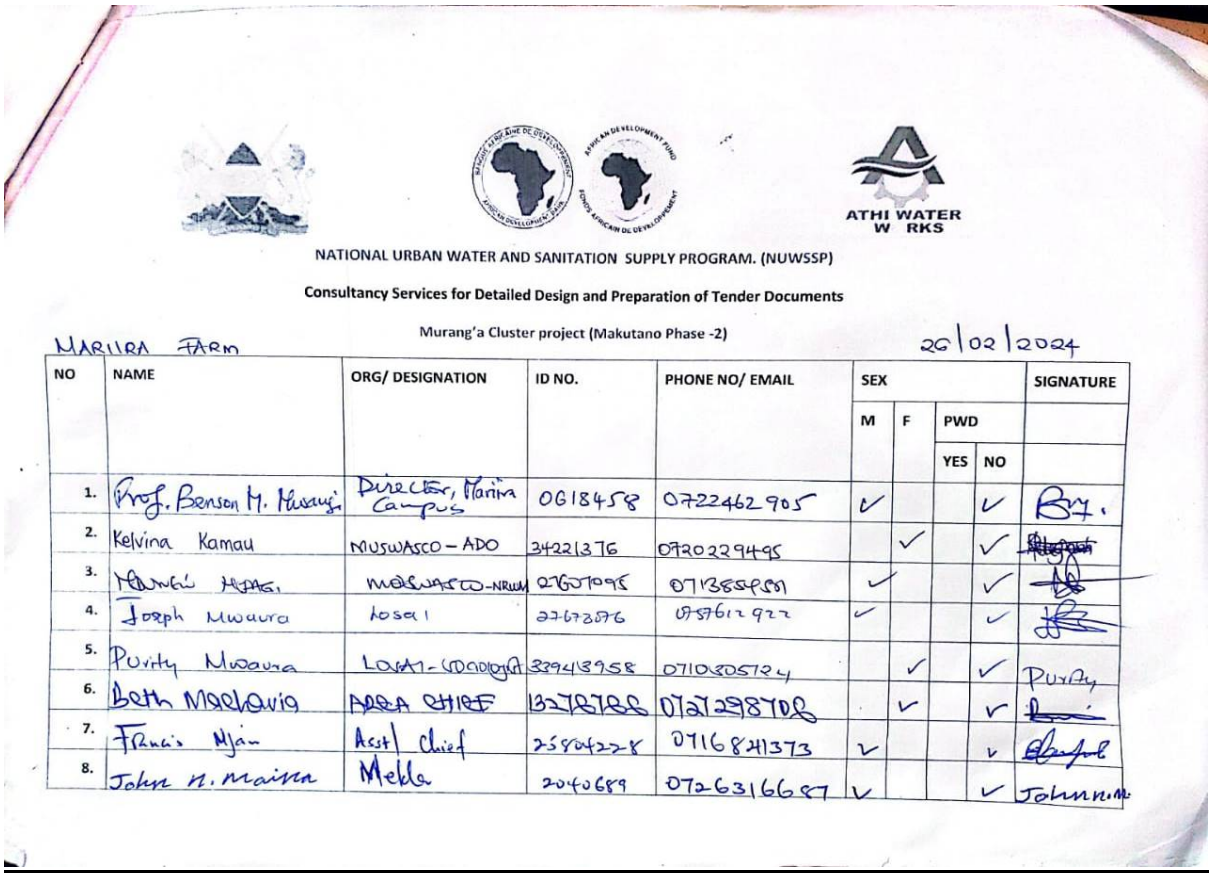
MINUTE No.	ITEM DESCRIPTION
	The Sociologist explained that there will be anticipated negative impacts during the construction phase and mitigation measures will be put in place.
Min 4 **02/26/2023**	**Discussion/Comment & Responses** The Sociologist, initiated the discussion by encouraging the residents to ask questions. The following are the comments and responses **Comment** Rhoda Wanjiru inquired on explanation of rehabilitation. **Response** The Assistant Engineer explained that rehabilitation means repairing of broken/ damaged water lines. The water pipes are damaged by roots of trees planted on the water lines. **Comment** Joseph Kinyanjui stated the residents have caused the damage to the water lines by themselves. **Response** The Sociologist indicated that people need to take good care of the existing water pipes. This includes no construction of permanent structures and no planting of trees on the land above the water lines. Residents need to adhere to the measures to ensure they get water and to protect the infrastructure. **Comment** Josephine Wachera enquired on compensation of affected people. **Response** The residents present agreed to have encroached the wayleaves by putting up fences and planting trees. The proposed project water lines will be along the wayleaves. The RAP exercise will be done and all affected will be recorded and notified in advance before commencement of the project. **Comment** Samuel Gitau inquired on the quality of the water pipes to be laid. He complained that pipes with small diameters tend to block easily and requested for larger pipes to be incorporated in the project. He also stated that the pipes used are of low quality.

