ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED REHABILITATION OF A DILAPIDATED WATER SUPPLY NETWORK IN MANDERA TOWN, MANDERA COUNTY



CONSULTANCY SERVICES FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED INTERVENTIONS FOR CLUSTER 3' ISIOLO, NANYUKI & MANDERA WATER SERVICE PROVIDERS

JANUARY, 2025

INTERNAL QUALITY CONTROL

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CERTIFICATION

We hereby certify that the content of this Environmental and Social Impact Assessment Report for proposed rehabilitation of a water supply network in Mandera Town, Mandera County is factual and that the content conforms to the provisions of the Environmental Management and Coordination Act Cap. 387 and the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2003.

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ABBREVIATIONS

ACC	Assistant County Commissioner
ASAL	Arid and Semi-Arid Lands
CECM	County Executive Committee Member
CBO	Community Based Organization
CSR	Corporate Social Responsibility
CC	County Commissioner
CGM	County Government of Mandera
DCC	Deputy County Commissioner
DOSHS	Directorate of Safety and Health Services
DWC	Double Wall Corrugated
EMCA	Environmental Management Coordination Act
EHS	Environmental Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GDP	Gross Domestic Product
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Virus
MANDWASCO	Mandera Water & Sanitation Company
KMD	Kenya Meteorological Department (KMD
LPG	Liquefied Petroleum Gas
MCA	Member of County Assembly
MD	Managing Director

MP	Member of Parliament
MoWSI	Ministry of Water, Sanitation & Irrigation
NEMA	National Environment Management Authority
NEAP	National Environmental Action Plan
NGO	Non-Governmental Organization
O & M	Operation and Maintenance
OSHA	Occupational Safety and Health Act
PAPs	Project Affected Persons
PPE	Personal Protective Equipment
RC	Reinforced Concrete
RCC	Roller Concrete Compacted
SOPs	Standard Operating Procedures
SSHP	Site Safety Health Procedures
STIs	Sexually Transmitted Diseases
ToR	Terms of Reference
WASREB	Water Services Regulatory Board
WHO	World Health Organization
WRA	Water Resources Authority
WRUA	Water Resources Users Association
WTP	Water Treatment Plant

0 EXECUTIVE SUMMARY

0.1 Introduction

The Ministry of Water, Sanitation and Irrigation (MoWS&I) through Water Sector Trust Fund (WSTF) is implementing Water and Sanitation Development Project (WSDP) which aims at improving water supply and sanitation services in select coastal and north eastern regions in Kenya and improve the financial performance of Water Service Providers (WSPs) affected by the COVID-19 pandemic. Mandera Water & Sanitation Company (MANDWASCO) has been selected as one of the beneficiaries under this program. The program will support MANDWASCO to undertake rehabilitation of an existing water supply network. It will involve rehabilitation of existing wells which serve one of the main pipelines in Mandera town and upgrading of the same pipeline. Additionally, the project will also entail meter replacement and installations.

The proposed project is located in Mandera town, an area that is predominantly categorized as arid. It is characterized by limited water resources, evidenced by low precipitation, seasonal rivers and low surface water yields. The area also experiences frequent droughts which are exacerbated by the climate change phenomenon. The primary surface water source in the area is the Daua River, whose source is the Ethiopian highlands. It flows eastwards along the county's border with Ethiopia. However, its flow is highly seasonal and unreliable, often drying up during drought periods. Ground water is used to supplement water from Daua River through digging of wells. Mandera Water and Sanitation Company (MANDWASCO), the proponent, is mandated to provide water and sanitation services within the county. Though the company has made significant progress in water supply, its capacity is still limited by dilapidated infrastructure and low network coverage. The pipeline that is targeted for rehabilitation is served by 8No wells whose current state is deplorable. It is against this background that MANDWASCO has proposed to undertake rehabilitation works on this pipeline to enhance efficiency and improve water access in Mandera Town.

Towards this, the proponent has initiated an Environmental Social Impact Assessment (ESIA) as part of the project planning activities. The Environment Management and Coordination Act (EMCA, 1999) requires that developments of such nature be subjected to an ESIA with an aim of identifying key environmental and social issues that may arise from the project and design appropriate mitigation measures.

0.2 Project Description

The project will entail rehabilitation of an existing water supply system. The components targeted for rehabilitation include: 3No intakes; Rising mains; storage facilities and distribution lines.

Intake Works

The intake works will entail:

(i) Suftu Intake: Rehabilitating infiltration galleries, minor repairs to wells and storage tanks, site clearance, and gabion protection along riverbanks

(ii) Neboi Intake**:** Rehabilitating infiltration galleries, soil stabilization around wells, and cleaning the meter chamber.

(iii) Handadu / Shafshafey Intake: Fencing the intake site, well rehabilitation, minor repairs to meter chambers, and replacing one pumping unit.

Rising Mains (24.5 km rehabilitation works)

Each intake has its own pumping water main, with diameters ranging from 75mm to 160mm and approximately 24 km in length. The water mains transport water to 12 elevated and ground-level tanks around Mandera Town.

Proposed works include replacing defective bulk meters, installing a bulk meter on Shafshafey Line 2, replacing the entire hospital line (24km) and sections of Neboi pumping mains (500m), relocating the Neboi rising main, realigning distribution mains, and providing air valves and washouts.

Storage System

Proposed works include minor rehabilitation of 3No ground level masonry tanks. The rehabilitation works will include: drainage system provision, vent pipe installation, metal ladder installation, chain-link fence construction, faulty washout valve replacement, flow meter installation, and tank scouring and cleaning.

Distribution Lines

The water distribution system covers approximately 28 km2, with pipelines ranging from 40mm to 160mm in diameter, mainly uPVC and GI pipes, totaling around 69 kilometers.

Proposed works include repairing/reconstructing broken chambers, providing chamber covers, installing marker posts, clearing chambers of debris, constructing chambers for unhoused appurtenances, and pipeline rehabilitation of 10 km

Meter Replacement

This will entailsupplying and installing 1,500 DN 20 and 500 DN 25 consumer meters to improve measurement accuracy and management.

-

0.3 Objectives of the ESIA

The specific objectives of the assessment include:

- ❖ To establish the baseline conditions in the project area so as to determine the likely impacts of the project on existing resources and infrastructures
- ❖ Ensuring compliance with relevant environmental and social regulations, policies, and standards at local, national and international level
- ❖ To identify both positive and negative environmental impacts associated with the project and provide for mitigation measures
- ❖ Identification and analysis of stakeholders for purposes of stakeholder consultation

- ❖ Evaluating the significance and magnitude of identified impacts to determine their potential importance and consequences.
- ❖ Developing appropriate mitigation measures and management strategies to avoid, minimize, or offset adverse impacts on the environment and affected communities.
- ❖ Preparation of an Environmental and Social Management Plan (ESMP) and an Environmental and Social Monitoring Plan
- ❖ Providing recommendations to enhance the project design and planning to maximize positive impacts and reduce negative impacts on the environment and communities.
- ❖ Creation of awareness about the project and obtain opinions and concerns regarding the proposed project
- ❖ Providing decision-makers with comprehensive information

0.4 Project Methodology

The EIA team conducted Project Screening and Scoping that identified all the environmental impacts associated with the proposed project. A Stakeholder Engagement Plan was developed as per the mapped stakeholders. A household survey was undertaken targeting 100 respondents. Key Informant Interviews were conducted. Public meetings were also held to create awareness about the project and obtain their views. The views of the public and secondary stakeholders are summarized in Chapter Five of this report.

0.5 Policy Legal and Regulatory Framework

The following policies and regulatory frameworks were reviewed by the consultant:

- ✓ Mandera County Climate Change Adaptation Policy
- ✓ Mandera County Health Services Act, No. 4 of 2019
- ✓ The Mandera County Disaster Risk Management Bill, 2023
- ✓ Mandera County Public Works and Services Act
- ✓ Water Act, 2016
- ✓ Water Management Regulations, 2021
- ✓ Water Quality Regulations, 2006, (Legal Notice No.121),
- ✓ Environment Management & Coordination Act Cap 387
- ✓ The Environmental (Impact Assessment and Audit) Regulations, 2003/Legal Notice 31 & 32
- ✓ Environmental Management and Coordination (Conservation of Biological Diversity) Regulations 2006
- ✓ Environmental Management and Coordination (Wetlands, Riverbanks, Lake Shores and Sea Shore Management) Regulations 2009
- ✓ Environmental Management and Co-ordination (Controlled Substances) Regulations, 2007
- ✓ Environmental Management and Co-ordination (Waste Management) Regulations, 2006
- ✓ Environmental Management and Coordination (Noise and Excessive Vibration Pollution) Control Regulations, 2009
- ✓ Sustainable Waste Management Policy
- ✓ Sustainable Waste Management Act

- ✓ Extended producer Responsibility Regulations
- ✓ Land Act 2012
- ✓ Physical and Land Use Planning Act
- ✓ County Government Act 2012
- ✓ Occupational Health and safety Act
- ✓ National Gender and Development Policy, 2019

0.6 Public Participation and Stakeholder Engagement

The assessment involved mapping and identification of key stakeholders in water supply and generally water resource management. The aim was to inform them of the proposed project, seek their opinion and expertise and develop an environmental management plan based on this input. The key stakeholders engaged were drawn from Department of Water services, Department of Environment, National Government Administration Office-Mandera. Public participation involved household data collection to establish individual concerns and opinions regarding the project. The outcome of these meetings and household survey is annexed to this report.

0.7 Project Alternatives

(i) No project Alternative

This alternative entails maintaining the current status quo without implementing the project. Potential negative impacts include continued dilapidation of the pipeline, water leakage, unaccounted for water-increased Non -Revenue Water, water shortages, high operational and underutilization of local skills. It also risks exacerbating water-related conflicts and vandalism of existing infrastructure. However, opting for the "No Project" alternative would avoid potential environmental disturbances and maintain current conditions.

(ii) Development Alternatives

The proponent has two options including: constructing a new pipeline to serve the residents of Mandera town who are not connected to water supply; and rehabilitating the old pipeline and its water sources to increase its capacity. The first option is advantageous as it will allow for optimal designing taking into consideration the current and projected population. However, this option is costly and require laborious planning processes. The second option is more affordable and will not require elaborate planning processes. It will be implemented the same space hence will not require any land acquisition. It is however disadvantageous in that the scope of expansion is limited to the existing water source and coverage area. Despite this, it is notable that rehabilitation will significantly increase water supplied to Mandera residents.

0.8 Project Category

The proposed project which involves the rehabilitation of an existing water supply system, is classified as a **Medium Risk Project** *ref. Legal Notice 31 (3c) Water Supply and distribution infrastructures* which requires proponents to submit a comprehensive project report

0.9 Potential Project Impacts and Proposed Mitigation Measures

	Positive Impacts	Negative Impacts

Construction Phase	• Job opportunities • Skill transfer to the local communities • Promotes local businesses through sourcing of construction materials locally and other enterprises such as accommodation and catering • Improvement of infrastructure-pipeline, wells • Improved livelihoods in the area as money generated from increased businesses in the area	• Conflict due to disagreements on wages, piece rate, allocation of employment opportunities • Devegetation along the pipeline • Land degradation due to excavation during pipe laying • Noise and vibrations • Solid waste generation • Soil disturbance-hanging gulley and steep • Occupational hazards such as falls, fire and other injuries • Increased population influx-insecurity, moral decadence • There may be increased risk of HIV/AIDS transmission particularly due to influx of migrant workers who may engage in casual sexual relationships due to their temporary stay • Workers' influx due to availability of casual employment which may create pressure on services or cultural conflicts • Increased risk of child labour on site due to high number of non-school going children. • Children may be indirectly involved through sale of food and provision of support services • Construction sites pose a risk of sexual exploitation and abuse from rogue workers.

<table>
<tr><td>Mitigation Measures</td><td colspan="2">Involvement of all stakeholders including local leaders in project planning
Establish standard procedures for skilled and non skilled employment
Institute a grievances and redress committee
Demarcate construction areas and routes to avoid unnecessary vegetation disturbance
Rehabilitate disturbed sites after pipe laying and intake rehabilitation works
Adhere to the noise and vibrations protocols provided for in regulations
Engage a EHS expert to enforce OSH guidelines
Community sensitization on security and moral issues that may result from the project
Conduct HIV/AIDS sensitization to workers and community through weekly talks and on-site sensitization materials
Prioritize locals in provision of employment opportunities and sensitize workers and migrants acceptable social conduct in this community
Establish an employment policy which regulates the age of workers to those above 18 years.
Provide signages with sensitization and warning messages against sexual exploitation and abuse
Develop a code of conduct for workers on matters sexual exploitation and abuse and sensitize the community on the GRM procedure.</td></tr>
<tr><td>Operation Phase</td><td>Positive Impacts</td><td>Negative Impacts</td></tr>
<tr><td></td><td>Direct Impacts
Regular supply of quality water to the Mandera residents
Access to water for livestock
Increased revenue to MANDWASCO
Cumulative Impacts
Reduced cases of water borne diseases among the locals
Improvement of livelihoods
Improved local economic development
Increased productive time (school, business activities)</td><td>Direct Impacts
Possibility of water contamination at source or during reticulation.
Continuous extraction may lead to lowered water tables, impacting local ecosystems and vegetation.
Water use conflicts especially during the dry season
Illegal connections and vandalism which may affect MANDWASCO operations</td></tr>
</table>

	• Institutional strengthening & Capacity building for the water company	
Mitigation Measures	• Establishing a regular maintenance schedule for wells, pumps, and treatment facilities. • Developing contingency plans for quick response to infrastructure failures or emergencies. • Promoting integrated water resources management that includes rainwater harvesting, groundwater recharge, and use of alternative water sources for purposes of sustainability • Regular testing and monitoring of water quality by MANDWASCO and WRA to ensure it meets safety standards • Implementation of institutional /community awareness programs on water hygiene and safe usage practices. • Sensitizing community on pipeline safety protocols e.g. access control, emergency response in case of contamination and environmental protection • Implementing effective billing systems and revenue collection mechanisms to enable continued operation and maintenance	
Recommendations	• During the construction phase, provide an open communication channel to facilitate engagement between community, MANDWASCO and Contractor • All relevant stakeholders should be actively involved in the project from the planning, design, construction to commissioning • Engage the local leaders to create a 'buy in' and project support to ensure sustainability	

Summary of the ESMP and the implementation arrangements

Several impacts have been identified that are likely to affect the project both positively and negatively. They have also been identified based on three different project phases: construction, operation and decommissioning phase. A plan illustrating how the identified impacts will be managed throughout the project cycle has been formulated. However, it is important to note that before the construction commences, the contractor will be required to develop an updated Construction Phase-Environmental and Social Management Plan (CP-ESMP) that will be implemented during the construction phase of the project. MANDWASCO will oversee the implementation of the ESMP through its ESS unit. The contractor will be expected to hire an EHS to implement the CP-ESMP and provide weekly monitoring reports. MANDWASCO will require to undertake capacity building for its ESS staff prior to the project implementation.

1 INTRODUCTION

1.1 Project Background

Mandera County is situated in the far North-eastern part of Kenya and covers an area of approximately 25,942 square kilometres. The climate is characterized by high temperatures and low rainfall, typically annual average rainfall is 255mm, with the eastern and southern part of the county receiving an annual average of below 240mm. The primary surface water source in the county is the Daua River, whose source is the Ethiopian highlands, flows eastwards along the county's border with Ethiopia. However, its flow is highly seasonal and unreliable, often drying up during drought periods. Ground water is used to supplement water from Daua River through development of boreholes and shallow wells. These often have high levels of salinity or contamination from various sources, making the water unsafe for consumption without treatment.

The coverage of piped water systems is limited, and water points are often distant from residential areas, requiring long walks to fetch water. The county faces challenges in maintaining and expanding water infrastructure. Existing infrastructure, such as pipelines and storage facilities require repair and upgrading to meet the growing demand for water. Access to water remains a challenge for many residents, particularly women and children who typically bear the responsibility for water collection. The main water provider in Mandera is Mandera Water and Sewerage Company (MANDWASCO), a county owned utility company. The company has limited capacity due to lack of adequate water resources in addition to dilapidated infrastructure. Currently, MANDWASCO supplies about 1,534 $m^3$of water per day, which is far below the demand, estimated at 9,266 m3 per day. This gap in water supply can be significantly reduced by improving water supply infrastructure.

The proposed project is a key component of the Conditional Liquidity Support Grant (CLSG) programme, aimed at enhancing water supply and sanitation services in the north-eastern and coastal regions, while also improving the financial performance of Water Service Providers (WSPs) impacted by the COVID-19 pandemic. This initiative is being implemented by the Ministry of Water, Sanitation, and Irrigation (MoWSI) through the Water Sector Trust Fund. For the Mandera project, MANDWASCO will focus on rehabilitating existing infrastructure to ensure reliable water supply. The project includes the following key activities:

- Rehabilitation of Existing Wells: Upgrading and maintaining current wells to improve their functionality and reliability.
- Upgrading Water Pipelines: Rehabilitating aged and dilapidated pipelines, including 34.5 km of HDPE pipelines (50mm to 160mm diameter) to restore and enhance water distribution efficiency.
- Meter Replacement and Installation: Supplying and installing 1,500 DN 20 and 500 DN 25 consumer meters to improve measurement accuracy and management.

MANDWASCO's primary mandate is ensuring a consistent and reliable water supply to Mandera residents. By rehabilitating existing infrastructure, the project aims to improve water access, public health and overall service delivery in the county. Improved water supply in Mandera county is a component of the new development strategy that seeks to ensure arid and semi-arid counties are included in the country's development agenda. Sessional Paper No 8 of 2012 for sustainable development of Northern Kenya and other arid lands recognizes the need to prioritize water access so as to accelerate development which will consequently address insecurity and high level of vulnerability in the region.

1.2 Project Justification

Mandera Town and its environs fall under the arid and semi-arid lands (ASAL). The area receives low rainfall, experience frequent dry periods, seasonal rivers and has an acute shortage of clean water supply. The problem is compounded by the increased urban population occasioned by border activities and the positive fruits of devolution which has created opportunities in what was small market centres and towns turned into busy commercial centres and local government administrative centres. As a result, the existing service infrastructure cannot meet the current water demand in Mandera town. There is need to upgrade what is existing through rehabilitation and development of new pipelines. Rehabilitation offers a low-lying fruit which can be leveraged in the short term.

1.3 Purpose of the Study

The implementation of service infrastructure provides multiple benefits to both the targeted community and the country as well. These benefits include improved service access, enhanced public health, improved livelihoods and economic development. More specifically, construction of water infrastructure will help in improving accessibility of clean water to residents, ensuring consistent water supply and improved sanitation among residents. However, it is notable that the construction and operation processes may generate negative environmental and social impacts. Such negative effects if not properly managed may obscure the realization of benefits anticipated from the proposed development. It is therefore paramount that a comprehensive assessment of possible negative impacts is undertaken to identify mitigation measures and safeguards that need to be instituted during the project period.

To ensure that development provides optimal benefits without creating a significant social and environmental burden, the Government of Kenya has put in place policy, institutional, and legislative framework to address major causes of environmental degradation and negative impacts on ecosystems deriving from development programs. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound. It is an obligation of the Kenya Government to conduct an Environmental and Social Impact Assessment (ESIA) on development projects such as the proposed one. The ESIA assesses the impacts of a proposed project before commencement of implementation. In addition to helping formulate environmental management framework, ESIA provides for public participation in the decision-making process within the proposed project.

1.4 Objectives of the Study

The specific objectives of the ESIA study include:

- To provide a project background and detail the project components to determine the impact of different project activities.
- To establish the baseline conditions in the project area so as to determine the likely impacts of the project on existing resources and infrastructures
- Ensuring compliance with relevant environmental and social regulations, policies, and standards at local, national and international level
- To identify both positive and negative environmental impacts associated with the project and provide for mitigation measures of the negative impacts.
- Identification and analysis of stakeholders relevant to the project at both national and local levels for purposes of stakeholder consultation
- Evaluating the significance and magnitude of identified impacts to determine their potential importance and consequences.
- Developing appropriate mitigation measures and management strategies to avoid, minimize, or offset adverse impacts on the environment and affected communities.
- Preparation of an Environmental and Social Management and Monitoring Plan (ESMMP) including proposed work programs, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigating measures.
- Providing recommendations to enhance the project design and planning to maximize positive impacts and reduce negative impacts on the environment and communities.
- Creation of awareness about the project and obtain opinions and concerns regarding the proposed project i.e. location, design, operation and management through public participation and consultation meetings as per Part II Section 17 of the Environmental (Impact assessment and Audit) Regulations, 2003
- Providing decision-makers with comprehensive information and analysis to support informed decision-making regarding project approval, modification, or rejection.

1.5 Scope of the Study

In accordance with the ToR, the scope of the assignment entails:

a) Detailed description of the proposed project
b) Assessment of the baseline conditions in the project area
c) Stakeholder engagement
d) Analysis and Assessment of Potential impacts and recommendations for mitigation and potential development needs
e) Cumulative impact assessment
f) Waste Management (Solid and liquid/ effluents/wastewater)
g) Analysis of the relevant policy, legal and regulatory frameworks
h) Analysis of alternative to the project site, design and inputs

i) Development of an environmental and social management and monitoring plan

1.6 Approach and Methodology

The ESIA study utilized a systematic approach to identify the environmental and social impacts of a project, and describing the mitigation, management and monitoring measures that will be implemented to address these impacts. The approach also entailed stakeholder engagement. Ultimately, the study allows relevant organizations to make informed decisions about development proposals, and potentially affected stakeholders to participate in the process.

1.6.1 ESIA Process

1.6.1.1 Screening

The expert undertook an initial identification of potential interactions between the Project and physical, ecological and human receptors indicating the level of impact assessment required. It involved examination of relevant national and international legislative requirements and an illustration of the potential interactions of project activities with the physical, ecological and human receptors.

1.6.1.2 Scoping

This stage outlined the perceived required scope of the ESIA to be undertaken, taking into consideration the nature of the project, the results of the screening and applicable requirements. This stage included:

a) **Issues Identification**- a process of systematic identification of potential interactions between Project activities or events and known receptors
b) **Desk-Based survey**- a review of existing environmental and social information, and gap analysis to identify additional baseline information required for the impact assessment.
c) **Identifying receptors-** Identification of potential physical, ecological, and human receptors that may be affected by the Project
d) **Analysis of Alternatives**- undertaking an analysis of technically and financially feasible alternatives for the proposed project sites.

1.6.1.3 Baseline Field Surveys

Field Studies included:

- **Baseline Survey:** The expert undertook a household survey within the project area to understand the existing socio-economic conditions. The information was used in assessing the socio- economic implications of the proposed project.