MINUTE No.	ITEM DESCRIPTION
	Response The Assistant Engineer informed the residents that the proposed water pipes would last for 25 years and the pipes would not block. **Comment** Rachael Wanjiku requested for the youth to be involved in the works to provide labour**.** **Response** The Sociologist informed the resident that the local community would be the ones to provide the unskilled labour and will be recruited through the Chief's office.
Min 5 **02/26/2023**	**Project support** The Consultant EHS Officer, inquired whether the community members would express their support for the RAP activities and the project in general by raising their hands. All community members raised their hands in favour.
Min 5 **02/26/2023**	**Any Other Business** The Assistant Chief was requested to create a communications channel to disseminate information on the project. The director Mariira Farm requested the residents to welcome the project and be part of it. He explained that the project will be of much help to the school and the community at large. He also encouraged the residents to enrol for studies in the University. The Assistant Chief emphasized on youths being responsible so that they can get opportunities in the project and other sectors.
Min 6 **02/26/2023**	**Meeting Closure** There being no other business, The Assistant Chief thanked all for attending the meeting at 4.40PM with a word of prayer from John Kinyanjui.

Photo Log

	
Meeting in progress at Mariira Farm with administration, Mariira University directors, MUSWASCO and Consultant	Meeting in progress at Mariira Farm with administration, Mariira University directors, MUSWASCO and Consultant

Attendance list



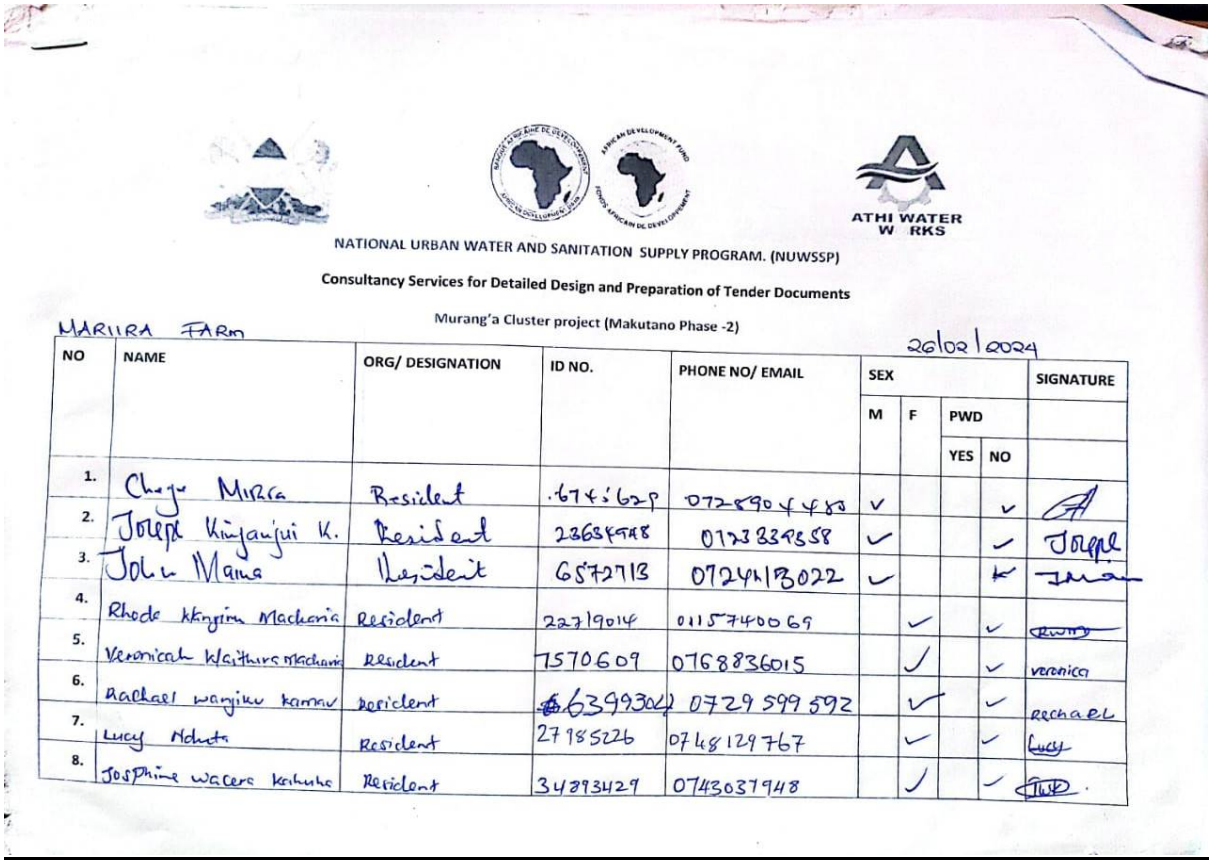
NATIONAL URBAN WATER AND SANITATION SUPPLY PROGRAM. (NUWSSP)

Consultancy Services for Detailed Design and Preparation of Tender Documents

Murang'a Cluster project (Makutano Phase -2)

MARIRA FARM 26/02/2024

NO	NAME	ORG/ DESIGNATION	ID NO.	PHONE NO/ EMAIL	SEX				SIGNATURE
					M	F	PWD		
							YES	NO	
1.	Prof. Benson M. Muraya	Director, Marira Campus	0618458	0722462905	✓			✓	
2.	Kelvina Kamau	MUSWASCO – ADO	34221376	0720229495		✓		✓	
3.	[illegible]	MUSWASCO-NRW	27607098	0713854581	✓			✓	
4.	Joseph Muaura	Kosai	27673876	0787612922	✓			✓	
5.	Purity Muaura	LOAM-Sociologist	33943958	0710805724		✓		✓	Purity
6.	Beth Macharia	AREA CHIEF	13278788	0721298708		✓		✓	
7.	Francis Njau	Asst Chief	25804228	0716841373	✓			✓	
8.	John N. Maina	Mekla	20440689	0726316687	✓			✓	Johnnm



ATHI WATER W RKS

NATIONAL URBAN WATER AND SANITATION SUPPLY PROGRAM. (NUWSSP)

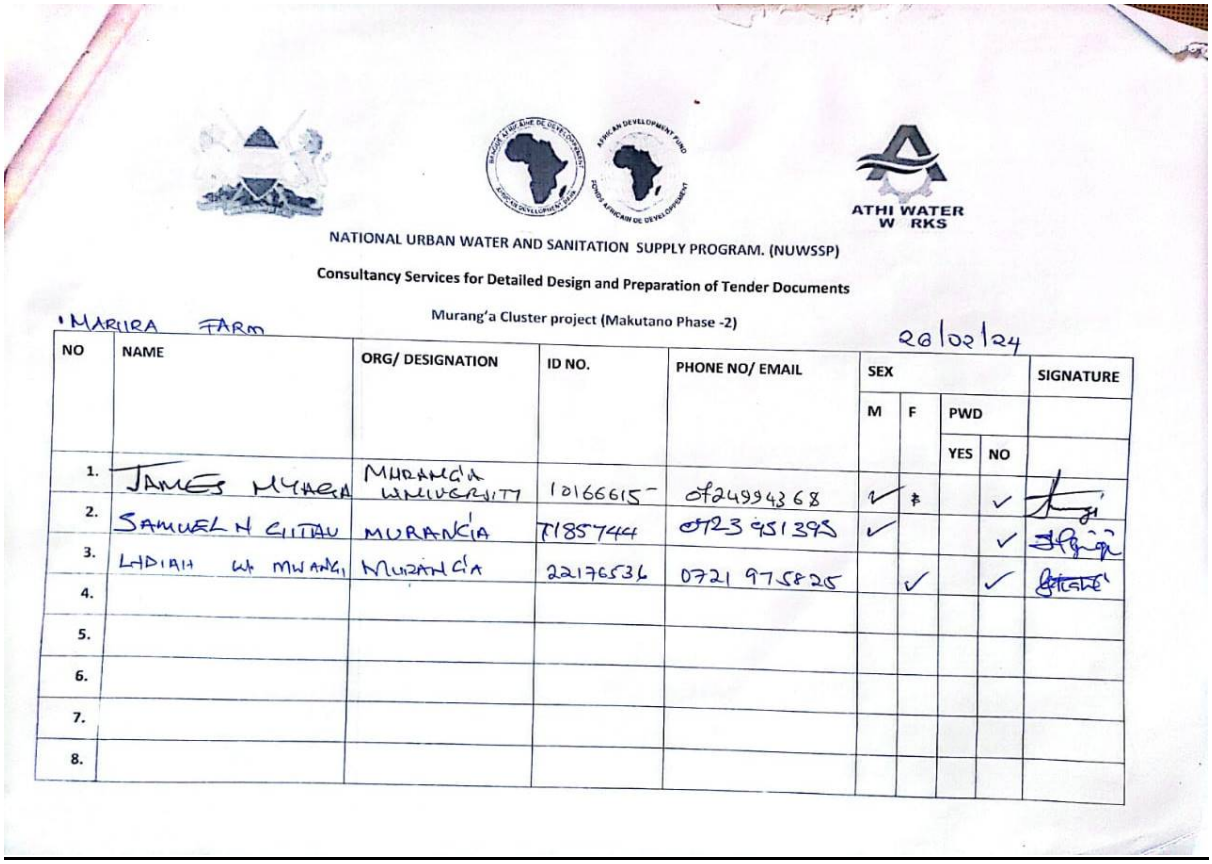
Consultancy Services for Detailed Design and Preparation of Tender Documents