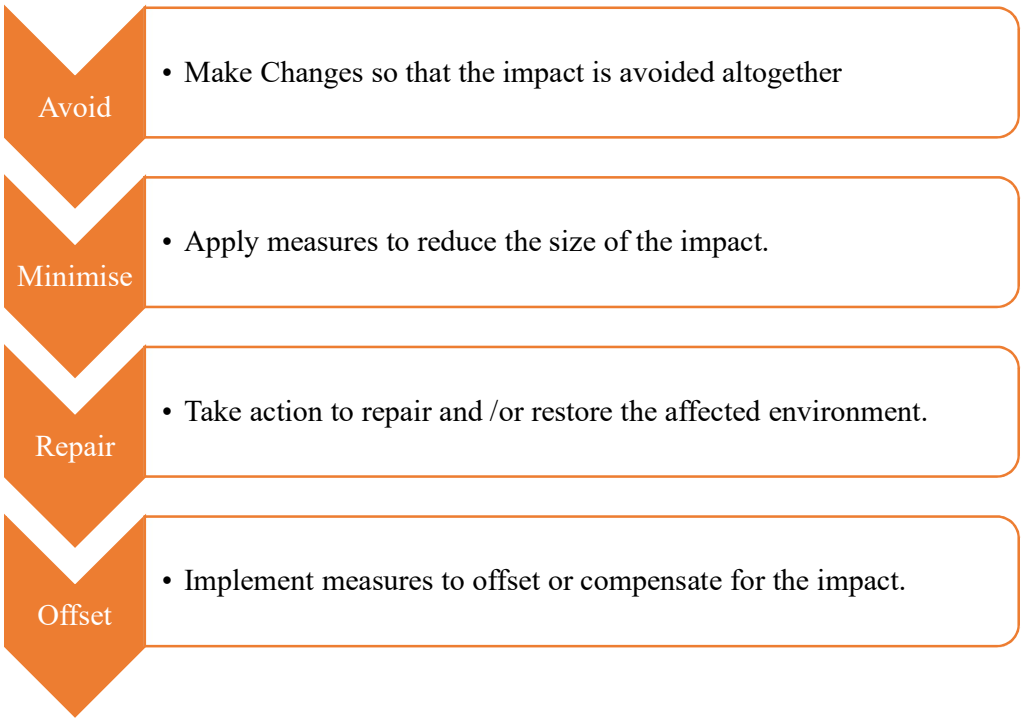
1.6.2 Impact Assessment Framework

The process of assessing the potential project impacts is centred on the following aspects:

- Prediction-What will happen to the environment because of this project?
- Evaluation-Will it have a beneficial or adverse effect? How big is the change expected to be? How important will it be to the affected receptors?

- Mitigation: If the impact is of concern, can anything be done to avoid, minimise, or offset the impact or to enhance potential benefits?
- Residual Impact: After mitigation, is the impact still of concern?

The hierarchy as illustrated in the chart below will inform the mitigation measures:



Environmental and Social Management Plans (ESMPs) are developed to capture all mitigation and management measures, and environmental and social commitments made within the ESIA Report. Adherence to these plans will be a condition of any Project construction and operation contracts awarded.

1.6.3 Stakeholder Engagement

This involved mapping out the relevant stakeholders who are likely to be affected by the proposed project either directly or indirectly. A stakeholder analysis was conducted to determine their level of power and interest to know the best approach for engaging them and the significance of their input to the project. The outcome of this engagement was analysed in the Public Participation Chapter 5 of this report.

1.7 Structure of the Study Report

Environmental and social impact assessment will include:

Executive summary: This section presents a summary of the entire report.

Chapter 1: Introduction: This chapter gives description of the Project Background, Justification of the Project, Study Methodology and Field Findings, and Scope and Content of the project.

Chapter 2: Project description: This chapter gives a description of the status of the project in the project cycle, specifically during construction, operation and decommissioning.

Chapter 3: Policy, legal and institutional / administrative framework: This chapter outlines the overview of legislative framework, regulatory, international guidelines and conventions relevant to this project.

Chapter 4: Environmental setting: This chapter gives description of the environmental setting of proposed project and surrounding areas, e.g., climate, soils, geology, vegetation, fauna, land use, human populations, socioeconomics, cultural heritage.

Chapter 5: Stakeholder Engagement: This chapter gives description of the objectives, methods used and summary of results of the public consultation activities undertaken during the ESIA.

Chapter 6: Analysis of alternatives: This chapter gives a description of the project details of the proposed project, alternative options, designs and implementation strategies.

Chapter 7: Assessment of environmental impacts and mitigation measures: This chapter presents the analysis of beneficial and adverse impacts of the project on the biophysical and human (social, cultural and economic) environments. The analysis covers anticipated impacts during the construction, operation phases and decommissioning phases and describes the enhancement and mitigation measures proposed to enhance benefits.

Chapter 8: Environmental and social management and monitoring Plans: This chapter presents the proposed Environmental and Social Management and Monitoring Plans prepared for the project.

Chapter 9: Conclusion and recommendations: The conclusion briefly presents the environmental and social acceptability of the project, taking into account the impacts, measures and recommendations identified during the assessment process.

Appendix and Annex: This section presents attached documents such as Minutes of stakeholder meetings and evidence of key informant meetings.

2 PROJECT DESCRIPTION

2.1 Project Location

2.1.1 General Project Area

The proposed project is set within the jurisdiction of MANDWASCO, covering a service area of 160 km² across 12 sublocations in the 9 locations of Mandera Town, Kenya. This area includes essential governmental offices (both National and County), security installations, businesses, residential housing, institutions, and livestock rearing centers.

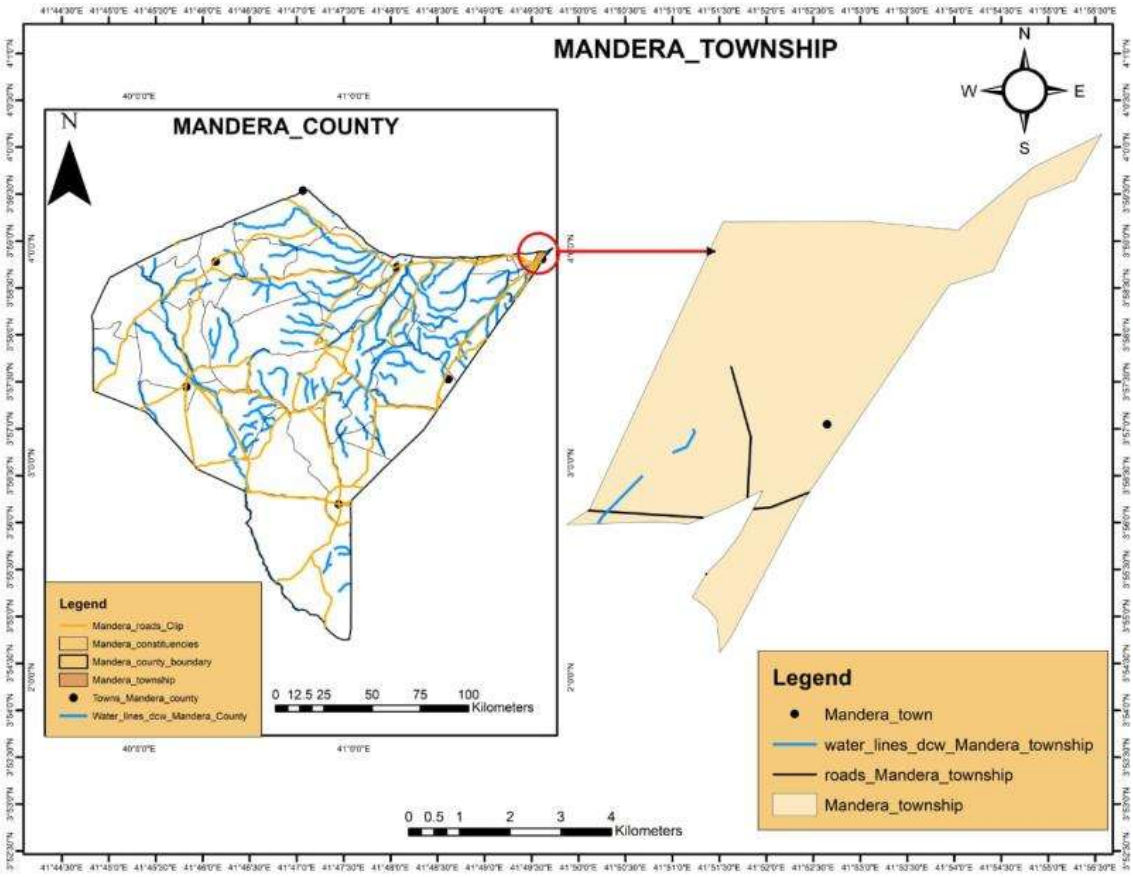


Figure 2-1: Map of Mandera Town

2.1.2 Description of the Proposed Project

The proposed project will be implemented by MANDWASCO within their area of jurisdiction. The service area of MANDWASCO spans 160 km2 and falls within 12 sublocations in the 9 locations of Mandera Town. This area is occupied by National Government offices, County Government of Mandera offices, security installations, businesses, residential areas, learning institutions and livestock rearing centers.

Locations and Sub-Locations of coverage

S/No.	Location	Sub-Location	Area (Km²)
1	Bulla Jamhuria	Bulla Power	4.0
		Bulla Jamhuria	0.9
		bulla Nguvu	0.9
2	Central	Central	2.6
3	Township	Township	4.58
4	Kamor	Kamor	2.6
5	Bulla Mpya	Bulla Mpya	3.0
6	Border Point 1	Border Point 1	9.6
7	Barwako	Barwako	27.6
		Bokolow	2.8
8	Shaf-shafey	Shaf-shafy	16.8
9	Neboi	Neboi	22.3
Total Area			160.70

2.1.3 Current State of Water Supply Infrastructure

The current water production is estimated at 2,550 m³/day, but this value generally fluctuates during the wet and dry seasons. There are several operational problems in the water supply. The entire scheme is not metered making it difficult to account for the water produced and distributed to consumers. Storage capacities are inadequate, and some consumers have resorted to constructing very large underground tanks (locally known as berkads). Individual water vendors are also exploiting ground water resources through wells and then selling water to the public by water bowsers, donkey carts and other means. The system also heavily relies on pumping, contributing to high energy costs to the water company. However, electricity supply in the town is generally stable and there are limited interruptions in pumping operations.

The Water Distribution System comprises mainly of GI and uPVC pipes varying in sizes of 40 to 160mm dia. total length approximately 93 km. Sections of the system are dilapidated, thereby contributing to high Non-Revenue Water, frequent water supply interruptions and high maintenance costs experienced by the water company. The growing menace of prosopis juliflora also contributes to the high maintenance costs as the fibrous roots intrudes into pipes through small cracks and leaking joints, thereafter, causing obstructions and blockages.



Plate 2-1: Existing infrastructure at suftu intake

2.1.4 Project Components

2.1.4.1 Water Source and Intake Works

The main water source in Mandera Town is River Daua, a transboundary river that flows through Ethiopia and Kenya thereafter draining into Somalia. The river is seasonal in nature with the flow reducing in the three months of January, February and March. Kamor Lagga divides Mandera Town into two equal parts with each half being supplied by an independent Water Supply located in it. Suftu intake, Haji Kerow and Boystown serve the upper part of Kamor Lagga with the lower part being served predominantly by Neboi, Handadu and Shafshafey intakes. This section provides an assessment of all the intakes and proposed rehabilitation works.

PROPOSED WORKS
<u>i) Suftu Intake</u> i. Rehabilitation of all infiltration galleries, to be carried out during the dry season ii. Minor rehabilitation works on wells i.e. covers, soil stabilization around the well, plastering etc. iii. Minor rehabilitation works on storage tanks i.e. scouring and cleaning, hacking of concrete, plastering and waterproofing of internal and external walling, painting, repair of access iv. covers, scour valve chambers and drainage pipes v. General site clearance and graveling of muddy and ponding sections vi. Gabion protection along the banks of the river to prevent the continued bank erosion experienced

Neboi Intake

vii. Rehabilitation of all infiltration galleries
viii. Minor rehabilitation works on wells i.e. covers, soil stabilization around the well, plastering etc.
ix. Soil stabilization around wells using hardcore & marram filling compacted in layers of 200mm up to 2-meter depth recommended
x. Cleaning of meter chamber through the removal of mud and cleaning of meter and associated fittings with wire brush recommended

Handadu / Shafshafey Intake

i. Fencing of the intake site to reduce trespassing and restrict unauthorized access
ii. Rehabilitation works on wells
iii. Minor rehabilitation works on meter chambers i..e removal of debris, cleaning of fittings and appurtenances with wire brush, replacement of defective meter etc.
iv. Replacement of 1 Nr pumping unit

2.1.4.2 Pumping Water Mains

Each intake has its independent pumping water main. The raw water pumping mains are of varying diameters ranging from 75mm to 160mm and are approximately 24 km long. The materials vary from GI and UPVC in some sections. The water mains transmit water from the various intake sites to 12 Nr elevated, and ground level tanks located at high elevation areas around Mandera Town. The pipelines are along the road reserve and there are bo structural encroachment on the line. The area is however infested with Juliflora prosopis which will need to be cleared.

PROPOSED WORKS

- ✓ Replace 2 Nr defective bulk meter
- ✓ Installation of bulk meter on Shafshafey Line 2
- ✓ Replacement of entire hospital line and sections of Neboi pumping mains which is approximately 24 km.
- ✓ Relocation of Neboi rising main from the Lagga (500m)
- Re-align distribution mains to pass through designated wayleaves and road reserves
- ✓ Provision of air valves and washouts on all pumping water mains, as per guidelines

2.1.4.3 Storage System

The storage system is comprised of 3 No ground level masonry tanks, 2 No elevated plastic tanks and 11 Nr elevated steel tanks with tower heights ranging from 3 meters to 18 meters. The total existing storage capacity is approximately 1,480 m^3.

PROPOSED WORKS
Minor rehabilitation works required i.e., hacking of existing plaster, plastering and water proofing, painting for all tanks Provision of drainage system for all the tanks Install vent pipes with protective mesh Install metal ladder fixed on internal and external wall of the tank Construct chain-link fence around open access tank site Replace faulty washout valves Install flow meters on all outlet water mains Scouring and cleaning of all tanks

2.1.4.4 Distribution System

The Water Distribution System serves an area of approximately 28 Km^2. The Distribution System comprises of pipelines of diameters varying from 40mm to 160mm. The existing pipes are mainly uPVC and GI pipes, approximate total length 69 kilometers.

PROPOSED WORKS
• Repair / reconstruct broken chambers Provide chamber covers where missing / broken. • Install marker posts • Clear chambers of debris • Construct chambers for unhoused appurtenances within chambers, are exposed or completely buried • Soil and rubbish are common in chambers • Clearance in some chambers heavily encroached by prosopis juliflora shrubs • pipeline rehabilitation of 10 km of (50mm to 160mm diameter)

2.1.5 Project Classification

The proposed project which involves the rehabilitation of an existing water supply system, is classified as a **Medium Risk Project** *ref. Legal Notice 31 (3c) Water Supply and distribution infrastructures* which requires a proponent to submit a comprehensive project report to the National Environment Management Authority.

2.2 Total Project Cost

The total project cost is for the proposed project is estimated at Twenty million four hundred and ninety and seven hundred shillings only (Ksh 20,490,700.00).

3 POLICY, LEGAL AND REGULATORY FRAMEWORK

3.1 Introduction

3.1.1 The Constitution of Kenya

The Constitution is the supreme law of the Republic that governs all persons and all State organs at all levels of government. In relation to the environment, article 42 of chapter one, *The Bill of Rights,* confers to every person the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative measures, particularly those anticipated in Article 69, and to have obligations relating to the environment fulfilled under Article 70. In addition, Article 21 entrenches water as a constitutional right by establishing a right to "clean and safe water in adequate quantities". This article places an obligation on the government to take steps to progressively realize this right.

3.1.2 The Kenyan Vision 2030

The Kenya Vision 2030 is a policy document outlining Kenya's development programme covering the period between the years 2008 to the year 2030. The objective of Vision 2030 is to help transform Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens in a clean and secure environment by 2030. Additionally, the Kenya Vision 2030 also has environmental goals outlined under the social pillar. According to the pillar, Kenya aims to be a clean, safe and sustainable environment by 2030. The country aims to achieve this goal by for example, improving pollution and waste management strategies. By commissioning an environmental impact assessment study for the project, the proponent has displayed his desire to support the Kenya Vision 2030. Further, the development blueprint seeks to ensure that improved water and sanitation is available and accessible to all. The main goal is to **improve access to water** and sanitation, have an **innovative self-financing mechanism for the sector**, and adequate investment planning to move the water sector into the path of Vision 2030. The economic, social, and political pillars of the vision 2030 are further anchored on infrastructure as one of the key foundations for the Vision 2030.

3.1.3 National Policy on Water Resources Management and Development

The National Water Policy of April 1999, known as Sessional Paper No. 1 of 1999, advocates for decentralizing operational activities from the central government to various sectors, including local authorities, the private sector, and encouraging community involvement. This

decentralization aims to enhance efficiency in delivering water services. The policy addresses issues such as water supply, sanitation facilities development, institutional framework, and financing within the water sector. Its overarching goal is to establish a rational and efficient framework to meet water needs for national economic development, poverty alleviation, environmental protection, and the social wellbeing of citizens through sustainable water resource management.

This approach encourages county government in Mandera to play active roles in improving water service delivery efficiency. By implementing sustainable water resource management practices and ensuring adequate infrastructure development, Mandera can meet its water supply needs effectively. *The policy also underscores the significance of institutional frameworks and financing mechanisms tailored to local contexts, which MANDWASCO can utilize to enhance their operational capabilities and ensure equitable access to clean water for all residents. This Conditional Liquidity Support Grant (CLSG) programme provides an opportunity for water infrastructure development through an innovative funding mechanism.*

3.1.4 Policy Guidelines on Environment and Development

Among the key objectives of the Policy Paper on Environment and Development (Sessional Paper No.6 of 1999) are: -

a) To ensure that from the onset, all development policies, programmes and projects take environmental considerations into account,

b) To ensure that an independent environmental impact assessment (EIA) report is prepared for any industrial venture or other development before implementation,

c) To come up with effluent treatment standards this will conform to acceptable health standards.

Under this paper, broad categories of development issues were covered that require sustainable approach these issues include the waste management and human settlement sectors. The policy recommended the need for enhanced re-use/recycling of residues including wastewater, non-waste technologies, increased public awareness raising and appreciation of clean environment. *The proponent, MANDWASCO is therefore obligated to provide wastewater management system to those who will be connected to the proposed water supply network.*

3.1.5 Sustainable Development Goals

Goal number eleven of the global sustainable development goals focuses on making cities inclusive, safe, resilient and sustainable. Some of the goal's targets which are relevant to the project include: to ensure access for all ; adequate, safe and affordable housing and basic services and upgrade slums by 2030 and to enhance inclusive and sustainable urbanization and capacity for sustainable human settlement planning in all countries by 2030. *The proposed project will contribute to this goal directly through increased access to water supply among urban residents of Mandera which will consequently contribute to multiple SDGs including: No Poverty, Zero*

Hunger, Good Health and Well-being, Quality Education, Gender Equality, Clean Water and Sanitation

Water Regulatory Framework

3.1.6 Water Act, 2016

The Water Act 2016 provides for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water. Under this provision, the responsibility to regulate access, use and control of water resources is vested with the Water Resource Authority (WRA). Further it provides for the inclusion of communities living along the water resources in development projects. The Water Resource User Association (WRUA) are for consideration of project impacts on the community.

Part II section 18 of this act provides for the national monitoring and information systems on water resources. Sub-section 3 of this allows the water management authority to demand from any person or institution, specified information samples or raw material on water resources. Under these rules, specific records may require to be kept by a site operator and the information made available to the authorities as and when required.

Section 73 of the act allows a person with a license to supply water to make regulations for purposes of protecting against degradation of water resources. Section 75 allows the licensee to construct and maintain drains, sewers and other works for intercepting, treating or disposing of any foul water arising or flowing upon land for preventing pollution of water within their jurisdiction. In Kenya, water is regarded as a national resource and is therefore owned by the state for and on behalf of the people (Section 3).

Section 36 requires applications for permit made in case of proposed diversion, abstraction, obstruction, storage or use of water from a water body.

MANDWASCO is required to obtain an abstraction variation permit. It is also a requirement to regularly undertake sample testing to determine the quality of water at the point of intake and distribution. These records should be availed to WRA upon request. MANDWASCO is also required to design regulations for purposes of safeguarding River Daua.

3.1.7 Water Management Regulations, 2021

These regulations provide that any individual or entity planning to engage in activities involving the use of water from a water resource, such as rivers, lakes, streams, or groundwater, must first obtain a permit from the relevant regulatory Authority. This regulation ensures that water usage is controlled to prevent over-extraction, pollution, or misuse, promoting sustainable management of water resources. The permit application typically requires details on the purpose of water use, the specific location of the water resource, the estimated quantity of water needed, and the intended duration of the activity. In some cases, an environmental impact assessment may be necessary to evaluate potential effects on local ecosystems and

communities. The Authority reviews applications and may impose conditions to protect water resources and ensure responsible usage. Failure to secure a permit before commencing activities can lead to penalties, fines, or legal action.

MANDWASCO shall submit an ESIA license to WRA for authorization of the proposed works. The treatment of water abstracted from Daua River should meet required guidelines.

3.2 Environmental Policy and Regulatory Framework

3.2.1 National Environment Action Plan Framework

The National Environmental Action Plan Framework is the second national environmental policy after the 1994 National Environmental Action Plan (NEAP). The development of NEAP is provided for by EMC (amendment) Act 2015 which requires preparation of Environmental Action Plan at different levels; County and national levels. The framework recognizes the intertwined linkages between economic growth and environment in Kenya. It highlights priority themes and activities for the country towards achieving sustainable environment.

3.2.2 Environment Management & Coordination Act Cap 387

This Act of Parliament, EMCA 1999 and the subsequent amendments, is the parent Act of Parliament that provides for the establishment of appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto.

EMCA, in its 13 interrelated parts, provides regulatory provisions for all levels of environmental conservation and management. The first one part provides legislative guidelines on administrative and planning components of environmental management. They include; (I); General principles (II); Administration (III); Environmental planning (IV); Protection and Conservation of the Environment. Parts five to seven focus on on-field management of the environment as an integral component of actual or proposed projects. (V), Environmental impact assessments (EIA), audits and monitoring (VI); Environmental audit and monitoring (VII); Environmental quality standards. The last five parts of the Act regulate on enforcement of provisions outlined in the Act and recognition of international agreements along which the EMC (amendment) Act 2015 has been established. They are; (VIII); Environmental Restoration orders, Environmental Easements (IX); Inspection, analysis and records (IX); Inspection Analysis and Records (X); International Treaties, Conventions and Agreements (XI) National Environment Tribunal (XII); Environmental Offences (XIII).