Murang'a Cluster project (Makutano Phase -2)

MARIRA FARm

26/02/2024

NO	NAME	ORG/ DESIGNATION	ID NO.	PHONE NO/ EMAIL	SEX				SIGNATURE
					M	F	PWD		
							YES	NO	
1.	Chege Mirira	Resident	.674.629	0728904485	✓			✓	
2.	Joseph Kinjanjui K.	Resident	23685948	0723339358	✓			✓	Joseph
3.	John Mama	Resident	6572713	0724113022	✓			✓	
4.	Rhoda Wanjiru Macharia	Resident	22719014	0115740069		✓		✓	
5.	Veronicah Waithira Macharia	Resident	7570609	0768836015		✓		✓	veronica
6.	Rachael wanjiku kamau	Resident	26399304	0729 599 592		✓		✓	RACHAEL
7.	Lucy Mbuta	Resident	27185226	0748129767		✓		✓	Lucy
8.	Josphine wacera kahuthe	Resident	34393429	0743037948		✓		✓	



ATHI WATER W RKS

NATIONAL URBAN WATER AND SANITATION SUPPLY PROGRAM. (NUWSSP)

Consultancy Services for Detailed Design and Preparation of Tender Documents

Murang'a Cluster project (Makutano Phase -2)

MARIRA FARM 26/02/24

NO	NAME	ORG/ DESIGNATION	ID NO.	PHONE NO/ EMAIL	SEX				SIGNATURE
					M	F	PWD		
							YES	NO	
1.	JAMES MUHIA	MURANG'A UNIVERSITY	12166615	0724994368	✓			✓	
2.	SAMUEL N GITAU	MURANG'A	7185744	0723 951395	✓			✓	
3.	LYDIAH WA MWANGI	MURANG'A	22176536	0721 975825		✓		✓	
4.									
5.									
6.									
7.									
8.									

Detailed Design, Tender Documentation, ESIA/RAP and Construction Supervision for Water and Sanitation Works in National Urban Water and Sanitation Supply Program

Minutes of Public participation Meeting for Gwa Kibugi area held on March 04 2024 at 02.00- 4.40 PM at Gwa Kibugi -Kigumo.

Project:	**Detailed Design, Tender Documentation, ESIA/RAP and Construction Supervision for Water and Sanitation Works in National Urban Water and Sanitation Supply Program**
Subject:	**Minutes of Public Participation meeting Gwa Kibugi**
Date and Time:	**March 04 2024 at 02:00 PM-4.40PM**
Venue:	**Gwa Kibugi Open field**

CONSULTANT

Losai Management Limited

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MEMBERS PRESENT (The attendance full list is attached)

S/No.	Name	Organization	Designation
1.	Beth Macharia	NGAO	NGAO - Chief
2.	Francis K. Njau	NGAO	NGAO – Assistant Chief
3.	Ndung'u Njagi	MUSWASCO	NRWM
4.	Maureen Mukiri	MUSWASCO	PRM
5.	Gerald Mwangi	MUSWASCO	R.O
6.	Peterson Murimi	MUSWASCO	R.O
7.	Purity Mwaura	Losai	Sociologist
8.	Ngesu Kimani	Mariira	Farmer & resident Wakibugi
9.	Jonathan Kamau	Mariira	Farmer & resident Wakibugi
10.	Stephen Maina	Mariira	Farmer & resident Wakibugi
11.	Rachael Mwangi	Mariira	Farmer & resident Wakibugi
12.	Patrick Mwangi	Mariira	Farmer & resident Wakibugi
13.	Joseph Kimemia	Mariira	Farmer & resident Wakibugi
14.	Esther Wanjiru Kimani	Mariira	Farmer & resident Wakibugi
15.	Jane Wangari	Mariira	Farmer & resident Wakibugi
16.	John Mwangi Njoroge	Mariira	Farmer & resident Wakibugi
17.	Patrick Kagiri	Mariira	Farmer & resident Wakibugi
18.	Joel Kiambi	Mariira	Farmer & resident Wakibugi
19.	Michael Maina	Mariira	Farmer & resident Wakibugi
20.	Joseph Macharia	Mariira	Farmer & resident Wakibugi
21.	Maina Kamira	Mariira	Farmer & resident Wakibugi
22.	Charles Njoroge	Mariira	Farmer & resident Wakibugi
23.	Francis Wanjibi	Mariira	Farmer & resident Wakibugi

24.	Peter Njoroge	Mariira	Farmer & resident Wakibugi
25.	Simon Kamau	Mariira	Farmer & resident Wakibugi
26.	Rhoda Wanjira	Mariira	Farmer & resident Wakibugi
27.	Keziah Wanjiku	Mariira	Farmer & resident Wakibugi
28.	Josephine Kahuha	Mariira	Farmer & resident Wakibugi
29.	Joseph Kinyanjui	Mariira	Farmer & resident Wakibugi
30.	Mary Wanjiru	Mariira	Farmer & resident Wakibugi
31.	Nancy Wanjiku	Mariira	Farmer & resident Wakibugi
32.	Joakim Waweru	Mariira	Farmer & resident Wakibugi
33.	Joyce Njeri	Mariira	Farmer & resident Wakibugi
34.	Veronicah Waithera	Mariira	Farmer & resident Wakibugi
35.	Samuel Maina	Mariira	Farmer & resident Wakibugi
36.	William Ngere	Mariira	Farmer & resident Wakibugi
37.	John Maina	Mariira	Farmer & resident Wakibugi
38.	Samuel Gitau	Mariira	Farmer & resident Wakibugi
39.	Antony Mwangi	Mariira	Farmer & resident Wakibugi
40.	Peter Maina	Mariira	Farmer & resident Wakibugi

ABBREVIATIONS

AfDB	African Development Bank
AOB	Any other Business
AWWDA	Athi Water Works Development Agency
Consultant	Gath Consulting Engineers
CDS	Community Development Supervisor
ESIA	Environment Social Impact Assessment
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RAP	Resettlement Action Plan

AGENDA

1. **Introduction.**
2. **Project brief and scope of works.**
3. **Agenda of meeting & Project anticipated impacts**
4. **Comments and Response section**
5. **Project support**
6. **A.O.B**
7. **Meeting Closure**

MINUTE No.	ITEM DESCRIPTION
Min 1 **03/04/2024**	**Introduction** The meeting began at 02:00 PM with a word of prayer from John Kinyanjui. This was followed by self-introductions by all members. The Assistant Chief welcomed the attendees and handed over the meeting to the Area Chief to take the community members through the agenda of the day.
Min 2 **03/04/2024**	**Project Brief and Scope** The Sociologist began by giving a brief introduction of the Project and stated that the Consulting agency as Losai Management Limited. She described it as engineering consulting firm contracted by Athi Water Works Development Agency (AWWDA) to oversee the implementation of water and sanitation works in the project and further explained that the Project's financiers are African Development Bank. The MUSWASCO NRWM explained the scope as follows: **SCOPE OF WATER SUPPLY AND SANITATION WORKS** The scope of construction works involves; **a) Raw Water Mains** l) Design review and rehabilitation of OD 280 mm raw water main **b) Treatment Works** m) Construction of additional 3000m3 treatment works at Mariira farm **c) Transmission Main** n) Interconnection to newly laid DN 200 mm Mariira Kenol line **d) Storage Tanks** o) Construction of 250m3 and 1250 m3 new storage /break pressure tank along the transmission main at Mutheru and Machegecha **e) Distribution Networks** p) 30km of distribution networks
Min 3 **03/04/2024**	**Agenda of the meeting** The Consultant explained that the meeting agenda as: **RAP and what it entails -** The community members were told RAP stands for Resettlement Action Plan. It's a plan that outlines how people or communities affected by a project will be compensated or assisted if they need to be relocated or experience disruptions to their lives due to the project. This includes recording of assets that are along the way of the