All the chapters 1 to 13 apply to the proposed project at one stage or the other and therefore the project proponent is required to understand and conform with the Act accordingly. One such area is Environmental and Socio Impact Assessment. This is expressly stated in section 58(2) of the Act.

3.2.3 The Environmental (Impact Assessment and Audit) Regulations, 2003/Legal Notice 31 & 32

This is a supplementary legislation to the EMC (amendment) Act. It gives additional punch by providing guidelines for conducting Environmental Impact Assessments and Audits. It offers guidance on the fundamental aspects on which emphasis must be laid during field study and outlines the nature and structure of Environmental Impact Assessments and Audit reports. The legislation further explains the legal consequences of partial or non-compliance to the provisions of the Act.

The Legal Notice 31 &32 categorizes the proposed project as a medium risk one that requires a Comprehensive Project Report (CPR).

3.2.4 Environmental Management and Coordination (Conservation of Biological Diversity) Regulations 2006

These regulations are described in Legal Notice No. 160 of the Kenya Gazette Supplement No. 84 of December 2006. These Regulations apply to conservation of biodiversity that includes Conservation of threatened species, inventory and monitoring of biological diversity and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties. This legislation takes cognizance of the need to promote the integrity of biodiversity to promote their integrity. Most of the biological diversity is highly threatened by development in the current world and there is an apparent need to enhance their integrity. Section IV prohibits any activity, which may have adverse effects on the ecosystem.

The proposed intake rehabilitation works may threaten the River Daua ecosystem hence the need to implement the Environment Management Plan to mitigate through pollution.

3.2.5 Environmental Management and Coordination (Wetlands, Riverbanks, Lake Shores and Sea Shore Management) Regulations 2009

These regulations provide for the protection, management of wetlands, riverbanks, lakeshores, seashore management, and detail guidelines on the same.

3.2.6 Environmental Management and Co-ordination (Controlled Substances) Regulations, 2007

These Regulations aim to regulate the production, trade and use of controlled substances and products; provide for a system of data collection to facilitate compliance with relevant reporting requirements under the Montreal Protocol on Substances that Deplete the Ozone Layer; promote the use of ozone friendly substances, products, equipment and technology.

3.2.7 Environmental Management and Co-ordination (Waste Management) Regulations, 2006

Regulations guiding waste management are described in Legal Notice No. 121 of the Kenya Gazette Supplement No. 69 of September 2006. They offer legal provisions on handling of a variety of wastes emanating from various projects and activities. The waste categories covered by the regulations include:

- Industrial waste
- Hazardous and toxic wastes
- Pesticides and toxic substances
- Biomedical wastes
- Radio-active substances

These Regulations outline requirements for handling, storing, transporting, and treatment / disposal of all waste categories as provided therein. Part V section 34 requires that pesticides or toxic substances be disposed at designated site or plant approved by the authority.

The contractor & MANDWASCO will engage a licensed waste collector to handle waste generated during construction and operation respectively

3.2.8 Environmental Management and Coordination (Fossil Fuel Emission Control) Regulations 2006

These regulations are described in Legal Notice No. 131 of the Kenya Gazette Supplement No. 74 of October 2006 and will apply to all internal combustion engine emission standards, emission inspections, the power of emission inspectors, fuel catalysts, licensing to treat fuel, cost of clearing pollution and partnerships to control fossil fuel emissions.

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

This is covered under the legal notice number 61. These Regulations under part II section 3 prohibit making or causing any loud, unreasonable, unnecessary or unusual noise, which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.

Section 4 prohibits excessive vibrations and excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or30 meters from any moving source.

Operations of machineries that produce excessive noise are also prohibited under section 11 including Operating or repair of any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical device; or engaging in any commercial or industrial activity, which is likely to emit noise or excessive vibrations that exceed the levels prescribed in the First Schedule (See annex) to these Regulations.

The legal notice also prohibit construction at night except for the purposes specified in sub-Regulation (2) which include roads and other public utilities. Section 15 calls for an Environmental Impact Assessment to be carried out by any person intending to carryout construction, demolition, mining or quarrying work to do an Environmental Impact Assessment studies to identify natural resources, land uses or activities which may be affected by noise or excessive vibrations from the construction, demolition, mining or quarrying.

Determine the measures that are needed in the plans and specifications to minimize or eliminate adverse construction, demolition, mining or quarrying noise or vibration impacts; and incorporate the needed abatement measures in the plans.

3.2.10 Sustainable Waste Management Act, 2022

It emphasizes the need to ensure a clean and healthy environment for all Kenyans, focusing on reducing air, land, freshwater, and marine pollution. The Act also seeks to ensure the effective delivery of waste management services, ensuring communities have access to reliable waste disposal systems. Additionally, it aims to foster economic development by creating an enabling environment for employment opportunities within the waste management sector, supporting the growth of the green economy.

MANDWASCO would work to ensure sustainable waste and water management practices that promote both environmental health and public well-being.

3.2.11 Extended producer Responsibility Regulations, 2021

Extended Producer Responsibility (EPR) Regulations require packaging producers to assume financial responsibility for the entire lifecycle of their products, particularly in terms of waste management. This means that producers must fund the full net cost associated with the collection, sorting, treatment, and recycling of packaging waste. Specifically, they are responsible for financing systems to collect discarded packaging from consumers, sorting it into different categories, and treating it to make it suitable for recycling or other waste management processes. By shouldering these costs, producers are incentivized to design packaging that minimizes waste and is more easily recyclable, thereby reducing the environmental impact. EPR Regulations also mandate that producers comply with reporting and operational standards to ensure effective waste management and recycling efforts.

MANDWASCO is expected to put in place a waste management strategy for any waste that is generated by the utility directly through their operations or indirectly through the operations of their water consumers.

3.2.12 Land Act 2012

The Land Act of 2012 is a significant legislative framework designed to regulate the management, administration, and utilization of land resources. It aligns with the Constitution's definitions of public, private, and community land, as outlined in Articles 62, 63, 64, and 260. The Act provides a comprehensive approach to managing public land, which is owned by the government or reserved for public use, ensuring it is utilized for the public good and managed sustainably. It also addresses the rights and responsibilities related to private land, facilitating secure transactions, ownership, and dispute resolution. For community land, the Act recognizes and supports land held under customary law by communities, aiming to protect these lands and respect community interests. A central aim of the Act is to promote sustainable land management practices that balance environmental preservation with resource use, including provisions for land use planning and zoning. Additionally, the Act establishes mechanisms for resolving land disputes and outlines the roles of governmental and administrative bodies in its

implementation and enforcement, ensuring a coherent approach to land management and equitable resource distribution.

If the project especially the main distribution lines requires public land for infrastructure, the Act ensures that its use aligns with regulations that prioritize public benefit and sustainable practices. For private land, the Act facilitates clear procedures for land acquisition, compensation, and dispute resolution, which are essential for smooth project execution. In cases where the project impacts community land, the Act mandates engagement with local communities and adherence to customary land practices to ensure fair distribution of benefits and avoid conflicts.

3.2.13 Physical and Land Use Planning Act, 2019

The Physical and Land Use Planning Act in Kenya provides a comprehensive framework for managing and guiding land development and physical planning across various levels of government. It outlines principles and objectives aimed at promoting sustainable development by balancing environmental, social, and economic needs while ensuring public participation in the planning process. The Act establishes procedures for preparing and implementing land use plans at the national, county, urban, rural, and city levels, each tailored to specific needs and conditions. At the national level, broad strategic plans set the overall direction, while county plans address regional priorities and urban and rural plans cater to the distinct challenges of different areas. The Act also sets standards for land use and creates a regulatory framework for enforcement, including mechanisms for monitoring, evaluation, and conflict resolution. Planning authorities are designated to oversee compliance and implementation, and there are provisions for building capacity among planning professionals.

MANDWASCO should ensure that the water project includes public participation, adheres to land use standards, and integrates with broader regional and national plans.

3.2.14 County Government Act, 2012

The County Government Act of 2012 is a pivotal legislation in Kenya that implements Chapter Eleven of the Kenyan Constitution, which focuses on devolution. This Act establishes the framework for county governments, including the roles and responsibilities of both the county assemblies and the county executives. It sets forth the processes for electing county governors and assembly members, delineating their functions in areas such as healthcare, education, agriculture, and infrastructure. The Act emphasizes the importance of accountability and transparency, outlining financial management practices, including budgeting and reporting requirements. Additionally, it includes provisions for controlling and overseeing county operations, as well as mechanisms for resolving disputes. By decentralizing governance, the Act aims to enhance local participation in decision-making and improve service delivery, thus bringing government operations closer to the people and promoting local development. Article 196 provides for public involvement in county planning and development processes. EIA provides a channel through which this can be realized. Public participation is undertaken at different levels with various groups including: host community, non- state actors and relevant government actors.

The proposed project should operate within a framework of accountability and transparency mandated by the Act. The county government oversees the project, ensuring it aligns with local development plans and adheres to financial management guidelines. Public participation will be conducted with relevant groups at the community and county level. The Act also provides mechanisms for resolving any disputes, helping to ensure the project's success and sustainability.

3.2.15 Occupational Health and safety Act, 2007

The Occupational Health and Safety Act (OHSA) is a comprehensive legislation designed to ensure that workplaces are safe and conducive to workers' health. Its primary objective is to protect employees from a wide range of hazards, including exposure to toxic chemicals, harmful noise levels, extreme temperatures, and unsanitary conditions. To achieve this, the act requires employers to identify potential risks, assess their impact, and implement preventive measures such as engineering controls, administrative changes, and personal protective equipment. Workers have the right to be informed about these hazards and are responsible for adhering to safety protocols. The Act also mandates that employers provide training and education to ensure employees understand safety procedures and emergency protocols. Compliance is enforced through inspections by government agencies, which can impose fines or mandate corrective actions for violations. Additionally, the act requires employers to maintain records of injuries and safety incidents and to have plans in place for emergency situations.

The Occupational Health and Safety Act (OHSA) is essential in maintaining a safe work environment in the context of the proposed works. It requires identifying and assessing potential hazards, such as those related to heavy machinery, chemicals, and environmental conditions. Preventive measures, including proper equipment maintenance and safety procedures, must be implemented. Workers need to receive training on safety practices and emergency responses.

3.2.16 National Gender and Development Policy, 2019

The 2019 National Gender and Development Policy of Kenya is designed to promote gender equality and empower individuals across various dimensions. It envisions a society where both men and women, regardless of socioeconomic status, have equal opportunities for economic participation and benefit. This includes access to employment, fair wages, and entrepreneurial opportunities, alongside removing barriers to financial resources. The policy also emphasizes the recognition and respect for the diverse identities of all Kenyans, encompassing ethnicity, age, disability, and other social factors, fostering a culture of inclusivity and understanding. Additionally, it aims to ensure that everyone, irrespective of gender, has equal rights and access to essential services such as education, healthcare, housing, and employment. This involves guaranteeing quality education for all children, equitable healthcare services, safe and affordable housing, and equal employment opportunities.

By ensuring that both men and women have equal access to water resources and employment opportunities related to the project, MANDWASCO promotes economic empowerment and fairness. This includes adopting gender-balanced hiring practices and offering training programs that empower women and marginalized groups with relevant skills.

3.3.10 Mandera County Climate Change Adaptation Policy, 2020

The Mandera County Climate Change Adaptation Policy mandates the integration of climate change adaptation strategies across all sensitive sectors, including livestock production, crop farming, fisheries, urban planning, forestry, range management, water supply, and sanitation. This comprehensive approach aims to ensure sustainable management practices in the face of environmental challenges. Specifically, for water supply management, the policy emphasizes initiatives such as promoting water conservation, improving storage infrastructure, and implementing efficient irrigation methods to address the impacts of fluctuating precipitation patterns and water scarcity. Similarly, in sanitation services, the focus is on building resilient infrastructure capable of withstanding extreme weather events like floods and droughts, alongside advocating sustainable waste management to safeguard water sources from contamination. These efforts are designed to bolster community resilience, foster sustainable development, and guarantee consistent access to safe water and sanitation services amid the uncertainties of climate change.

MANDWASCO can leverage on this fund to fund multiple components including solarization of rehabilitated intakes, sustainable management of prosopis juliflora which is degrading pipelines etc

3.3.11 The Mandera County Disaster Risk Management Bill, 2023

The Mandera County Disaster Risk Management Bill focuses on establishing comprehensive strategies and protocols to effectively manage and mitigate various types of disasters within Mandera County. This legislation aims to enhance disaster preparedness by outlining procedures for planning and readiness in the face of natural calamities like floods, droughts, and earthquakes, as well as human-made disasters such as industrial accidents or conflicts. The bill emphasizes the importance of early warning systems to promptly alert communities at risk, ensuring swift responses and coordinated efforts during emergencies. It also addresses risk reduction and mitigation through infrastructure development, public education initiatives, and strategic land-use planning. The bill underscores the need for robust coordination mechanisms between government agencies, non-governmental organizations, and community stakeholders involved in disaster response and recovery efforts. Furthermore, it provides frameworks for allocating resources and funding to support these initiatives, aiming to build resilience and safeguard the well-being of Mandera County's residents in the face of potential disasters.

The Mandera County Disaster Risk Management Bill plays a crucial role in ensuring reliable water supply and sanitation services, particularly during disasters. In the context of water supply, the bill includes provisions for disaster preparedness that address risks like droughts, which can severely impact water availability. It mandates the development of contingency plans and early warning systems to anticipate and mitigate water shortages, ensuring timely responses to maintain essential services for communities. Regarding sanitation, the bill emphasizes infrastructure resilience and planning to safeguard sanitation facilities from damage during disasters such as floods or earthquakes. It outlines protocols for swift response and recovery efforts to restore sanitation services promptly in affected areas, preventing the spread of

waterborne diseases and ensuring public health safety. Moreover, the bill promotes coordination between water supply authorities, sanitation agencies, disaster management teams, and community organizations. This collaborative approach strengthens the effectiveness of disaster response efforts, ensuring that resources are allocated efficiently to address both immediate needs and long-term resilience in water supply and sanitation infrastructure.

3.4 Mandera County Health Services Act, No. 4 of 2019

The Mandera County Health Services Act, No. 4 of 2019, establishes a comprehensive framework governing healthcare provision within the county. This legislation outlines the organizational structure of health services, detailing the roles and responsibilities of health institutions and personnel. It sets standards for healthcare delivery, ensuring services meet national and international benchmarks. The act addresses healthcare financing mechanisms, including budget allocations and partnerships, to sustainably fund health initiatives. Emphasizing public health, it includes provisions for disease prevention, health promotion, and community health education. Regulatory measures are also defined, covering licensing, accreditation, and monitoring of health facilities and professionals to uphold quality and safety standards. Moreover, the act promotes community engagement in healthcare decision-making and establishes protocols for emergency preparedness and response.

The Mandera County Health Services Act, No. 4 of 2019, plays a critical role in ensuring that water supply and sanitation services align with comprehensive health standards and regulations within the county. Under this legislation, water supply is recognized as a fundamental component of public health infrastructure, emphasizing the need for clean and safe water to prevent waterborne diseases and promote community health. The act mandates that water sources used for domestic purposes meet specified quality standards to safeguard public health. It also establishes guidelines for sanitation services, aiming to prevent environmental contamination and ensure hygienic conditions through proper waste disposal and sewage management practices.

3.5 Mandera County Public Works and Services Act of 2014

The Mandera County Public Works and Services Act stands as a pivotal framework aimed at bolstering road and transportation infrastructure to foster socio-economic advancement within Mandera County and its surrounding regions. This legislation delineates strategic initiatives to enhance the construction, maintenance, and improvement of vital road networks, bridges, and transportation systems crucial for intra-county connectivity and broader regional integration. By facilitating easier movement of goods and people, these infrastructure improvements not only reduce transportation costs but also expedite access to markets, attract investment, and stimulate local economic activities. Moreover, the Act ensures alignment with regional development strategies, promoting collaboration across borders to maximize economic benefits. It also emphasizes environmental sustainability, social equity, and public participation, thereby fostering transparent and inclusive development practices.

In addition to road and transportation infrastructure, the Mandera County Public Works and Services Act also plays a crucial role in addressing water supply and sanitation challenges within

the region. The legislation extends its scope to include provisions for the development, maintenance, and enhancement of water supply systems and sanitation facilities across Mandera County. Specifically, the Act outlines initiatives aimed at improving access to clean and reliable water sources, which is fundamental for public health, agricultural productivity, and overall socio-economic development. This includes projects such as drilling boreholes, constructing water storage facilities, and laying pipelines to ensure communities have consistent access to safe drinking water.

3.3 INSTITUTIONAL STRUCTURE OF THE WATER SECTOR

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

3.3.1 Ministry of Water, sanitation and Irrigation (MWI)

Its the ministry overseeing water in Kenya, manages policy formulation, sector coordination, monitoring, and supervision to ensure efficient water and sewerage services nationwide. It also focuses on sustaining water resources and developing them for irrigation, commercial, industrial, power generation, and other purposes. The Ministry's mission is to support national development by advocating and facilitating integrated water resource management to improve water availability and accessibility. Key technical departments within the Ministry include Water Services, Water Resources, Water Storage and Land Reclamation, and Irrigation and Drainage.

3.3.2 Water Sector Trust Fund (WSTF)

The Water Sector Trust Fund supports the improvement of water services in areas lacking adequate access by providing financial assistance for:

Encouraging community involvement in managing water services actively

- ✓ Investing in infrastructure for community water schemes in underserved regions;
- ✓ Developing community capacities and initiatives;
- ✓ Funding water service activities prioritized in the Government's Water Services Strategic Plan;
- ✓ Promoting awareness and disseminating information on community-based water service management.

3.3.3 Water Resources Authority (WRA)

Water Resources Authority is a state corporation established under the Water Act 2016, serves as the primary agency for water resources management in the nation. Its mandate includes several critical functions, notably the issuance of water use permits. The Authority is entrusted with ensuring the sustainable management of the country's water resources through:

i. Regulation and safeguarding of water resource quality against detrimental impacts,
ii. Classification, monitoring, and allocation of water resources,
iii. Implementation of policies and strategies pertaining to water resource management,

iv. Formulation of principles, guidelines, and procedures for water allocation,
v. Development of strategies for catchment-level management, including the establishment of catchment area advisory committees.

3.3.4 Water Services Regulatory Board (WASREB)

The Board's primary responsibility is to regulate water and sewerage services in Kenya, collaborating closely with the public. Its mandate includes:

i. Regulating the provision of water and sewerage services, encompassing licensing, quality assurance, and issuing guidelines for tariffs, pricing, and dispute resolution.
ii. Overseeing the implementation of policies and strategies concerning water services, including licensing of Water Services Boards and approval of their appointed Water Services Providers.
iii. Monitoring the performance of Water Services Boards and Water Services Providers to ensure effectiveness and efficiency.
iv. Establishing procedures for handling customer complaints related to water and sewerage services.
v. Informing the public about the performance of the water sector to enhance transparency and accountability.
vi. Providing expert advice to the Minister responsible for water affairs to support informed decision-making.

3.3.5 Water Services Boards (WSB)

The Water Service Boards (WSBs) are tasked with efficiently and economically providing water and sewerage services in their respective jurisdictions. The Nanyuki Water and Sewerage Company (NAWASCO) operates under the governance of the Laikipia County government. There are eight catchment boards established under the Water Act of 2016. According to this Act, the Boards are mandated to:

- Appoint and contract Water Service Providers (WSPs).
- Develop facilities, prepare business plans, and set performance targets.
- Strategize for the efficient and economical provision of water and sewerage services within their areas of jurisdiction.
- Manage National Government facilities as assets.
- Enhance the capacity of water service providers to improve efficiency, accountability, and responsibility in water supplies.
- Monitor and supervise the provision of water and sewerage services by WSPs.

3.3.6 Water Services Providers (WSP)

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

3.3.7 Sectoral Integration

Sectoral Integration in Kenya aims to ensure sustainable development and a healthy environment for all citizens. The National Environmental Council (NEC) assigns key responsibilities to NEMA, including setting national environmental goals, directing policy, and coordinating efforts among governmental bodies, local authorities, private sectors, NGOs, and other entities involved in environmental protection. Additionally, stakeholders such as the Ministries of Water and Irrigation, Environment and Natural Resources, Health and Sanitation, Lands, Housing and Urban Development, Transport and Infrastructure, along with Mandera County administrations, play crucial roles in fostering these objectives.

3.4 NATIONAL AND COUNTY PLANS AND STRATEGIES

3.4.1 The Kenya National Water Master Plan 2030

The Kenya National Water Master Plan 2030 has a special focus on enhancing water sanitation and irrigation systems. It aims to provide clean drinking water through infrastructure development and sanitation practices to prevent waterborne diseases.

Relevance to the project: The overall goal of Mandera water project is to improve access to clean and safe water for domestic purposes.

3.4.2 The National Water Harvesting and Storage Management Policy 2020 - 2025

The National Water Harvesting and Storage Management Policy 2020 - 2025 addresses water sanitation and irrigation within the context of sustainable water management. It emphasizes on ensuring there is clean water for consumption and hygiene. The policy establishes regulatory frameworks, promotes capacity building, and encourages research and innovation in water management.

Relevance to the project: The overall goal of cluster 3 projects is to improve access to clean and safe water making water provision sustainable for domestic purposes.

3.5 INTERNATIONAL CONVENTIONS AND TREATIES

A treaty is a binding agreement under International Law concluded by subjects of International Law, namely states and international organizations. Treaties can be called by many names including; International Agreements, Protocols, Covenants, Conventions, Exchanges of Letters, Exchanges of Notes, etc. However, all of these are equally treaties and the rules are the same regardless of what the treaty is called. Treaties can be loosely compared to contracts; both are means of willing parties assuming obligations among themselves, and a party to either that fails to live up to their obligations can be held legally liable for that breach.

Kenya is a signatory as well as a party to various international conventions, treaties and protocols relating to the environment and aimed at achieving sustainable development. According to the Registrar of International Treaties and other Agreements in Environment (UNEP 1999), there are 216 treaties, 29 of which are of interest to Kenya. The country is a signatory to 16 such agreements, which range from use of oil, protection of natural resources and protection of the atmosphere.

Protection of Natural Resources

There are 12 agreements of significance to Kenya under this category which the country has signed and ratified. This section reviews a number of policies that are triggered or met by the proposed project.