MINUTE No.	ITEM DESCRIPTION
	project. Details of the Project Affected Persons are also taken. Their details are crucial for implementation of the RAP process. **A cut-off** date is also set and communicated to the community members through the Chief's Office. A cut-off date is the deadline for recording all affected properties and livelihood. Any additional affected property / livelihood is not considered after the deadline. This is done for planning and execution of the Resettlement Action Plan. **Project anticipated impacts** The Sociologist explained that ESIA means Environmental and Social Impact Assessment. She also explained that public participation meeting involves the whole community in decision-making that affect their lives and their environment. The meeting was important for the community to air out their views and understand the works to be done. She stated that the ESIA report will incorporate each member's input and responses through questionnaires filled during the meeting. Subsequently, these valuable insights the report will be submitted to different regulatory bodies for licensing purposes. She further emphasized that the Water Treatment Works and Proposed Waterlines will be constructed at the County's land Mariira Farm and road reserves in Gwa Kibugi to avoid interfering with private land/ property. The process will be done through the local administration's office. The anticipated impacts are as follows; • Access to adequate clean drinking water. • Access to improved clean sanitation facilities especially to Mariira University. • Creation of various job opportunities. The local community will be considered for employment and this will be done through the administration's office. The food vendors to the workers will also be from the local community. • Economic growth as the project will open up many businesses. • Empowerment and Community Participation: During the implementation phase, there will be community engagement and participation. Community members will be actively involved in decision-making, project planning, and sometimes even construction. This participatory approach fosters a sense of ownership, empowerment, and community cohesion, leading to long-term sustainability and success of the project.

MINUTE No.	ITEM DESCRIPTION
	The Sociologist explained that there will be anticipated negative impacts during the construction phase and mitigation measures will be put in place.
Min 4 **03/04/2024**	**Discussion/Comment & Responses** The Sociologist, initiated the discussion by encouraging the residents to ask questions. The following are the comments and responses **Comment** Commented on a clearer scope. **Response** The Assistant Engineer explained the scope to the community in the simplest way possible. **Comment** John Kinyanjui stated the residents have caused the damage to the water lines by themselves. **Response** The Sociologist MUSWASCO indicated that people need to take good care of the existing water pipes. This includes no construction of permanent structures and no planting of trees on the land above the water lines. Residents need to adhere to the measures to ensure they get water and to protect the infrastructure. **Comment** Mary enquired on whether the residents will benefit from the connections. **Response** The Sociologist MUSWASCO explained that residents from Gwa- Kibugi will allow rehabilitation of the existing line. The new water line will be directing the storage tank at Mariira farm. **Comment** Keziah stated that if the residents will not be connected to the water there will not be willing to provide wayleave for it. The residents discussed the issue and stated that they were not willing to provide wayleave for the new water pipe. **Response** The local administration intervened with the residents but it was later on agreed that the project would maintain it's original scope. It was agreed

MINUTE No.	ITEM DESCRIPTION
	in unison to maintain the original scope to avoid issues with the community.
Min 5 **03/04/2024**	**Project support** The Consultant EHS Officer, inquired whether the community members would express their support for the construction of water treatment works and distribution works along Mariira. They all supported the project
Min 5 **03/04/2024**	**Any Other Business** The Assistant Chief emphasized to the residents on importance of water even in the future. He was backed up by the tea collections officials and the residents still stood by their ground on the project following it's original scope.
Min 6 **03/04/2024**	**Meeting Closure** There being no other business, The Assistant Chief thanked all for attending the meeting at 4.40PM with a word of prayer from Alex Muinde.

Photo Log

Meeting in progress at Gwa Kibugi with administration, MUSWASCO, Consultant and residents

A resident asking a question during the meeting at Gwa Kibugi with administration, MUSWASCO, Consultant and residents

Attendance list

NATIONAL URBAN WATER AND SANITATION SUPPLY PROGRAM. (NUWSSP)