3.5.1 Convention of Biological Diversity

This global convention was held to foster conservation and sustainable use of biological resources, to preserve their diversity for posterity. Kenya is a signatory to this convention, having ratified it in 1994. The provisions of this Convention have since been integrated in the laws of Kenya, climaxed by the development of the Kenya National Biodiversity Strategy and Action Plan in 2000 by the Ministry of Environment and Natural Resources.

Relevance: Where existing pipelines are being replaced the project will trigger this convention as it requires clearing of ground cover and minimal loss of biodiversity. However, clearing of ground cover and other plants will be done within the convention's requirements and guidelines.

3.5.2 African Convention on the Conservation of Nature and Natural Resources

It was held on 15 September, 1968 in Algiers. The convention sought to awaken the continent on the need to preserve natural ecosystems and employ sustainable use of natural resources of economic importance, particularly the soil, water, flora and fauna.

Relevance: In the project area, all the endemic and indigenous trees will be mapped and where it is logically possible to spare them during construction, they will not be interfered with.

3.5.3 The World Commission on Environment and Development

The commission focuses on the environmental aspects related to development and requires all development projects to be sustainable economically, socially and environmentally. The principle of the organization emphasis that development project should have no permanent negative impact on the biosphere and particularly the ecosystems. It is recommended that the project proponent incorporates mitigation measures to ensure that the project impacts on the ecosystem are reduced.

Relevance: The consultants used participatory methods to involve the target group and concerned stakeholders in order to inform and enlightened them on the likely negative environment and social impacts for them to prepare mitigation measures so as to ensure the proposed project is sustainable throughout its life span.

3.5.4 Sustainable Development Goals

The Sustainable Development Goal that is most relevant to the Proposed cluster 3 Development Project is Goal 6 which targets to ensure availability and sustainable management of water and sanitation for all.

Relevance: Mandwasco will ensure that there is provision of water to a water scarce project area where water shortage has led to some areas being underdeveloped.

3.6 THE WORLD BANK SAFEGUARDS

The World Bank has well set safeguard policies aimed at ensuring the organization's funded projects adhere to environmental and social protection. Relevant safeguards triggered for this project include;

3.6.1.1 OP/BP 4.01 (Environmental Assessment)

The World Bank implements policies for borrowing countries to ensure sustainability and environmental integrity in its development projects. Environmental assessments play a crucial role in this process, including various tools such as environmental impact assessment (EIA), regional or sectoral assessments, strategic environmental and social assessments (SESA), and others like environmental audits and management plans. Projects proposed to the World Bank undergo environmental screening to determine the appropriate level of assessment based on factors like project type, location, and potential environmental impacts. They are classified into three categories:

- **Category A: Projects with significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These may affect broader areas beyond the project site, requiring a detailed EIA.**
- **Category B: Projects with potential adverse impacts on human populations or environmentally important areas, though less severe than Category A. Mitigation measures are feasible, and impacts are generally site-specific and reversible.**
- **Category C: Projects with minimal or no adverse environmental impacts. These require basic screening, and no further environmental assessment is typically necessary.**

Environmental assessments at the World Bank aim to identify, avoid, and mitigate potential negative environmental effects of projects, ensuring sound decision-making and sustainability. The Mandera Water rehabilitation project, for instance, falls under Category C due to its minimal environmental impact and absence of permanent displacement of affected people.

3.6.1.2 OP/BP 4.04 (Natural Habitats)

The natural habitats policy aims to promote sustainable development by safeguarding and restoring natural habitats and their ecological functions. Projects supported by the World Bank must prioritize biodiversity conservation and the environmental benefits that habitats provide to communities. The policy imposes strict restrictions on damaging natural habitats in projects funded by the Bank, except in cases involving limited, localized riverine aquatic systems, where interaction with significant habitats is minimal.

3.6.1.3 OP/BP 4.11 (Physical Cultural Resources)

The purpose of this policy is to safeguard Physical Cultural Resources (PCR) from harm or destruction. These resources encompass archaeological, paleontological, architecturally significant, and religious sites such as graveyards, burial sites, and areas of unique natural value. While initial assessments indicate no identified physical or cultural resources will be impacted by the project, it is the Contractor's responsibility to be aware of the "Chance Finds Procedures." These procedures are to be followed in the event of discovering materials of potential archaeological, historical, paleontological, or cultural significance during excavation:

√ Immediately cease work upon discovering any materials that may hold cultural value. Inform the Project Manager and notify the relevant authorities;

√ Use plastic covers to protect artifacts and take measures to stabilize the area if necessary, ensuring proper artifact protection.

√ Prevent and penalize unauthorized access to the artifacts.

√ Resume construction activities only upon authorization from the relevant authorities.

While no cultural resources have been identified in the screening stage of Environmental and Social Impact Assessment (ESIA) study, the proponent must include a Chance Finds Procedure clause in all project contracts to ensure compliance in the event that during pipes expansion some artifacts are discovered. The recommended national chance findings procedure has been annexed to this report.

3.6.1.4 Involuntary Resettlement (OP 4.12)

The aim of this policy is to prevent or minimize, whenever possible, the necessity of exploring alternative project designs that may lead to resettlement. It specifically applies when land is involuntarily acquired or access to legally designated parks and protected areas is restricted. The policy strives to avoid involuntary resettlement or, when unavoidable, to reduce its negative social and economic impacts through compensation and resettlement measures.

This safeguard does is not triggered in this project because it is located within the public land and therefore does not involve involuntary acquisition of land or assets.

3.6.1.5 OP/BP 4.36 (Forests)

The forest safeguards policy aims to harness forests' potential to alleviate poverty sustainably, integrate them into economic development, and safeguard their crucial environmental services. One of its principles involves early screening for impacts on forest health, quality, and the well-being of forest-dependent communities***. This project does not trigger the safeguard since it does not intersect with any forested areas.***

4 BASELINE CONDITIONS

4.1 Physical Characteristics

4.1.1 Topography

Mandera Town (municipality) is generally characterized by low lying flat terrain. Low-lying areas can pose challenges for sanitation due to potential flooding during rainy seasons, which can contaminate water sources and sanitation facilities. Proper drainage and waste management systems are crucial to mitigate these risks.

4.1.2 Drainage

Daua River is the only major surface water body in the county apart from the earth pans and earth dams that have been dug over the years. Daua River, whose source is the Ethiopian highlands, flows eastwards along the county's border with Ethiopia, covering 150km along the border, and passes through Malkamari, Rhamu Dimtu, Rhamu, Libehia, Khalalio and Township wards into Somalia at Border Point One (BP1). The Daua River basin spans an area of about 60,106Km2. Geographically, the catchment extends between 41.8840– 38.4650 East and 3.9970 – 6.4560 North from the border to the origin of the catchment in southeastern Ethiopian highlands.



Plate 4-1: River Daua at the Kenya-Ethiopia border point

4.1.3 Climatic conditions

(i)Temperature

Temperatures are relatively high with a minimum of 24°C in July and a maximum of 42°C in February. High temperatures can increase water demand due to greater evaporation rates and higher agricultural, domestic etc water use requirements.

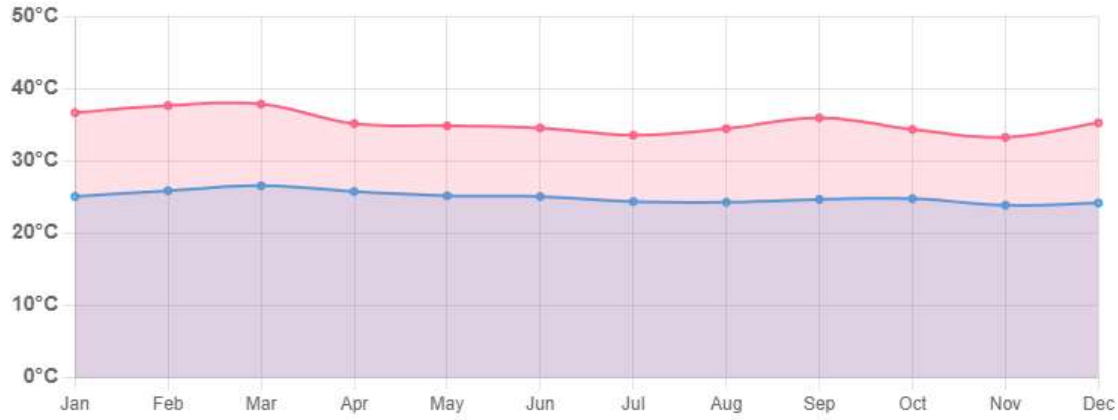


Figure 4-6: Average Temperature ranges Mandera County

Kenya Meteorological Department Mandera County, 2024

(ii)Rainfall

Annual average rainfall is 255mm, with the eastern and southern part of the county receiving an annual average of below 240mm. The long rains fall in April and May averaging 69.1mm, while the short rains fall in October and November averaging 122mm. Most parts of the county experience long hours (approximately 11 hours) of sunshine in a day. This is favourable for solar infrastructure investment which will reduce the cost of operation and maintenance of water supply system operated by MANDWASCO.

Areas receiving below 240mm annually (specifically the eastern and southern parts) are likely more prone to water scarcity. For water supply planning, this suggests that these regions may require additional infrastructure for water storage, such as reservoirs or rainwater harvesting systems, to mitigate the impact of low rainfall periods. The long rains in April and May averaging 69.1mm and the short rains in October and November averaging 122mm provide opportunities for water harvesting and storage. During these periods, there is a relatively higher amount of precipitation that can be collected and utilized for various purposes, including domestic water supply and irrigation.

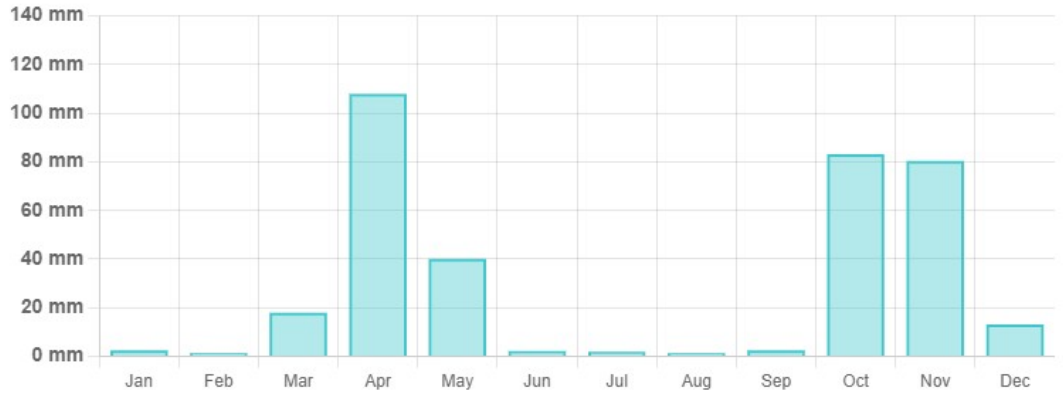


Figure 4-7: Average Rainfall Mandera County

Kenya Meteorological Department Mandera County, 2024

4.2 Current Infrastructure

The current water supply infrastructure in Mandera Town is characterized by a production capacity of approximately 2,550 m³/day, which fluctuates with seasonal changes. The water distribution network is outdated and inadequately maintained, with major sections comprising GI (Galvanized Iron) and uPVC (unplasticized Polyvinyl Chloride) pipes spanning about 93 km. Issues such as inadequate storage capacities, lack of metering, and high energy costs due to reliance on pumped systems are prevalent. Additionally, the water supply system is plagued by frequent interruptions, high non-revenue water, and maintenance challenges exacerbated by factors like pipe intrusion by the invasive "Mathenge" plant.

4.3 Ecological characteristics

4.3.1 Flora

Vegetation in the project area is mostly found along the road, within institutions and on the property boundaries in residential areas. Riparian vegetation is characterized by overgrown grass, acacia and *Prosopis juliflora* which occur along River Daua where most intakes are located. The common trees species in the area include; Acacia, Bamboo, Guava, Lemon, Pawpaw, Prosopis Juliflora and Neem Tree.




Plate 4-2: Typical vegetation cover on the road reserve

4.3.2 Fauna

The pipeline is within a typical urban area with commercial and residential land uses hence no wildlife is found here. The intake are located along river Daua which is a habitat for crocodiles, hippos, and diverse fish specie. It is however notable that the river section within the municipality hosts minimal species due human traffic as it serves as a borderpoint between Kenya and Ethiopia. The wildlife mostly occurs in the undisturbed downstream areas of Elwak.

4.4 Socio- Economic Characteristics

4.4.1 Population

The population of Mandera County is 867,457 persons according to the 2019 Kenya Population and Housing Survey report (KPHC). This comprised 434,976 male (50.14%), and 432, 444 female (49.85%). This demographic diversity highlights the need for inclusive planning in infrastructure development to ensure equitable access to clean water and sanitation facilities. High population density areas necessitate substantial investment in water treatment, distribution networks, and sanitation services to meet the growing demands and improve public health outcomes.

Sub County	Male	Female	Intersex	Total
Mandera West	48166	50130	4	98300
Barrisa	78301	74288	8	152598
Kutulo	35799	36593	2	72394
Lafey	40476	42976	5	83457
Mandera South	71688	85527	5	157220
Mandera East	83538	76095	5	159638
Mandera North	77008	66835	7	143850
Total	434976	432444	37	867457

KNBS,2019

Socio-Economic Profile of The Study Area

A baseline survey was conducted in the study area by gathering data from sample populations through a detailed household questionnaire survey. The survey covered key demographic information, socioeconomic conditions, water access, current sanitation practices, public health status, community issues, and awareness, as well as attitudes toward the proposed project. Both quantitative and qualitative data were collected across these indicators from a representative sample, enabling a rigorous analysis of community conditions, practices, needs, and concerns. These insights will provide crucial inputs into the technical planning and design of the project. The survey targeted all the estates where the rehabilitation infrastructure works will be undertaken.

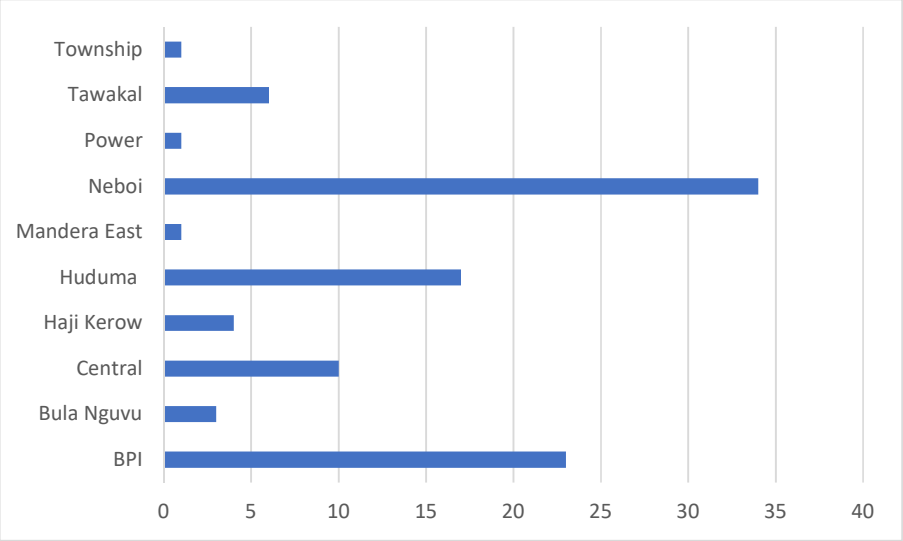


Figure 4-1: Residential areas/estates within the project area

4.4.2 Demographic Factors

Gender

Females represents 59% of respondents and males 41%. Women involvement in planning for water projects is critical since they are likely more impacted by water collection and sanitation issues, emphasizing the need for gender-sensitive solutions. Improving water and sanitation facilities will significantly benefit women, who play a central role in household health management, and ensure broader community well-being. Women's strong involvement in community issues also suggests they should be key stakeholders in the planning and implementation of the proposed project.

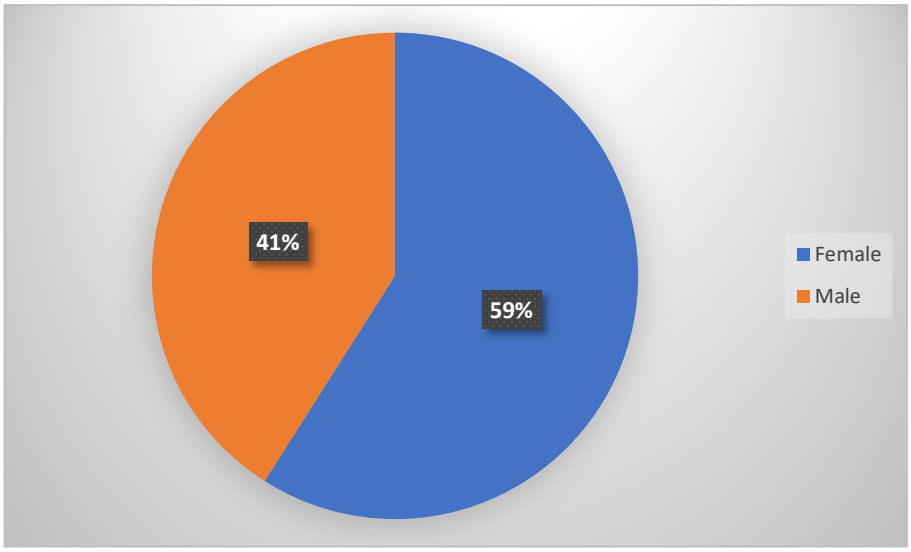
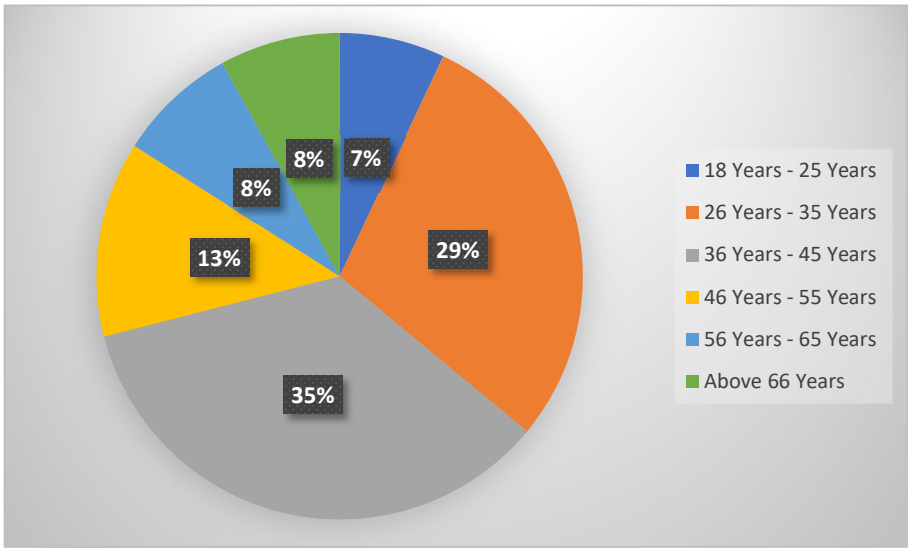


Figure 2:2 Respondents gender

Age Group

35% of the respondents were between the age of 36 years – 45 years, 29% are between 26 years – 35 years, 18-25 years were 7%, 46-55 years were 13%, 56-65 years were 8% and above 66 years were 8%.



Education Level

Regarding the level of education attained by household heads, 11% have Lower Primary, 4% have lower secondary, 46% have no formal school, 3% have non-formal literacy, 14% have technical college and university education.

The data shows a high number of residents have no formal schooling, indicating a need for targeted community-based education on water and sanitation. Tailored educational strategies across all levels are crucial for improving community water management and hygiene practices.

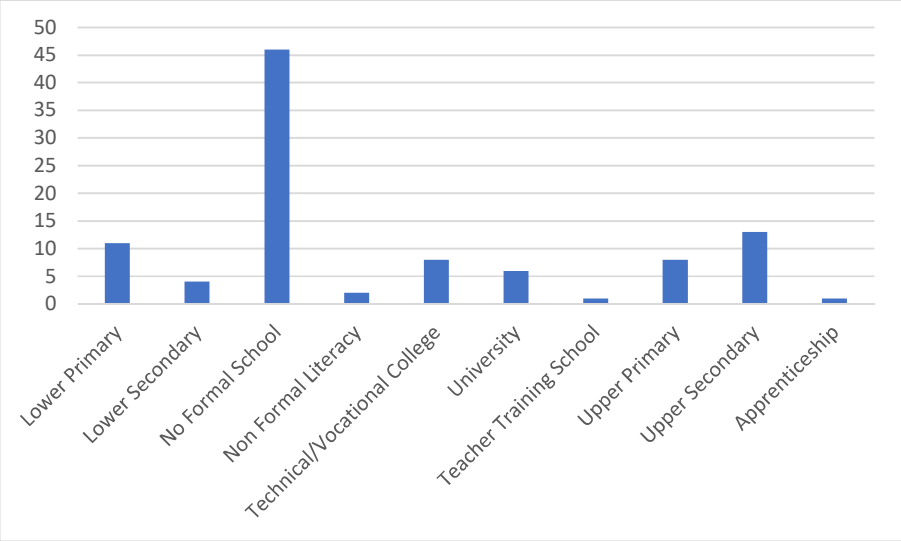


Figure 4-3: Education level in the project area

Household Members (Adults)

90% of the households have between 5 – 10 adults, 9% less than 5 adults and 1% more than 10 adults. This population is relatively low compared to the average household population in the Northern region of Kenya. This could be attributed to the urban influence and the prevalence of a youthful population who have young families.