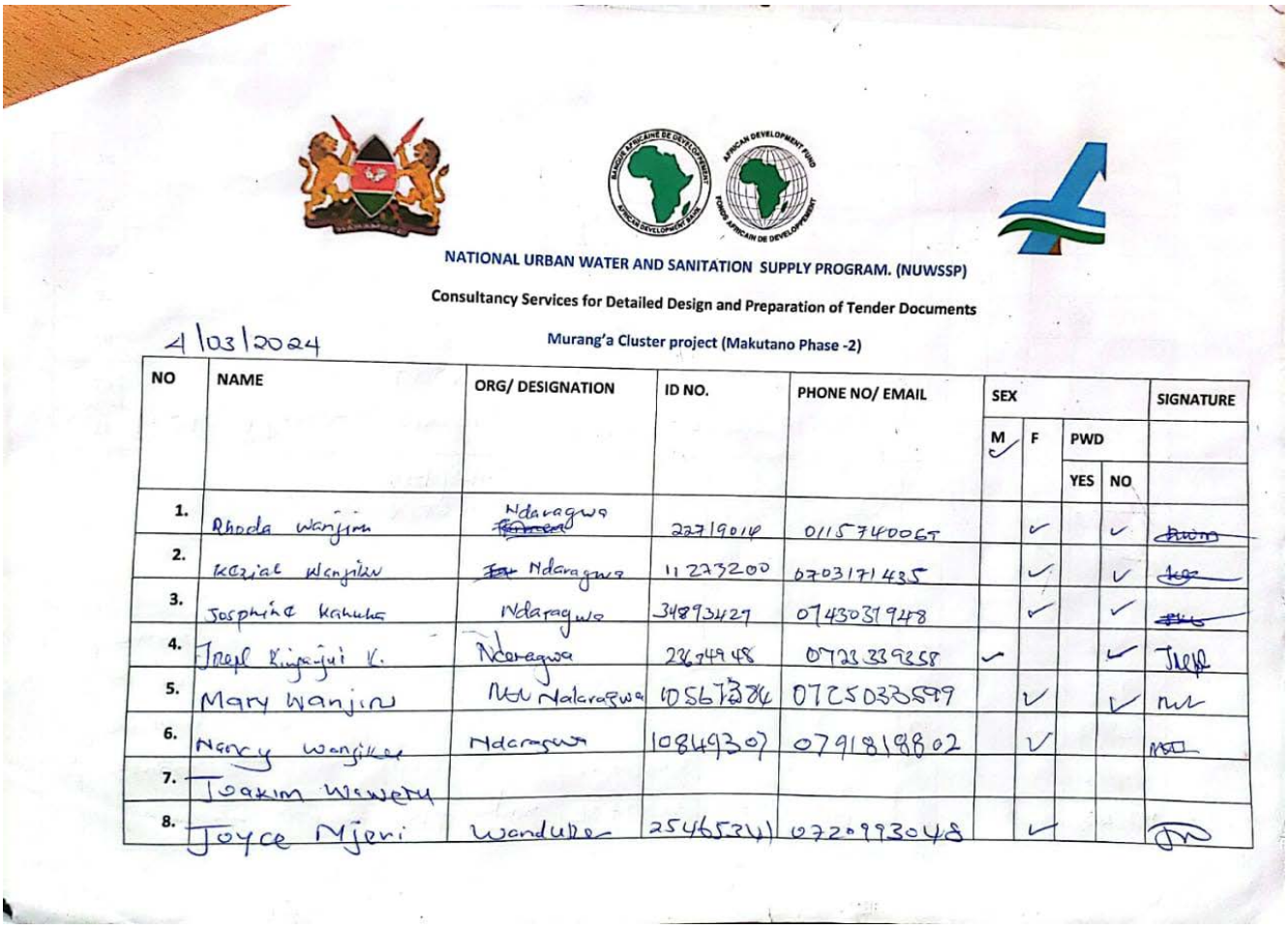
Consultancy Services for Detailed Design and Preparation of Tender Documents

Murang'a Cluster project (Makutano Phase -2)

4/03/2024

NO	NAME	ORG/ DESIGNATION	ID NO.	PHONE NO/ EMAIL	SEX		PWD		SIGNATURE
					M	F	YES	NO	
1.	BETH MACHARIA	CHIEF-MAHIIRA	13278788	0727298708		✓		✓	[signature]
2.	NJERI SU KIMANI	Farmer	✓	—	✓			✓	[signature]
3.	NJUNGU NJAGI	NRWM	27607095	0713854501	✓			✓	[signature]
4.	MAUREEN MUKIRI	PRM-MUSWASCO	27849607	0725205678		✓		✓	[signature]
5.	GERALD MWANGI	R.O. Kigumo	30064120	0723693636	✓			✓	[signature]
6.	PETERSON MURIMI	R.O Kigumo	28144783	0726166611	✓			✓	[signature]
7.	Jotham N. Kamau	Farmer	22036038	0724007213	✓			✓	[signature]
8.	Stephen Mwira	Farmer	17748324	0729433657	✓				stephen