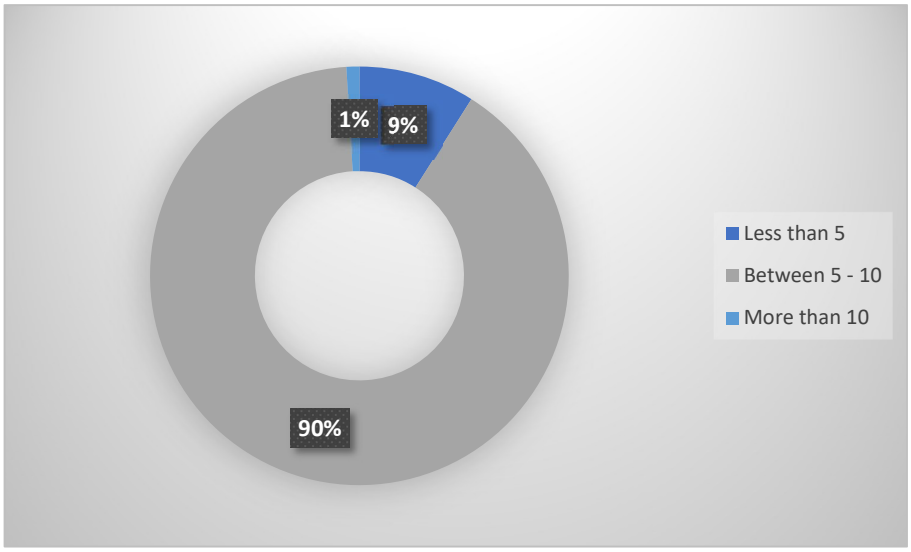


Figure 4-4: Household size

4.4.3 Main Source of Income

The most common occupations are businessmen/trading, kiosk owners and tailoring. Business had 18% of the respondents, kiosk owners had 14%, tailoring had 10%, pastoralists had 9%, charcoal burning had 8 %, welding had 1%, casual domestic labor had 9%, crop farming had 4%, police had 3%, boda boda had 1%, construction had 5%, mixed farming had 4%, teaching had 4%, casual farm labor had 5%, carpentry had 4% and hair dressing had 1%.

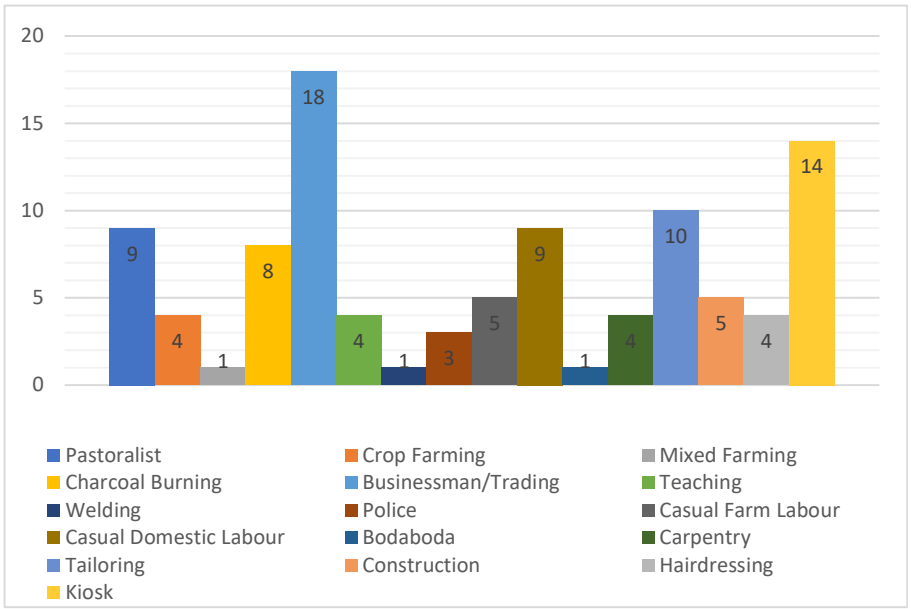


Figure 4-5: Main sources of income

4.4.4 Length of Stay in Project Area

31% of respondents have lived in their current dwellings for 1-5 years, 22% for 5-10 years, and 20% for more than 10 years. This distribution highlights varying needs for water access: recent residents may require support in establishing stable conditions, while long-term residents can provide insights into persistent issues and long-term infrastructure needs.

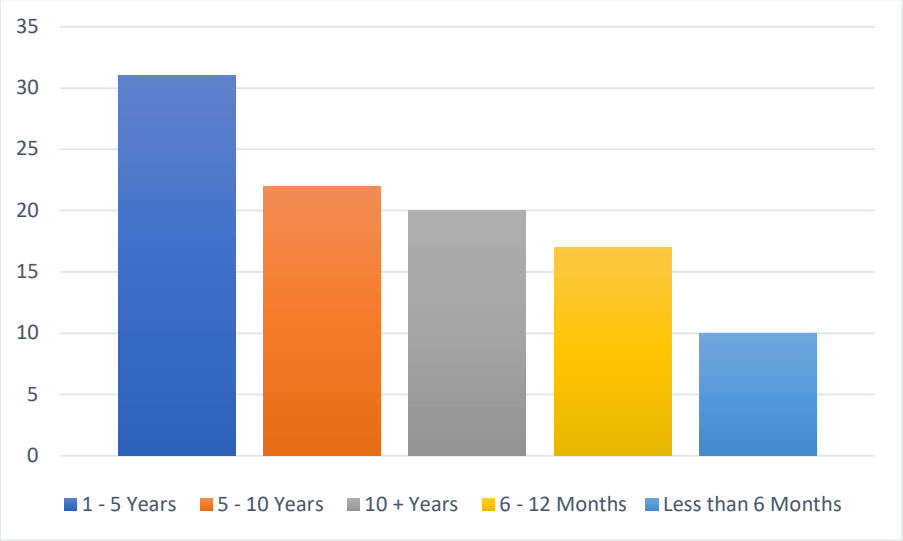


Figure 4-6: Length of stay in the area

4.4.5 Housing Tenure

86% of the respondents own the houses they live in, 14% are rented. This ownership pattern suggests a population likely to be receptive to long-term infrastructure improvements. The high rate of personal ownership could facilitate easier implementation of the water network rehabilitation project

4.4.6 Energy Sources

60% of the households use firewood for cooking, 37% charcoal, 2% biogas and 1% use gas/LPG. 72% of the households use electricity for lighting, 27% use solar and 1% use paraffin/kerosene. The heavy reliance on biomass for fuel is a concern to environmental sustainability particularly in an arid environment.

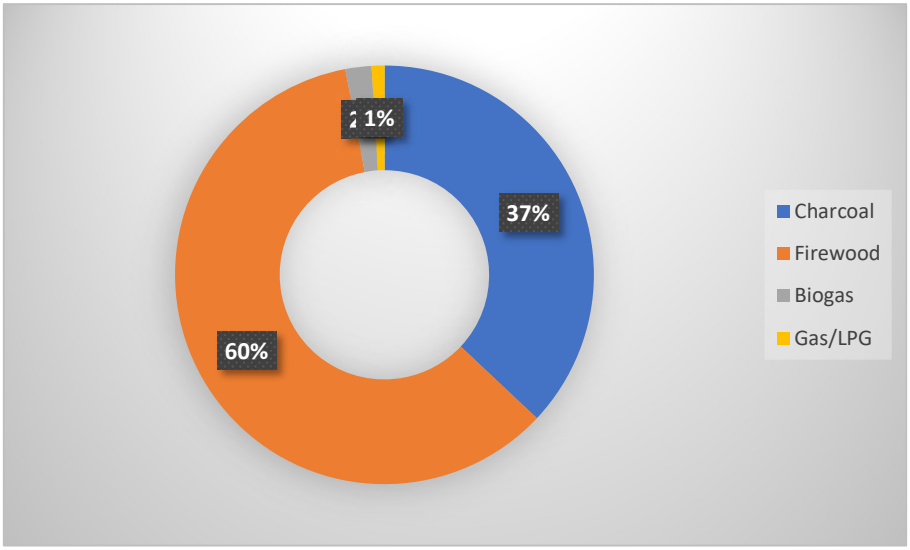


Figure 4-7: Energy sources for cooking

4.4.7 Household Health Record

41% of the respondent's household members have been either ill or had an accident in the past month. The 3 most common illnesses in the households this year are flue/cough, malaria, eye infection and pneumonia.

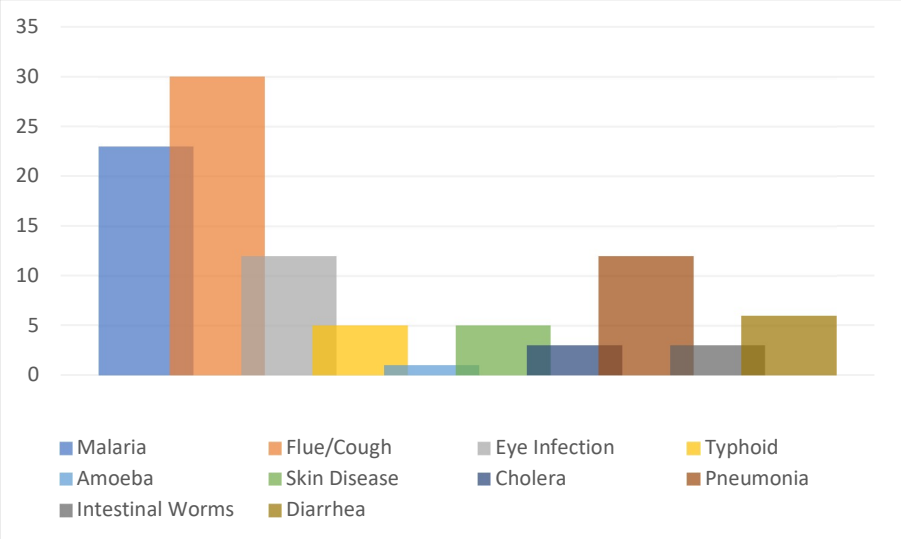


Figure 4-8: Disease prevalence in the area

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81% of the respondents seek health care services in a government/health centre, 11% private hospitals, 4% drug shops and 4% private clinics when they are either ill or had an accident.

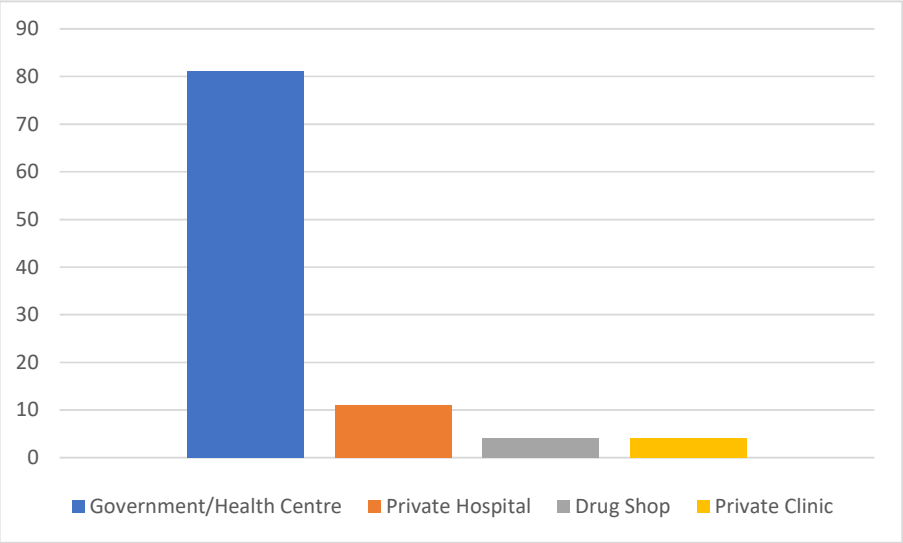
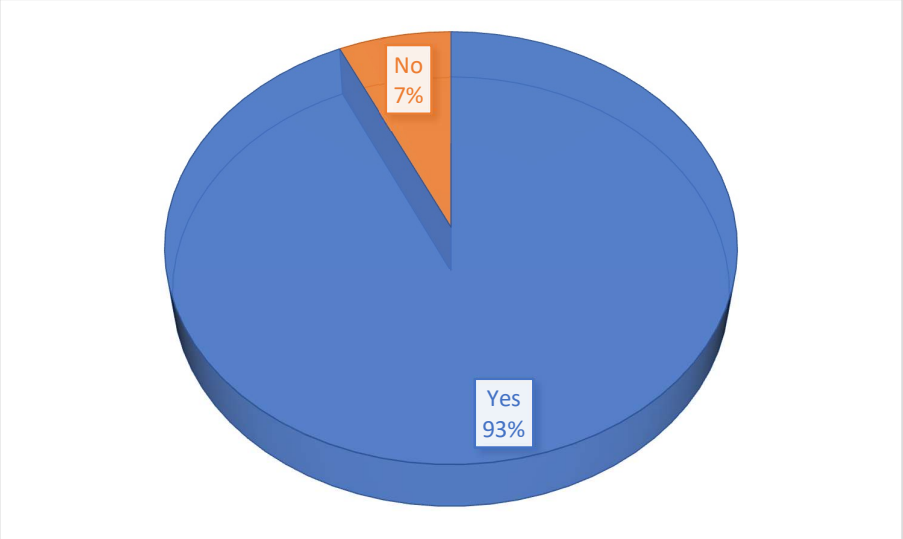


Figure 4-9: Health facilities frequently visited

4.4.8 HIV/AIDs awareness

93% of the respondents are aware of the HIV/AIDs campaign in the community. The most used medium of HIV/AIDs campaign are radios and barazas. 75% of the respondents are knowledgeable of the HIV/AIDs means of contraction and effects.



4.4.9 Source of drinking water

The main source of drinking water is water vendors 29% and other water sources are 21% from taps inside the house, 19% from protected wells, 14% from streams/rivers, 3% from protected spring, 6% from boreholes, 4% from public tap, 1% from tap outside the house, 1% from unprotected spring and 3% from unprotected well. The most preferred water source by the respondents was tap inside the house.

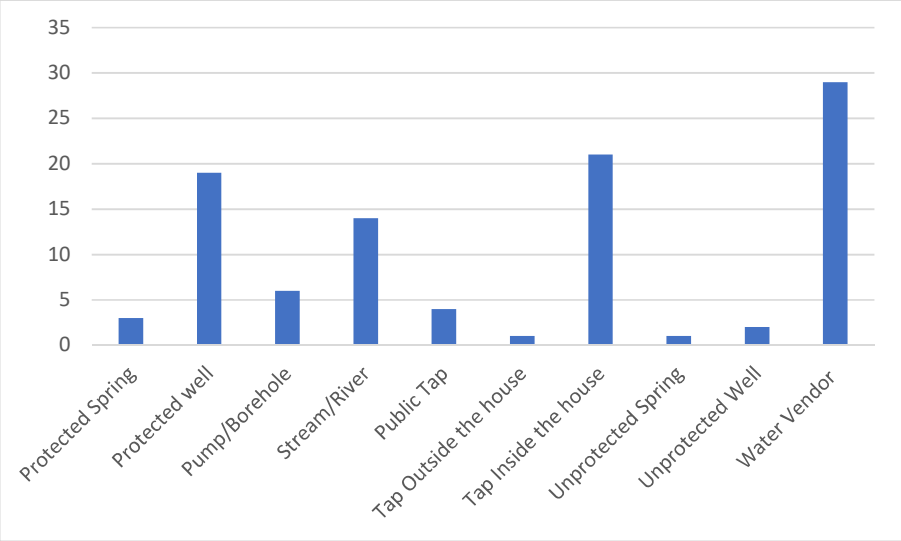


Figure 4-10: Main domestic water sources

The main sources of drinking water for domestic animals are pumps/boreholes, water vendors and streams/rivers. With pumps having 26%, stream having 15%, unprotected well having 1%, public tap having 1%, water vendors having 20%, tap inside house having 13%, rain water harvesting having 8% , the ones with no domestic animals with a 4%, protected spring having 3% and unprotected spring having 7%.

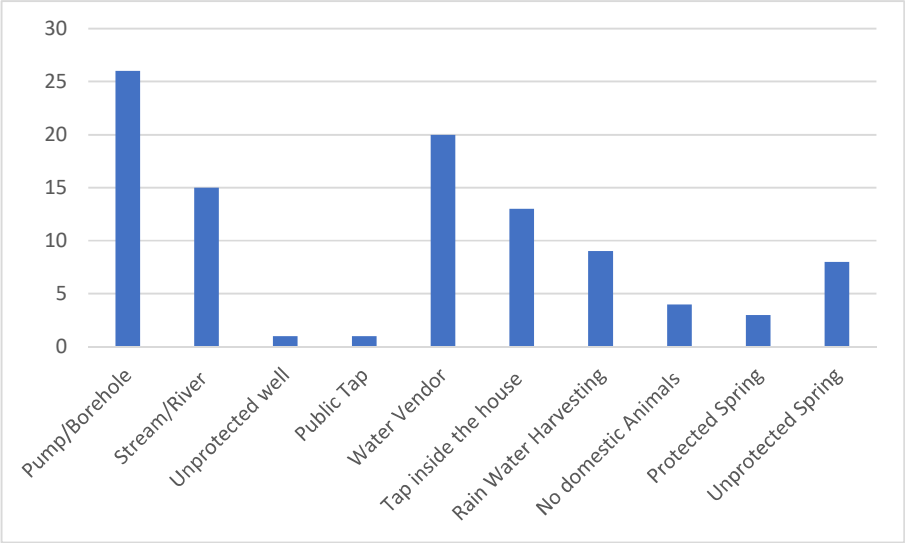


Figure 4-11: Sources of water for domestic animals

4.4.10 Distance travelled to water sources

43% of the respondents travel between 1 km – 5 km to the nearest source of water for drinking, 43% for less than 1 km, 12% between 6 km – 10 km and 2% between 11 km – 15 km.

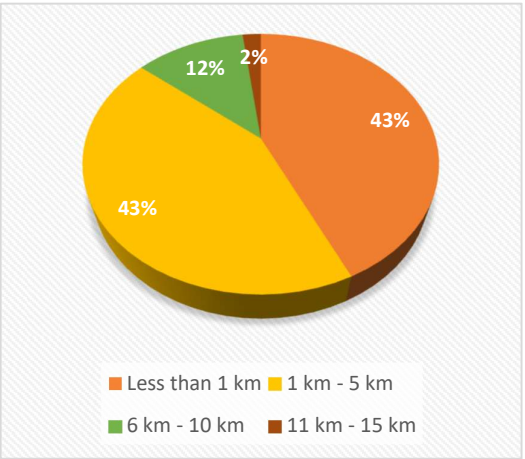




Figure 4-12: Distance travelled to water source

43% of the respondents take between 0 – 15 minutes to the water source, 26% between 16 – 30 minutes, 18% between 31 – 45 minutes, 9% between 46 – 60 minutes and 4% for more than 60 minutes.

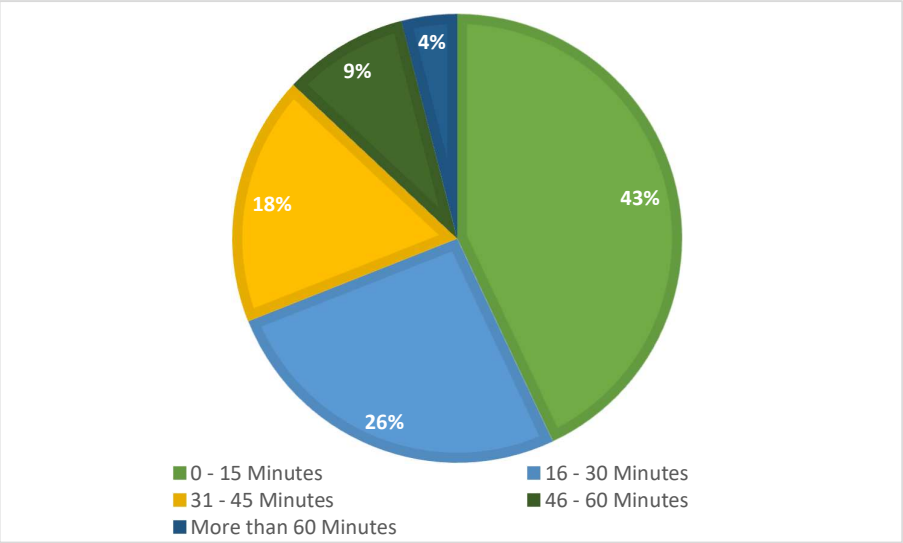
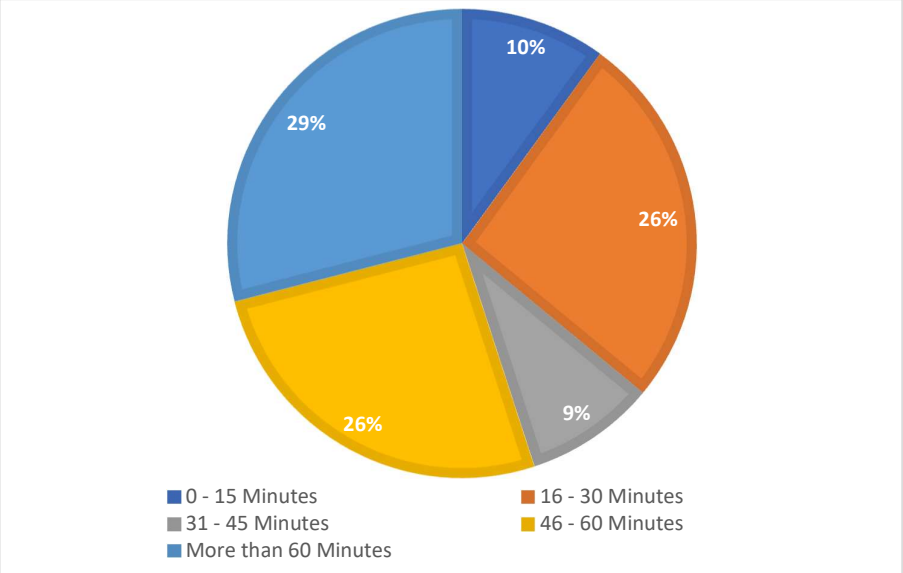


Figure 4-13: Time taken to the water source

29% of the respondents take more than 60 minutes to the water source, 26% between 16 – 30 minutes, 26% between 46 – 60 minutes, 10% between 0 – 15 minutes and 9% between 31 – 45 minutes.



4.4.11 Water Consumption

68% of the respondents use less than 100 litres per day and 32% use between 100 - 200 litres per day. The data indicates that 68% of respondents use less than 100 litres of water per day, which could suggest either limited access or efficient usage practices. Meanwhile, 32% use

between 100 and 200 litres daily, indicating higher water availability or greater needs. Addressing the needs of households with lower water usage is essential to ensure they have sufficient access for all daily activities, while also considering the overall water management and distribution strategies in the community.