	Name	Designation	ID	Tel NO.	Male	Fem.	PWD Yes	PWD NO	Signature
9.	Rachael Wanjiku Mwangi	Farmer	6399300	0729599592		✓		✓	Rachael
10.	Patrick Mwangi	Farmer	10849214	0715082354	✓		✓		[illegible]
11.	Joseph Kimemia	Farmer	7210191	0722815800	✓	✓		✓	[illegible]
12.	Esther Wanjiru Kimani	Farmer	21901186	0712565574		✓	✓	✓	E.W.K.
13.	Jane Wangari	Farmer	8841639 ~~0710420526~~	0710420526		✓		✓	J.W.
14.	John Mwangi Njoroge	farmer	2043955	0719608429	✓		✓	✓	[illegible]
15.	Patrick Kiagiri	farmer	10846102	0727976977	✓			✓	[illegible]
16.	Joel Kiambi	Farmer	8483413	0721643429	✓			✓	[illegible]
17.	Michael Maina	Farmer	2512339	0716838075	✓			✓	Malmaina
18.	Joseph Machaire	Farmer	2043998	0710142214	✓			✓	[illegible]
19.	John Maina	farmer	6572713	0724113022	✓			✓	[illegible]
20.	Maina Kimira	farmer	6573085	0729315294	✓			✓	[illegible]
21.	Charles Njogo	farmer	1991128	0722467955	✓			✓	[illegible]
22.	Francis Wanjibi	farmer	2040559	0795037825	✓			✓	[illegible]
23.	Peter Njoroge	farmer	1689844	0720039047	✓			✓	[illegible]
24.	Simon Kamau	farmer	3564169	0724824088	✓			✓	Simon



NATIONAL URBAN WATER AND SANITATION SUPPLY PROGRAM. (NUWSSP)

Consultancy Services for Detailed Design and Preparation of Tender Documents

4/03/2024

Murang'a Cluster project (Makutano Phase -2)

NO	NAME	ORG/ DESIGNATION	ID NO.	PHONE NO/ EMAIL	SEX				SIGNATURE
					M	F	PWD		
							YES	NO	
1.	Rhoda Wanjiru	Ndaragwa	22719016	0115740065		✓		✓	
2.	Keziah Wanjiku	Ndaragwa	11273200	0703171435		✓		✓	
3.	Josphine Kahuha	Ndaragwa	34893427	0743031948		✓		✓	
4.	Joseph Kinyanjui K.	Ndaragwa	23674948	0723339358	✓			✓	
5.	Mary Wanjiru	Ndaragwa	10567376	0725035599		✓		✓	
6.	Nancy Wangiku	Ndaragwa	10849307	0791819802		✓			
7.	Joakim Wewetu								
8.	Joyce Njeri	Wanduru	25465241	0720993048		✓			

PWD

No.	Name	Location	ID	Phone	M	F	Yes	NO	Signature
9.	Veronicah waithera	Ndaragwa	7570609	0768836015 0783360					Veronica
10.	Samuel Maina	Wakibugi	28072912	0718319997	✓			✓	[illegible]
11.	William Ngere	Wakibugi	20471609	0735460715	✓			✓	[illegible]
12.	John maina	wakibugi	2041052	0708774492	✓			✓	[illegible]
13.	SAMUEL N. GITAU	GAKIRA	7185744	0723951393	✓			✓	[illegible]
14.	ANTONY MWANGI	Wakibugi	23324434	0713332095	✓			✓	[illegible]
15.	Peter Maina	MARIIRA	21992563	0714484886	✓			✓	[illegible]
16.	Francis K. Mwangi	MARIIRA	23804228	0716841373	✓			✓	[illegible]
17.		ASST CHIEF							
18.	Purity Muthoni	Wandiogiri	13397049	0710305724		✓		✓	Purity
19.		LOCAT							
20.									
21.									
22.									
23.									
24.									

Annex 4: Grievance Resolution Mechanism

GRIEVANCE RESOLUTION MECHANISM

1. **Steps in dealing with grievances**

- Complaint received in writing from affected person
- Recording of grievance in standard form
- Reconnaissance site visit with the complainant.
- Submission of detailed complaint to Resident Engineer for resolution by negotiation.
- Submission of detailed complaint to the Grievance Committee for resolution by mediation.
- Submission of complaint to AWWDA for resolution.

2. **Composition of grievance committee**

No	Designation	Organization	Position
1.	EHS officer	AWWDA	Chair
2.	Resident Engineer	Consultant	Committee Secretary
3.	EHS officer	Consultant	Committee Assistant Secretary
4.	Site Administrator	Contractor	Member
5.	EHS officer	Contractor	Member
6.	Chief	Community Representative	Member

Annex 5: Consent Letter

Annex 6: Signed BoQs