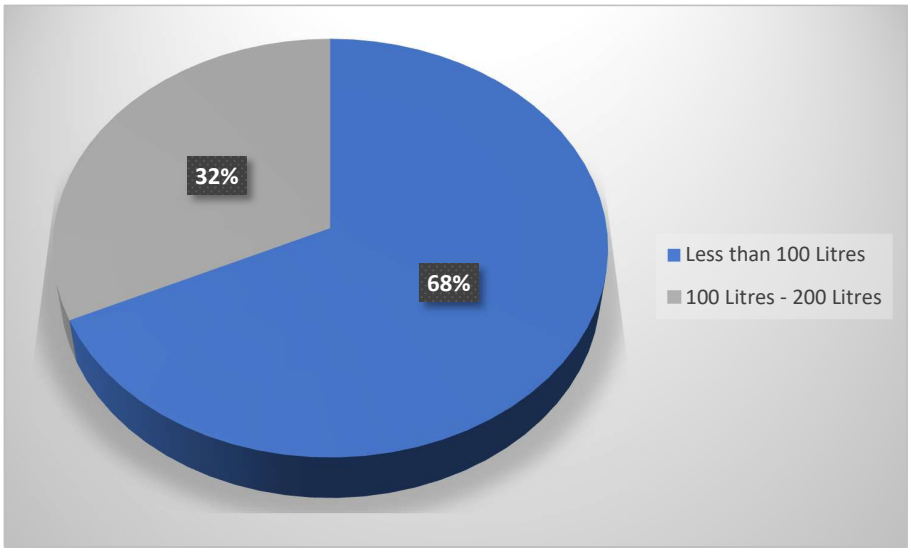


Figure 4-14: Water consumption among residents

4.4.12 Water Service Providers

34% of the respondents get water from WSPs while 66% do not. The data reveals that while 34% of respondents benefit from organized water services provided by WSPs, a substantial 66% rely on alternative water sources. This disparity highlights a potential gap in access to reliable and safe water services for the majority of the community. Addressing this gap is crucial for improving water quality, reliability, and overall public health in the area.

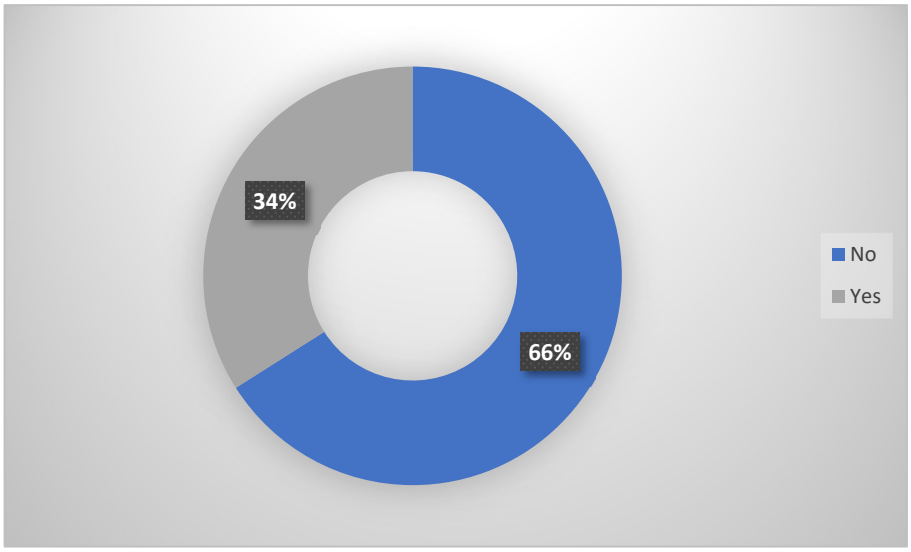


Figure 4-15: Water service providers

From the 55% of the respondents who get water from WSPs, the water is supplied on alternate days of the week, 42% on a weekly basis and 3% on irregular basis.

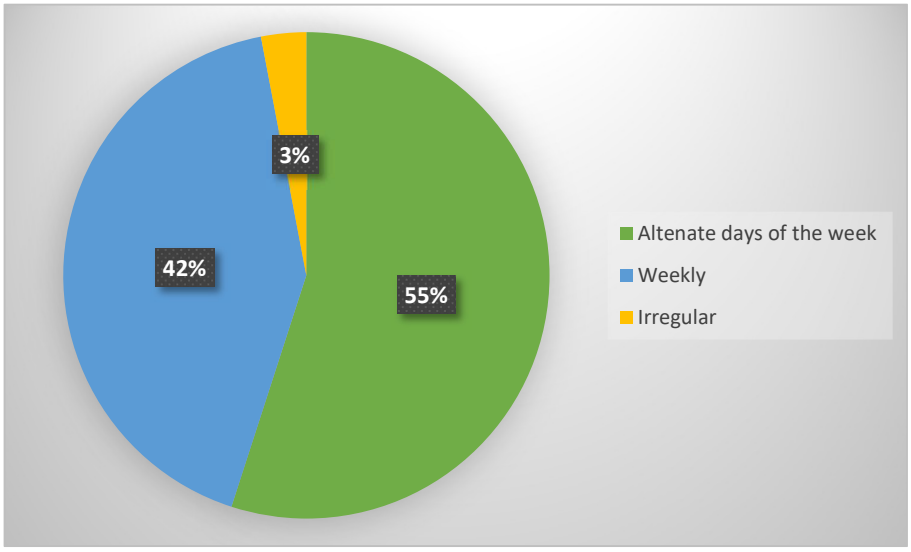


Figure 4-16: Water supply frequency

4.4.13 Costs

35% of the respondents pay for the WSP water they consume. The majority of the respondents 68% pay between 501 – 1000Ksh for the water monthly, 2% between 100- 500Ksh, 21%

between 1001-1500Ksh, 2% between 1501- 2000Ksh and over 2000Ksh having 4% of the respondents.

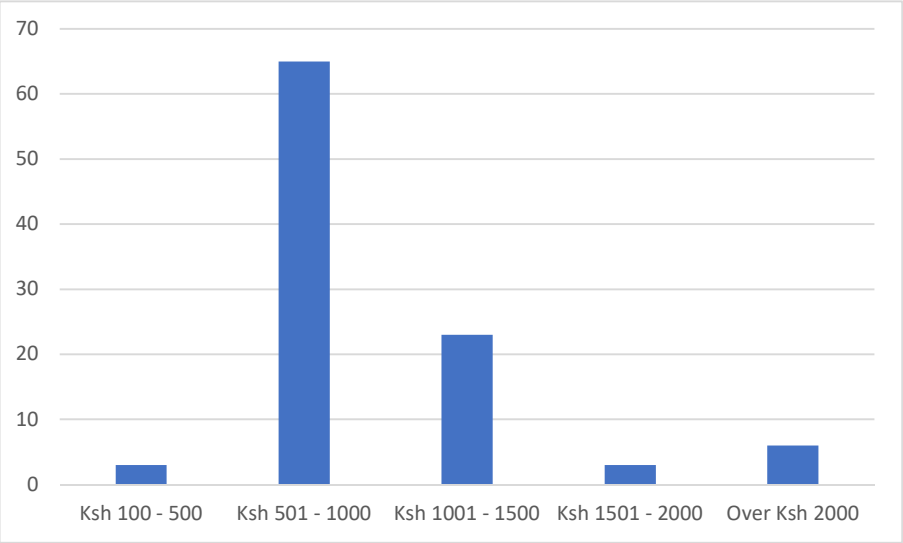


Figure 4-17: Cost of water

4.4.14 Satisfaction with water services

The data reveals mixed levels of satisfaction with water and sanitation services: 50% of respondents are neutral, 35% are satisfied, 9% are not satisfied, and 6% are highly satisfied. The high percentage of neutral responses and the relatively small proportion of highly satisfied individuals indicate that while the services are generally acceptable for many, there is significant room for improvement. Addressing the concerns of the dissatisfied and neutral respondents could help enhance overall satisfaction and service quality.

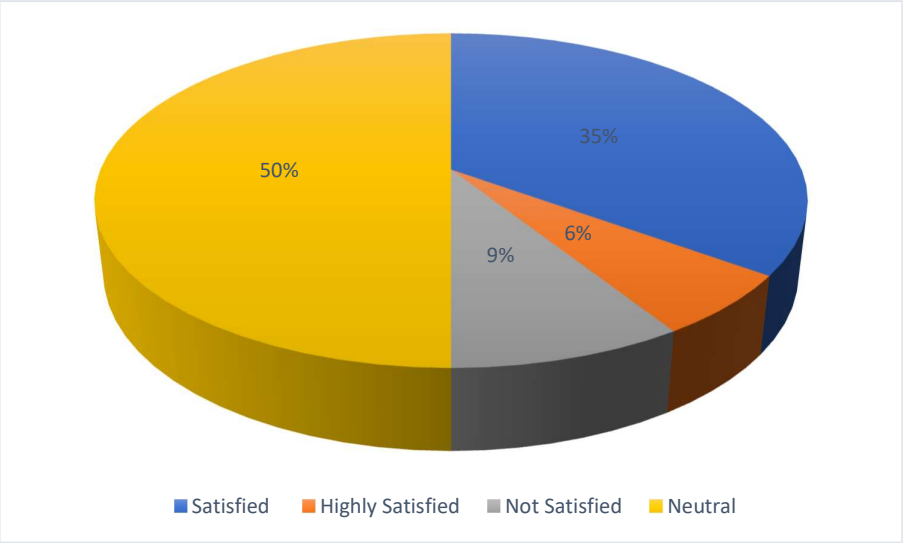


Figure 4-18: Level of satisfaction with water supply services

4.4.15 Rainwater Harvesting

The data shows that 57% of households harvest rainwater, reflecting a substantial reliance on this method as a supplementary water source. This practice highlights the community's adaptation to water availability challenges and the potential importance of supporting and enhancing rainwater harvesting systems to improve overall water security and resilience.

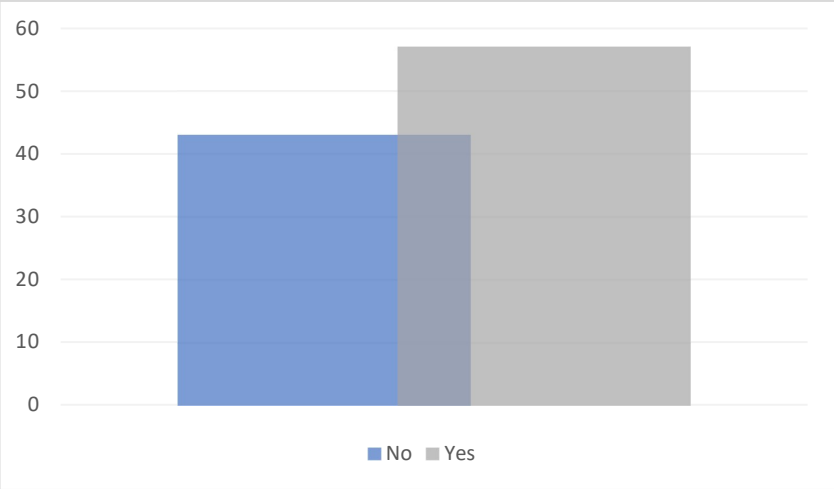


Figure 4-19: Rainwater harvesting

57% of the rainwater is harvested in tanks and 43% is harvested in household containers.

4.4.16 Sanitation Facilities

All the households have a toilet facility. 34% of the households have a pit latrine with wall and roof facilities, 22% pit latrine without slab, 13% pit with wooden floor and 13% urinal with stones.

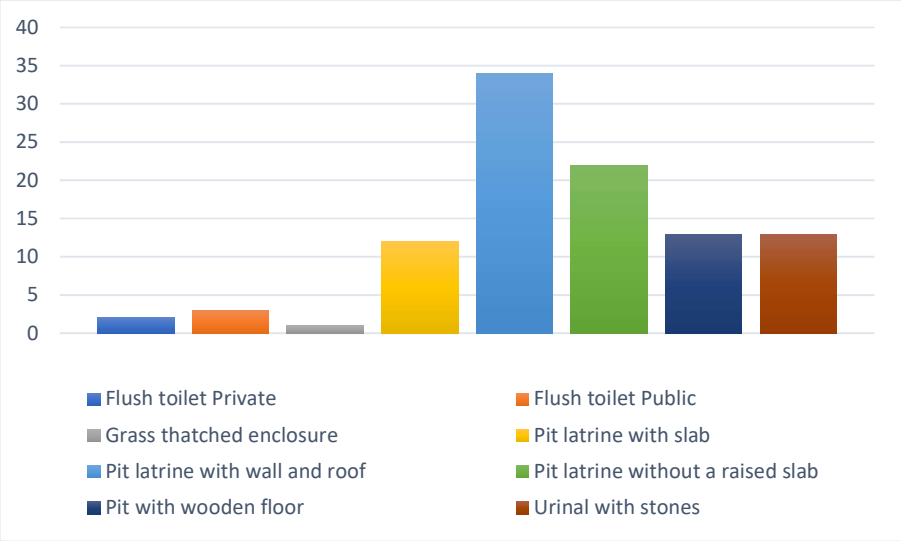


Figure 4-20: Sanitation options

The data indicates a range of cleanliness levels for toilet facilities: 38% are fairly clean, 33% are clean, 15% are very clean, 10% are dirty, and 4% are very dirty. While a majority of facilities meet or exceed basic cleanliness standards, a notable portion requires improvement. Addressing the issues with dirty and very dirty facilities is crucial for enhancing public health and ensuring better sanitation conditions for all.

Regarding hand washing facilities, 31% of households have a hand wash facility adjacent to their toilet or latrine. This relatively low percentage highlights a gap in hygiene infrastructure, suggesting that many households may lack convenient access to handwashing, which is crucial for effective sanitation and health practices. Addressing this gap could significantly improve hygiene and reduce the risk of disease transmission in the community.

The data shows that 39% of respondents have a bathroom or shelter in their households. This highlights a gap in access to private bathing facilities for the majority of the community. Improving the availability and quality of such facilities could enhance privacy, hygiene, and overall living conditions for many households.

4.4.17 Household Income & Expenditure

52% of the respondents earn less than ksh 5,000 from agricultural activities per year, 19% earn between ksh 50,001 – 100,000, 5% earn between 10001-20,000Ksh, 2% earn between 250001-500000Ksh, 7% earn between 5001-10000Ksh, 7% earn between 20001-50000Ksh and 8% earn between 100001-250000Ksh.

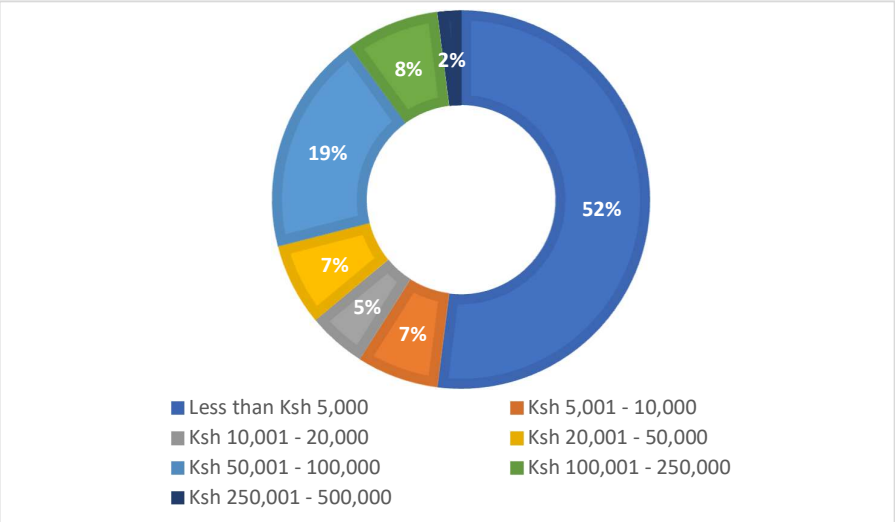


Figure 4-21: Household Incomes

36% of the respondents average monthly income is earn less than ksh 5,000, 6% earn between ksh 50,001 – 100,000, 13% earn between 10001-15,000Ksh, 1% earn between 250001-500000Ksh, 25% earn between 5001-10000Ksh, 36% earn between 20001-50000Ksh and 3% earn between 100001-250000Ksh.

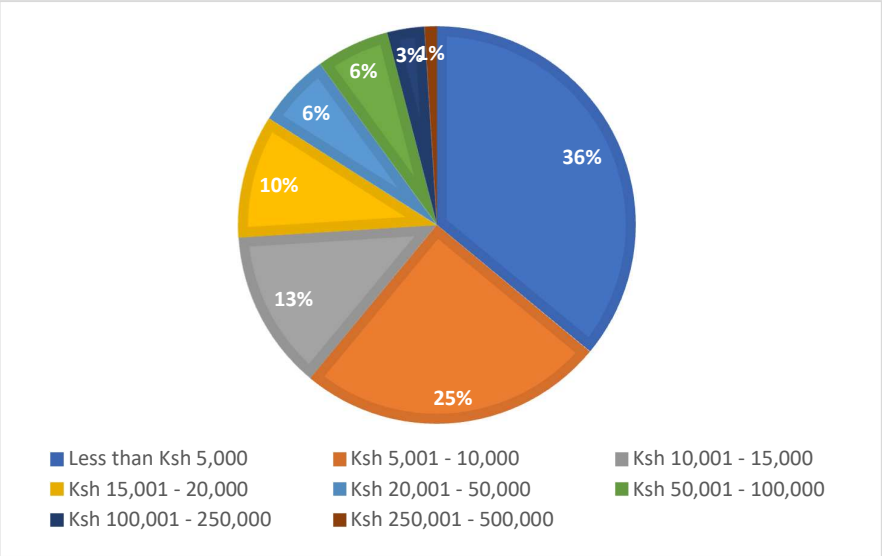
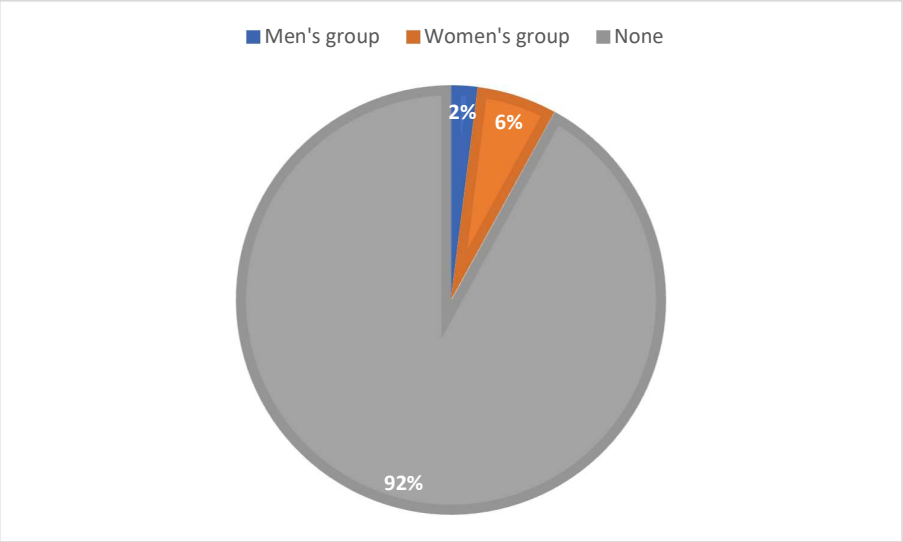


Figure 4-22: Household Expenditure

44% of the respondent's monthly expenditure ranges between ksh 20,001 – 50,000, 24% between ksh 10,001 – 20,000, 15% between ksh 5,001 – 10,000, 8% is less than 5000Ksh, 6% between 100001-250000Ksh and 3% between 50001-100000Ksh.

4.4.18 Social support groups and organizations

92% of the respondents are not in any social support groups/organizations, 6% are in women's groups and 2% are in men's groups.



The data indicates that 87% of respondents in social groups or organizations receive extension services, highlighting a strong support system for skill-building and technical assistance. In contrast, only 13% have access to credit services, suggesting a gap in financial support that could impact economic growth and development. Addressing this gap could help improve access to necessary financial resources and further support community development.

4.4.19 NGOs working in the project area

- Consortium of Cooperating Partners (COCOP).
- Islamic Relief.
- Kenya Red Cross.
- Action Against Hunger.
- Danish Refugee Council (DRC).
- Save the Children.
- Rural Community Development Agency (RACIDA).
- Organization for Sustainable Development Africa (OSDA).
- Nagaland Empowerment of People through Economic Development (NEPED).
- Voice Of Peace for All in The Horn of Africa (VOPA).

4.4.20 Cultural Sites

The cultural heritage/sites existing in the area are caves, graves, and ritual grounds. This should be safeguarded in the course of the project development.

4.4.21 Environmental Challenges in the Project Area

The main environmental challenges mentioned include: climate change, drying of rivers, deforestation, poor water drainage and poor waste disposal.

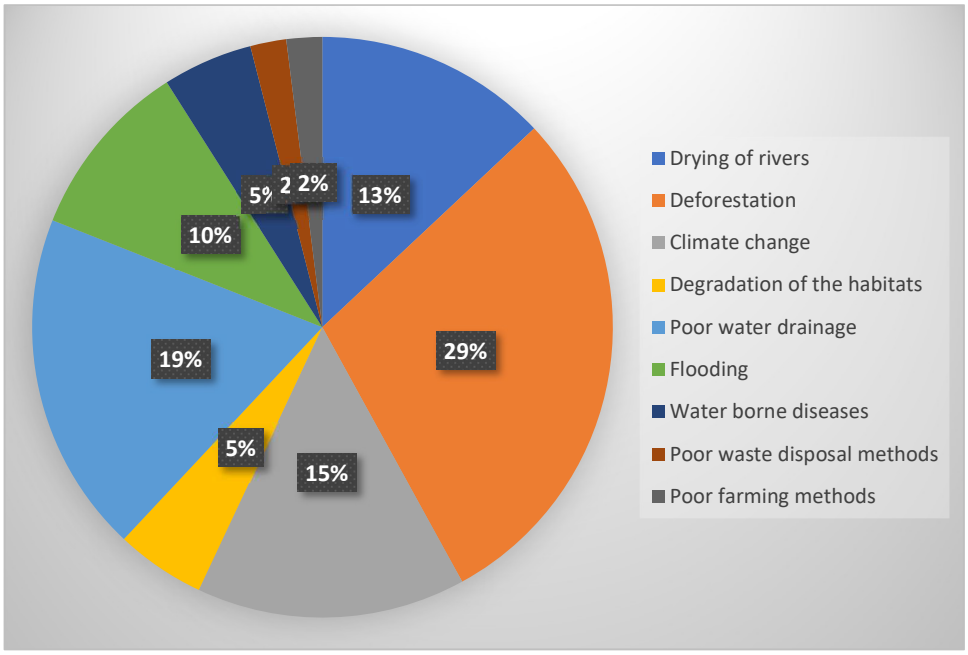
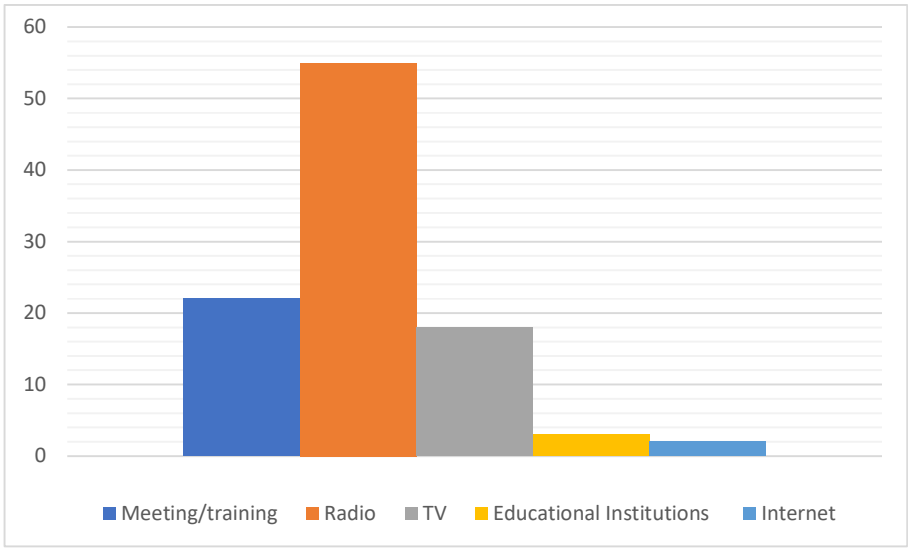


Figure 4-23: key environmental challenges

4.4.22 Main sources of information on environmental issues.

55% of the respondents' main source of information on environmental issues is through radio, 22% through meetings/trainings, 18% through educational institutions and 2% through internet.



4.4.23 Common tree species

- Acacia
- Bamboo
- Guava
- Lemon
- Pawpaw
- Prosopis Juliflora
- Neem Tree

4.4.24 Uses of these trees

42% of the tree species in the area are used for fetching firewood, 38% for medicinal value and 9% for making household vessels.

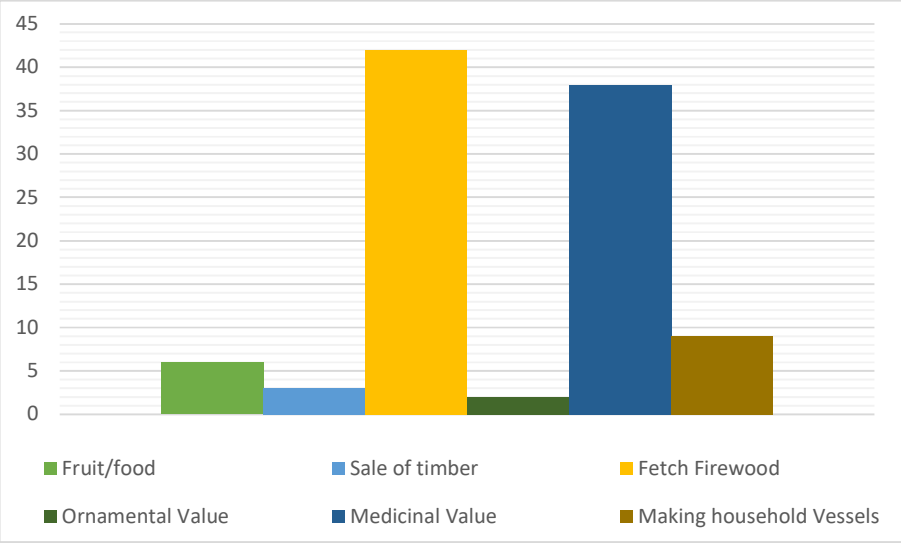


Figure 4-24: Common Uses of trees in the area

4.4.25 Awareness of the proposed WSP

The data shows that just 20% of respondents are aware of the proposed WSP project. This suggests a need for increased outreach and communication to ensure that a larger portion of the community is informed about the project, its benefits, and how they can engage with it. Enhanced awareness efforts could help improve community involvement and support for the project.

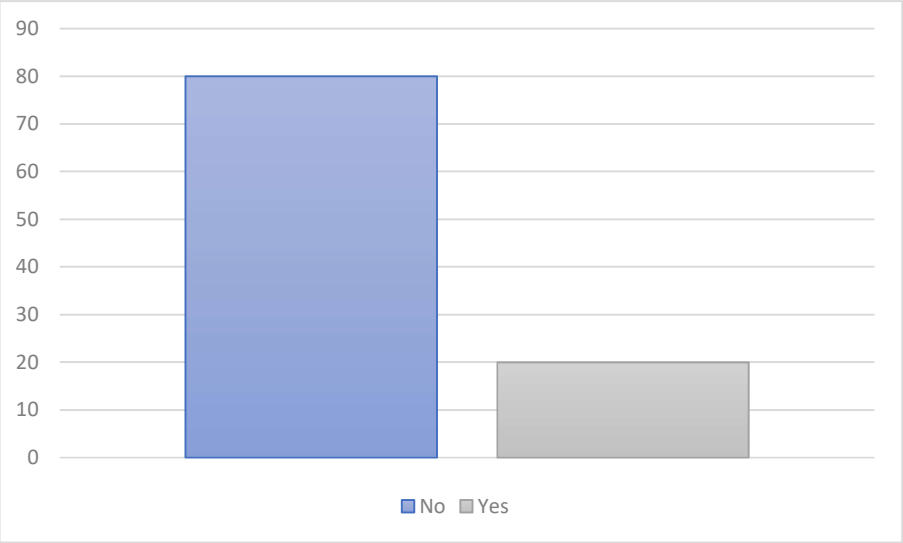


Figure 4-25: Project Awareness

4.4.26 Project Acceptance

The data below shows that 97% of respondents support the proposed WSP project in the area, reflecting a strong community consensus in favour of the initiative. This high level of support highlights the project's potential to address critical water needs and underscores the importance of moving forward with the project to meet community expectations.

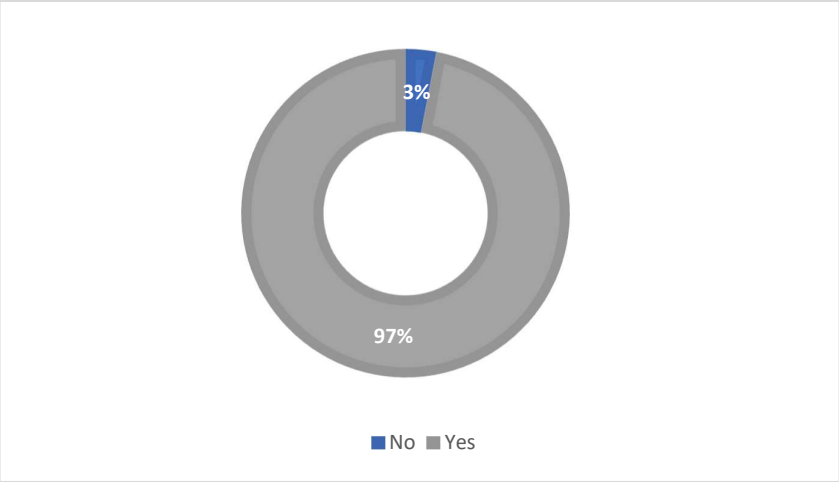


Figure 4-26: Project support

4.4.27 Anticipated social benefits of the proposed project.

53% of the respondents anticipate safe drinking water as the main benefit of the proposed project, 13% time savings, 10% decreased water borne diseases, 5% better hygiene, 6%

improved school attendance, 5% income generation, 1% reduced burden on women and girls and 7% increased community participation

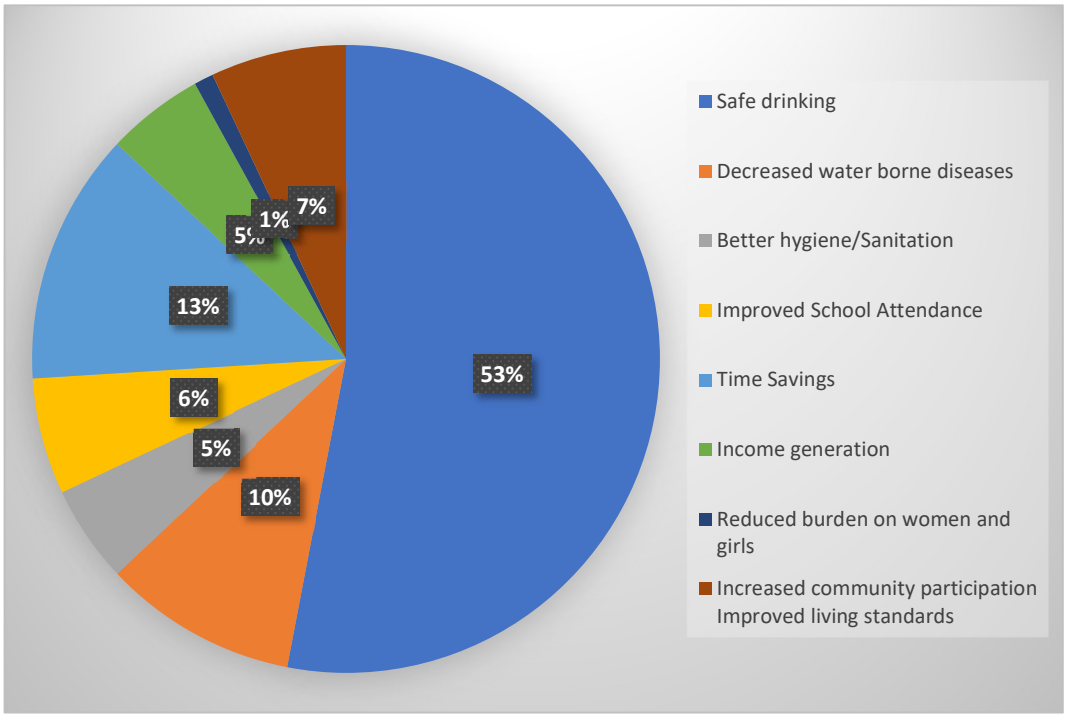


Figure 4-27: Anticipated social impacts

4.4.28 Environmental benefits anticipated due to the proposed project

The three most anticipated environmental benefits are provision for safe drinking water, improvement of hygiene standards, improve water supply efficiency and reduced water borne diseases. With Provision of safe drinking water at 40%, improvement of hygiene standards at 22%, reduce water borne diseases at 16%, control flooding at 3%, rainwater harvesting at 3% and improve water supply efficiency at 16%.

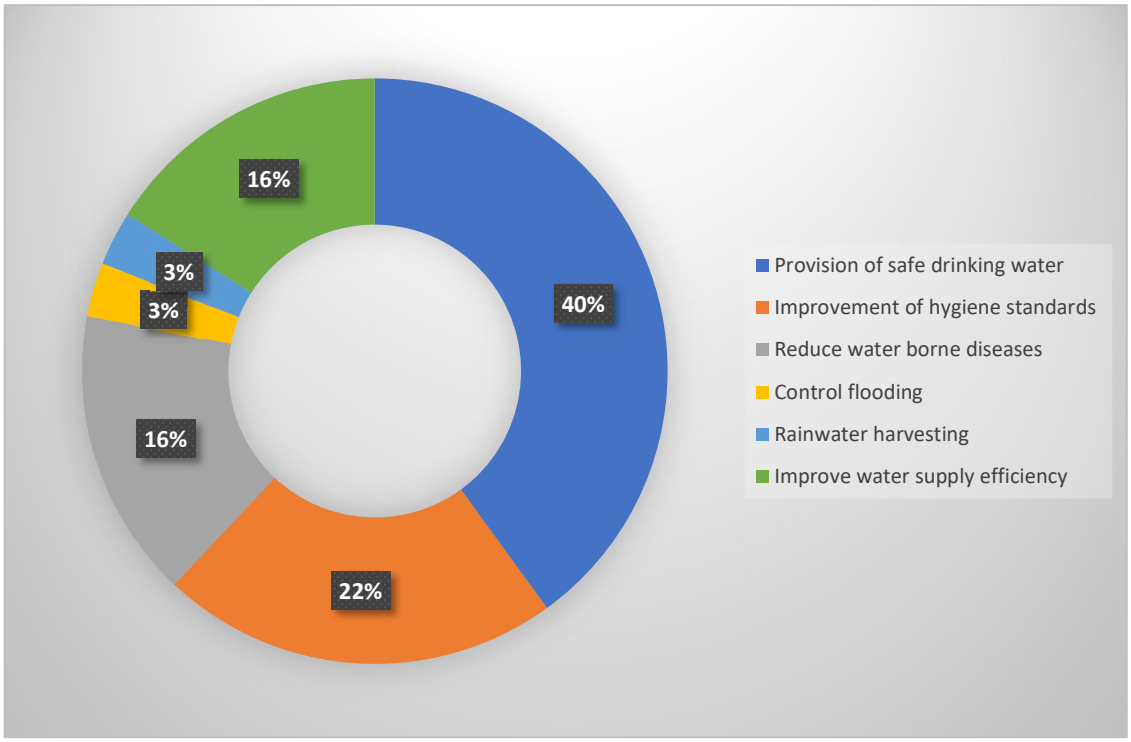


Figure 4-28: Project benefits

4.4.29 Environmental problems anticipated due to the proposed project

The most common anticipated environmental problems are devegetation/deforestation, flooding, increased water borne diseases, and diversion of water sources. Soil degradation at 5%, flooding at 15%, diversion of water sources at 12%, devegetation at 28%, water pollution at 5%, increased water borne diseases at 13%, drying up of rivers at 9%, loss of biodiversity at 7%, soil erosion at 3%, contamination of ground water at2% and blockage of drainage systems at 3%

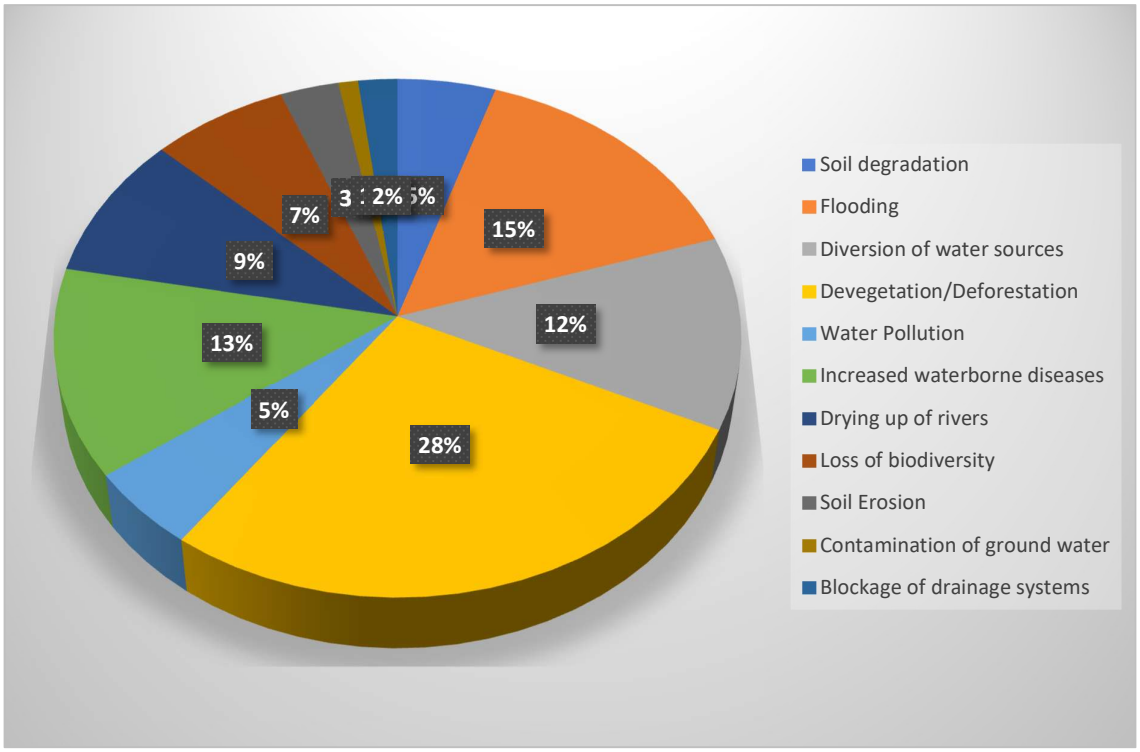


Figure 4-29: Anticipated environmental challenges

4.4.30 Mitigation measures anticipated from the environmental problems emanating from the proposed project

- Construction of better drainage facilities.
- Reforestation.
- Public education.
- Public awareness on effects of cutting down of trees.

4.4.31 Social problems anticipated due to the proposed project

According to the community, some of the social problems anticipated due to the proposed projects are; temporary loss of livelihoods at 26% (however from the field survey and public participation, there are no persons who will be displaced and no livelihood will be affected), loss of aesthetic land value at 8%, increased exposure of the community to GBV at 30%, corruption of social cultural norms at 2%, lead to child delinquency at 3%, loss of cultural and religious sites at 7%, human- human conflicts at12%, increased food prices at 8% and displacement of people at 4%.

5 PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT

5.1 Introduction

Stakeholder engagement is a critical process in a project as it significantly influences the project's success. Stakeholders in this report refers to person (s) who has an interest or can either affect or be affected by the project. It is important to undertake effective consultation with stakeholders from the project inception to closure.

In this project, stakeholders were mapped out as either primary or secondary. They were then analysed based on their impact, level of influence, importance to the project, and contribution to the project. This helped in determining the best strategy for engaging with them. It then concludes with a summary of the feedback obtained from the stakeholders that is reviewed and incorporated in the final design, construction and operation of the project.

5.2 Objectives of Stakeholder Engagement

Stakeholder engagement has the following objectives:

- ***Inform***: Provide accurate, relevant, timely and culturally appropriate information to Project stakeholders about the Project, its impacts and benefits, and the ESIA process.
- ***Engage:*** Provide opportunities for Project stakeholders to express their opinions and concerns about the Project, and to seek broad stakeholder support for the Project and impact management
- ***Understand:*** Enable the Project team to understand the concerns and priorities of stakeholders
- ***Review***: Incorporate justified concerns and priorities into the design, construction and operation of the Project
- ***Inform (feedback):*** Provide feedback to Project stakeholders and host communities as the Project develops so that the consultation process continues.

5.3 Stakeholder Mapping

Mapping of stakeholders is an essential process that assists the expert in understanding whom they need to prioritize in their engagement. The following stakeholders have been identified as persons who will be affected by the project or who could influence the project's success. They are mapped as either:

a) **Primary Stakeholders-** Those who hold a direct interest in the proposed project
b) **Secondary Stakeholders-** Those with an indirect interest, but they can influence the project's success.

They are mapped as shown in the table below:

Table 5-1: Mapping of Stakeholders

Primary Stakeholders	Secondary Stakeholders
• Hosting communities within the proposed infrastructure upgrading sites • Mandera Water & Sewerage Company (MANDWASCO) • Client: Water Sector Trust Fund • Project beneficiaries -households, schools, hospitals	County Government of Mandera • Department of Water & Sanitation • Department of Gender & Social Services • Department of Environment & Natural Resources
	• National Environment Management Authority (NEMA) • Water Resource Authority (WRA) • Water Resources Users (WRUA) • NGOs / CBOs
	Political class • MCA • Ward Administrator
	National Government Administration • County Commissioner • Chiefs and their Assistants

5.4 Stakeholder Analysis

Table 5-2: Analysis of project stakeholders

Stakeholder Name	Impact *(Low, Medium, High)*	Influence *(Low, Medium, High)*	What is important to the stakeholder?	How could the stakeholder contribute to the project?	How could the stakeholder block the project?	Strategy for engaging the stakeholder
Water Sector Trust Fund	High	High	Grant administration to facilitate infrastructure development	By providing funds for undertaking the project	Withdrawing financial support for the project	Regular status report, monthly reports and other deliverables
MANDWASCO	High	Low	Obtaining water to supply to the public	Communicate with other stakeholders to express their support for the project	Ending their engagement with WSTF	Information and feedback meetings every 6 months
Host Institutions **Churches, mosque, schools**	High	High	Understanding how the project safeguards their safety as the host community	By sharing their concerns, opinions about the project from the design stage.	Reject the project by refusing give up part of the land for the borehole drilling	Create project awareness and provide an open communication to ensure they understand the project well. Their engagement shall be ongoing

Stakeholder Name	Impact *(Low, Medium, High)*	Influence *(Low, Medium, High)*	What is important to the stakeholder?	How could the stakeholder contribute to the project?	How could the stakeholder block the project?	Strategy for engaging the stakeholder
						throughout the project cycle
County Government of Mandera- Department of Water	High	Low	Ensuring consistent water supply needs in the county are met.	By sharing relevant information on proposed project with the Client/Consultant. Assist in the creation of project awareness and promoting acceptance	_____	Through KII. Consultant sharing their findings with the County.
NEMA	High	High	Adequate Environmental and Social Impact Assessment is undertaken before the project construction	By availing the ESIA report for review and licensing	By not issuing EIA License	Providing ESIA Report and all other necessary documentation regarding the project for review

Stakeholder Name	Impact *(Low, Medium, High)*	Influence *(Low, Medium, High)*	What is important to the stakeholder?	How could the stakeholder contribute to the project?	How could the stakeholder block the project?	Strategy for engaging the stakeholder
WRA	High	High	Proper management and use of water resources	By sharing relevant information of the water resources that will be affected by the project.	By not issuing permits required for water abstraction	Consulting with the stakeholder during the design stage and providing the relevant reports needed for issuing of permits.
Politicians (MCA, Ward Administrators, MP etc.)	Low	High	The residents within their area of jurisdiction access and enjoy amenities like water	Creating awareness about the project to obtain support and project acceptance	Inciting residents against the project	Involving them in focused group discussions and public stakeholder meetings
Local Administration (CC, DCC, ACC, Chiefs & Assistant Chiefs)	Low	High	Law and order are adhered to during the project implementation phases	Help in organization of local meetings, sharing relevant information about the project area, assist in identifying the affected landowners,	-	Involving them in KII, focused group discussions and public stakeholder meetings. Communicating all findings during each step of the project.

Stakeholder Name	Impact *(Low, Medium, High)*	Influence *(Low, Medium, High)*	What is important to the stakeholder?	How could the stakeholder contribute to the project?	How could the stakeholder block the project?	Strategy for engaging the stakeholder
				Help in resolution of any complaints that may arise during the project implementation phase.		Head the Grievance Redress committee once they are set up

5.5 Stakeholder Engagement Approach

Stakeholder engagement process is a crucial process in the undertaking of any project. The interaction is aimed at creating awareness, obtaining their views/opinions and concerns about the project.

Table 5-3: Methodology adopted in Stakeholder Engagement

Technique	Target Group	Objective	Date Undertaken
Key Stakeholder Interviews	Secondary Stakeholders County Government of Mandera Department of Water, Environment & Natural Resources National Government National Government Administration State Department of Gender & Social Services	• To create awareness about the project • To obtain their views regarding the project	21/06/2024
Household Surveys targeting 100 respondents	• Residents within the project area	• To understand the socio-economic status of the affected communities	19-21/06/2024
Focused Group Discussion	Community leaders/ representatives of groups	• To obtain their input on the proposed design	20-21/06/2024

5.6 Summary of Feedback from the Secondary Stakeholders

The Consultant undertook Key Informant Interviews that targeted primary and secondary stakeholders. The feedback from the stakeholders is summarized below:

a) MANDWASCO (Technical Manager)

- A feasibility was carried out through a participatory process that consulted all the key stakeholders
- The project is anticipated to improve water quality, increase reliability and efficiency, reduce maintenance costs

- Negative impacts will include temporary contamination of water sources, disruption of services, ecosystem disturbance, waste generation and technical challenges e.g. coordination
- These impacts can be mitigated through creation of public awareness, provision of alternative water supply during the construction phase, adherence to regulations, quality checks and control

b) County Government of Mandera- Department of Social Services (Social Services Officer)

- The project will lead to increased access to water by the community
- Improved hygiene & sanitation standards in the town
- The negative impacts include disruption of business along the pipelines
- To mitigate against negative impacts there is need for involvement of the community during the project to find a middle ground especially for the businesspeople who will be affected

c) National Government-Deputy County Commissioner

- The office is aware of the proposed project
- The anticipated impacts include improved access to portable water which will lead to improved health, reduced waterborne related illnesses
- The negative impacts include illegal water connections, tampering of water meters, lack of payment of water bills, domestic conflicts
- These negative impacts can be mitigated through sensitization of the public

5.7 Summary of Feedback from the public

The Consultant undertook public participation through focused group discussions to create awareness and solicit views and opinions on the proposed project. The meetings targeted MANDWASCO, local administration and host community. The Consultant provided a brief of the project Scope, upcoming field activities then had an answer question-and-answer forum with the attendees. They are all supportive of the project as lack of water is a critical issue in the area. However, they had concerns that are summarised below. The minutes of the meetings minutes and attendance list are attached in the Appendix.

5.7.1 Feedback from Focused Group Discussion

- The project is timely due to the current water crisis in Mandera town
- The water supply infrastructure in Mandera town is in a dilapidated state and requires rehabilitation
- Residents in areas that are not served incur high costs in accessing water as they have to rely on vendors
- There is need for intake rehabilitation to ensure the capacity of MANDWASCO is enhanced
- The proposed project should incorporate a component on water treatment which is currently very basic hence compromising the quality of water supplied
- The locals especially youths should be given first priority in the available job opportunities during construction.

- There are multiple lagas in the area which could damage pipelines hence the need to make this consideration in the design
- Provide quality pipes that will withstand the harsh climatic conditions of this area
- MANDWASCO should consider investing in sanitation once they implement this project as a follow up



Plate 5-1: Lagas that characterize the project area



Plate 5-2: Mandera Boys School one of the project beneficiaries (see KII)



Plate 5-3: Focused Group Discussion with community leaders

6 ANALYSIS OF ALTERNATIVES

6.1 Introduction

The proposed project is set to be implemented in Manera town in Mandera County. The location of the proposed project is Suftu, Handadu, Naboi and Shafshafty. The project proposes to upgrade the existing water supply system by rehabilitating 3 No intakes, sump wells, and upgrading 34.5 km of pipeline with HDPE pipes including 24.5 km mains and 10km distribution lines. This chapter analyses the different alternatives considered in selection of the dam site and type and water supply transmission.

6.2 The No Project Alternative

(i) No project Alternative

This alternative entails maintaining the current status quo without implementing the project. Potential negative impacts include continued dilapidation of the pipeline, water leakage, unaccounted for water-increased Non -Revenue Water, water shortages, high operational costs and underutilization of local skills. It also risks exacerbating water-related conflicts and vandalism of existing infrastructure. However, opting for the "No Project" alternative would avoid potential environmental disturbances and maintain current conditions.

(ii) Development Alternatives

The proponent has two options including: constructing a new pipeline to serve the residents of Mandera town who are not connected to water supply; and rehabilitating the old pipeline and its water sources to increase its capacity. The first option is advantageous as it will allow for optimal designing taking into consideration the current and projected population. However, this option is costly and require laborious planning processes. The second option is more affordable and will not require elaborate planning processes. It will be implemented the same space hence will not require any land acquisition. It is however disadvantageous in that the scope of expansion is limited to the existing water source and coverage area. Despite this, it is notable that rehabilitation will significantly increase water supplied to Mandera residents.

7 IMPACT IDENTIFICATION, PREDICTION AND ANALYSIS

(i)Impact Identification

Impact identification involves pinpointing the potential impacts that an activity, project, or policy might have on the environment, society, or economy. The objective is to identify both positive and negative, as well as direct and indirect, impacts.

(ii). Impact Prediction

Impact prediction is the process of forecasting the magnitude and significance of the identified impacts. This involves understanding the extent of an impact (its magnitude, duration, intensity) and whether it is positive or negative.

Experts use their experience to predict the scale and significance of impacts based on knowledge of similar projects or environments.

(iii). Impact Analysis

Impact analysis is the detailed examination of the significance of identified and predicted impacts. This stage involves evaluating whether an impact is acceptable and what actions can be taken to mitigate negative consequences or enhance positive ones.

7.1.1 Impact assessment scoring

To systematically identify, predict, evaluate and determine the significance of impacts resulting from the project construction and operation, generic criteria developed by Haug et al (1984) were adopted. 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 erred on the side of caution.

Table 7-1: Impact significance rating criteria

SEVERITY OF IMPACT	RATING
Insignificant / non-harmful / less beneficial	-1/ +1
Small/ Potentially harmful / Potentially beneficial	-2/ +2
Significant / slightly harmful / Significantly beneficial	-3/ +3
Great/ harmful / beneficial	-4/ +4
Disastrous/ extremely harmful / extremely beneficial	-5/+5
DURATION OF IMPACT	RATING
One day to one month	-1/ +1
One month to one year	-2/ +2
One year to ten years	-3/ +3
Life of operation	-4/ +4
Post closure	-5/+5
SCOPE OF IMPACT	RATING
Activity specific	-1/ +1
Right of way specific (within right way)	-2/ +2
Local area (within 5km of the project)	-3/ +3
Regional	-4/ +4
National	-5/+5
FREQUENCY OF ACTIVITY / DURATION OF ACTIVITY	RATING
Annually or less / low	-1/ +1

6monthly / temporary	-2/ +2
Monthly / infrequent	-3/ +3
Weekly/ life operation/ regularly / likely	-4/ +4
Daily / permanent / high	-5/+5
FREQUENCY OF IMPACT	RATING
Almost never/ almost impossible	-1/ +1
Very seldom / highly unlikely	-2/ +2
Infrequent / unlikely/seldom	-3/ +3
Often / regularly/ likely/ possible	-4/ +4
Daily / highly likely/ definitely	-5/+5

Table 7-2: Significance rating matrix

CONSEQUENCE (Severity+ Spatial Scope + Duration)															
LIKELIHOOD (Frequency of activity + frequency of impact)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table 7-3: Mitigation ratings

Significance Ratings	Value	Negative Impact Management Recommendation	Positive Impact Management Recommendation
Very High	126-150	Improve proposed management	Maintain proposed management
High	101-125	Improve proposed management	Maintain proposed management
Medium – High	76-100	Improve proposed management	Maintain proposed management
Low - Medium	51-75	Maintain proposed management	Improve proposed management
Low	26-50	Maintain proposed management	Improve proposed management
Very low	1-25	Maintain proposed management	Improve proposed management

7.2 Potential Impacts and Mitigation Measures

It is envisaged that the proposed project will generate both positive and significant negative impacts during its life. In the assessment, the assessors will suggest measures to mitigate against

the negative impacts, while enhancing the positive one. They are not exhaustive and the proponents should continuously monitor the effectiveness of the mitigation or prevention measures recommended in the report.

7.2.1 Construction Phase

(i). Traffic Congestion

Traffic congestion is anticipated from site related traffic by Contractor vehicles during material delivery. This may interfere with socio-economic activities which majorly rely on the transport network affected by the construction activities. However, this will be temporary as pipe laying is not expected to take more than 7 days at a given site. The intake rehabilitation works are of minimal scale hence not necessitating large deliveries. The receptors are pedestrians and motorists using the affected roads.

Impact without Mitigation	
Severity of impact	-3
Spatial scope of impact	-2
Duration of impact	-1
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-12 Very low**

Mitigation measures

- ✓ The Contractor should provide temporary road signs or notices to indicate ongoing works;
- ✓ The Contractor should effect traffic controls and cleanliness to avoid congestion and truck accidents on roads;
- ✓ Contractor should ensure that vehicles park in designated parking areas and adhering to the following:
    a. Don't block pedestrian routes;
    b. Don't block traffic routes;
    c. Obey the speed limit
- ✓ Introduces speed limits;

(ii). Site Related Oil Spills

During construction, oil spills may result from such activities as oiling and fuelling construction equipment. The major receptors are River Daua and groundwater in the project area.

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-4
Duration of impact	-4

Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-26 low to medium**

Mitigation measures

- ✓ The Contractor should ensure that the employees on site are aware of the procedures for dealing with spills and leaks from oil storage tanks for the construction machinery though induction and safety training;
- ✓ In case of spillage the Contractor should isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent material and/or other materials approved by the Resident Engineer;
- ✓ The Resident Engineer and the Contractor should ensure that there is always a supply of absorbent material such as saw dust on site during construction, readily available to absorb/breakdown spill from machinery or oil storage;
- ✓ All vehicles and equipment should be kept in good working order, serviced regularly and stored in an area approved by the Resident Engineer;
- ✓ The Contractor should assemble and clearly list the relevant emergency telephone contact numbers for staff, and brief staff on the required procedures.

(iii). Air Quality

Bush clearing, materials delivery, treatment site clearance, trench excavation and construction traffic will generate a lot of noise and dust especially during the dry seasons. The area is predominantly dry thus dust is already a pre-existing problem. Vehicular traffic to the proposed sites is expected to increase especially during delivery of raw materials. Vehicular traffic emissions will bring about air pollution by increasing the fossil fuel emissions into the atmosphere. The main receptors of this impact will be residents living close to the road, pedestrians, schools located along the pipeline.

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-2
Duration of impact	-4
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-22 Very low**

Mitigation measures

- ✓ Construction workers should use dust masks
- ✓ Construction sites and transportation routes will be water-sprayed on regularly up to three times a day, especially if these sites are near sensitive receptors, such as residential areas or institutions (schools, hospitals, etc.).
- ✓ All the vehicles and construction machinery should be operated in compliance with relevant vehicle emission standards and with proper maintenance to minimize air pollution.
- ✓ Digging of trenches should be done manually (if possible) so as to avoid too many trucks and machines in the area. The use of manual labour will also benefit the community socio-economically.

(iv). Socio - Economic Impacts

During construction the project will have clear benefits with regard to local employment opportunities. The project will additionally require various skills and services which may not be available on the local level but certainly on the regional level, e.g. masonry workers, plumbers, etc. for which appropriate personnel will be contracted. The increase in employment will temporarily lead to an overall increase of income directly and indirectly (through increased demand of other local services). New businesses will grow such as food vending to construction workers In migration of people from different regions may lead to behavioural influences and this may increase the spread of diseases such as HIV/AIDS

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-4
Duration of impact	-4
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-26 low-Medium**

Mitigation measures

- ✓ Unskilled construction and skilled labour to be hired from the local population as far as possible to minimize on influx of foreigners into the community.
- ✓ Use of manual labour during trenching works where possible to ensure more employment of locals and hence ensure project support throughout the construction process.
- ✓ Sensitize workers and the surrounding community on awareness, prevention and management of HIV / AIDS through staff training, awareness campaigns, multimedia, and workshops or during community barazas.

(v). Displacement and loss of Land

The proposed project will not cause any form of displacement or loss of private land. There is no new development but rehabilitation of the existing intake wells and pipeline.

(vi). Noise Pollution

Construction of the proposed Project will most likely result in noise emissions as a result of the machines that will be used during well rehabilitation and installations. Noise will also be generated from the construction workers. The receptors of this impact are the host community schools, churches, mosque, residential areas neighbouring the proposed project sites.

Noise impacts would be considered significant if the Project would result in the following:

a) Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

b) Exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels.

c) A substantial permanent increase in ambient noise levels (more than 3 dBA) in the project vicinity above levels existing before the project; and

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing before the project.

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-4
Duration of impact	-1
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-14 Very low**

Mitigation measures

- Limit construction to daytime in residential areas and weekends in schools (where pipes are passing through schools) to avoid learning disruption
- Limit pickup trucks and other small equipment to a minimum idling time and observe a common sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible;
- Maintain noise levels during daytime of maximum 55 dBA in residential and educational areas and 70 dBA in industrial/commercial areas
- Provision of appropriate personnel protective equipment to workers
- Observe protocols e.g., use of barricades, notification should be done 14 days to the start of the works

(vii). Site Safety, Security, and Welfare arrangements

The nature of the project brings into fore many safety, security and health issues. These range from accidental falls in excavated areas, injuries from construction equipment or materials, poor hygiene etc.

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-2
Duration of impact	-5
Frequency of activity / duration of activity	-2
Frequency of impact	-1
Result	**-36 Medium**

Mitigation measures

- Barriers shall be erected to prevent unauthorized access to the project sites
- Security personnel shall be deployed to secure the safety of the workers and property against vandals and to control access for safety purposes;
- The Contractor shall have his workers appropriately trained on safety and health matters-safety talks shall be held on a weekly basis;
- Construction vehicles will observe the required speed limit of 50 KM/H around schools, residential areas, hospitals, markets etc.
- The targeted institutions will be sensitized on safety issues with regard to the proposed project
- Any accident, incident or hazardous situation should be reported immediately it occurs or identified;
- The Contractor shall ensure that any food served at the sites meets the minimum hygienic conditions;
- The contactor shall provide insurance cover for any eventuality during work to the employees;
- The proponent/contractor shall provide adequate and suitable sanitary facilities for workers during construction period;
- The Contractor shall deploy as EHS officer at the project 'site' to foresee implementation of the EHS and security matter; and
- The Contractor shall abide by the all the relevant provisions of OSHA, 2007 and other relevant legislations

(viii). Worker's welfare (hygiene and sanitation)

Welfare of the workers is crucial for a successful project. Both legal and moral standards require that workers are provided with adequate facilities that will guarantee safety and health. The

Act (OSHA, 2007) obligates the employer to provide essentials facilities for sanitation water, accommodation for clothing, portable water supply, first aid facilities etc. Conversely, moral standards require that 'duty of care' be upheld in working situations to prevent injurious conditions.

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-2
Duration of impact	-1
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-10 Very low**

Mitigation measures

- ✓ The Contactor shall abide by the requirements under OSHA, 2007 in regard to the safety, health and welfare of the workers
- ✓ The contractors shall provide, free of charge, appropriate PPEs
- ✓ The Contractor shall provide clean portable drinking water for the workers
- ✓ The Contactor shall provide first-aid services
- ✓ Sanitation facilities for both sex including a hand washing facility;
- ✓ The Contractor shall communicate and implement the contents of the EHS policy of the Company to the employees
- ✓ The Contractor shall make available emergency services at the site/ camp;
- ✓ The Contractor shall retain a well trained and experienced EHS officer at the site

(ix). Effects on flora (plants/vegetation)

The proposed project will have minimal impact on existing vegetation. Only a few scattered small shrubs and grass are in the area. There are no mature indigenous trees along the pipeline.

Impact without Mitigation	
Severity of impact	-3
Spatial scope of impact	-2
Duration of impact	-1
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-12 Very low**

Mitigation measures

- ✓ The Contractor must ensure minimal or no disturbance to existing vegetation by marking out access routes and construction area
- ✓ The project will make provision for tree planting within the site restoration activity

(x). Water Quality

It is expected that the proposed works particularly along Daua river may cause pollution or contamination of water. Oil spills may cause groundwater pollution through infiltration.

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-4
Duration of impact	-4
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-26 Medium**

Mitigation measures

- ✓ Locate storage areas and compounds away from the well site
- ✓ Designate an equipment servicing location away from the proposed site
- ✓ Appropriate storage of fuel and materials on site

- The contractor should engage a licensed waste collector to manage all the waste in the all sites
- Undertake water quality monitoring after construction to establish any contaminants in the water

(xi). Impact on vulnerable and marginal groups

If not managed properly, the construction activities can exacerbate social inequalities. The impacts of construction may create a disproportionately heavy burden on vulnerable and marginal groups such as persons living with disability who may have challenges with blocked access routes, chronically ill persons who be affected significantly by dust emissions, school going children who are at risk of accidents and falls due to ongoing works, the elderly who may experience inconveniences from blocked routes and noise from drilling and solar installation machines.

Impact without Mitigation	
Severity of impact	-2

Spatial scope of impact	-2
Duration of impact	-1
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-10 Very low**

Mitigation measures

- Create awareness to the community on the proposed project works to increase preparedness & readiness
- Construction materials and debris should not be stored along access routes
- Construction vehicles should adhere to recommended speed limits in the sensitive zones
- The contractor should have a watering schedule along the access road and on site to minimize dust emissions
- The contractor should engage the host community to establish suitable Corporate Social Responsibility project that will serve the interest of all particularly the marginal groups

(xii). Project Related Conflicts

There may be issues that may arise during project construction that need attention. This may range from employment issues, division of supply, project activities, duration of the construction period, engagement of host community etc.

Impact without Mitigation	
Severity of impact	-4
Spatial scope of impact	-2
Duration of impact	-1
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-14 Very low**

Mitigation measures

- The project shall have in place a conflict/issues management strategy including engaging an EHS expert who will manage the project related conflicts
- All matters or issues that may arise during construction shall be documented and presented to the relevant persons-MANDWASCO, Contractor, Administration Officers
- Sensitive matters beyond control of the relevant persons or institutions shall be referred to the court of law.

- The Contractor shall ensure that locals are given first priority during recruitment of workers. Unskilled labour opportunities will be given to the locals
- In specialized tasks, the Contractor shall ensure that apprentices are from the local community to allow for skills transfers
- The contractor shall hold periodic meetings with community representatives and local administration to communicate the project plan, design and progress.

(xiii). Politics and political good will

Intense and negative political influence is a recipe to collapse of many projects. Indulgence in political insinuations may lead to postpone or delay to project completion and implementation.

Impact without Mitigation	
Severity of impact	-3
Spatial scope of impact	-2
Duration of impact	-1
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-12 Very low**

Mitigation measures

- The project will provide for extensive public participation including the political class
- The community shall be sensitized on negative political influence on projects implementation
- The politicians will be engaged in all phases of the project so that they can be supportive of the project and act as instruments of community sensitisation.

(xiv). Gender Based Violence and Sexual Exploitation and Abuse

Construction works particularly the pipeline excavation may introduce migrant workers who may interact with the local community creating an avenue for sexual exploitation or abuse. This may also lead to gender- based violence due to the suspicions that may be created in families. Harassment within the workforce, particularly for women and youth laborers could arise.

Impact without Mitigation	
Severity of impact	-3
Spatial scope of impact	-1
Duration of impact	-1
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-10 Very Low**

Mitigation Measure

- Enforce the environmental and social safeguards
- Include measures to control GBV-SEA-SH risks during project planning.
- All workers should sign the code of conduct.
- Awareness creation and community outreach to educate locals about their rights and available reporting mechanisms.

Child Labour

Child labour may be employed directly or indirectly. Casual positions such as carrying materials like sand, cement clearing the site and excavation may attract child labour. Indirect child labour may occur when parents get engaged to work in the project and as a result leave their children to take over household activities leading to missing classes.

Impact without Mitigation	
Severity of impact	-4
Spatial scope of impact	-1
Duration of impact	-1
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-12 Very Low**

Mitigation

- The contractor should adhere to the labour laws;
- The client should conduct regular inspections to ensure no children are working on-site.
- Using law enforcement agencies to monitor and apprehend those who contravene the laws.

Workers Influx

Water piping works may lead to influx of workers in an area. Priority should be given to skilled and unskilled workers. If this is not observed, there could be conflicts and tensions, increased risk of sexual exploitation, harassment, or abuse. It could also lead to increased pressure on natural resources such as water, land, and firewood. Waste generation and improper disposal near construction sites.

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-1
Duration of impact	-1

Frequency of activity / duration of activity	-2
Frequency of impact	-1
Result	**-21 Very Low**

Mitigation

- Prioritization of locals when hiring workers
- Sensitize workers on an appropriate code of conduct during the construction period
- Ensure all workers sign a code of conduct and enforcing the code of conduct
- Establish grievance redress mechanisms to address complaints and concerns from the community on matters related to workers conduct

7.2.2 Operational Phase

(i). Vandalism of installed infrastructure

Water utilities often experience theft from residents especially when the system is not functional/no water flow. These activities can affect the delivery and management of the installed system, which results to limited access in the town. They ranging from destroying the theft of pipes, fittings, and water through bypassing meters and tempering with connections.

Impact without Mitigation	
Severity of impact	-4
Spatial scope of impact	-3
Duration of impact	-2
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-18 Very low**

Mitigation measures

- The implementing agency to ensure good relationship with the local community through continuous engagement
- Foster household ownership of the infrastructure through payment of water by households
- Enforce law against reported cases of vandalism

(ii). Water quality

The project seeks to supply water for domestic use and hence the potential risk of water contamination during the reticulation. This may lead to waterborne illnesses and other health complications.

Impact without Mitigation

Severity of impact	-5
Spatial scope of impact	-4
Duration of impact	-3
Frequency of activity / duration of activity	-4
Frequency of impact	-1
Result	**-60 Low to Medium**

Mitigation Measures

- Provide for periodic water quality monitoring at strategic points including the source, WTP and along the distribution lines
- Use high-quality casing materials and properly seal the annular space between the well and casing
- Implement a regular monitoring program to assess water quality parameters such as pH, turbidity, total dissolved solids (TDS), microbial contamination (e.g., coliform bacteria), and chemical contaminants (e.g., nitrates, heavy metals)
- Maintain the well and pumping equipment regularly to prevent build-up of sediment, biofilms, and other sources of contamination that could affect water quality.
- Educate local communities on the importance of water quality protection, proper sanitation practices, and the potential sources of contamination that could impact their borehole water
- Develop an emergency response plan to address sudden water quality issues or contamination incidents including: protocols for water testing, notification of stakeholders, and remediation actions.
- Secure borehole area to prevent accidental or deliberate water contamination

(iii). Water Conservation

Increased water provision may lead to wastage of the scarce resource among beneficiaries. The system could also present inefficiencies that lead to water loss in the course of distribution. Stakeholders noted that the current system has high levels of unaccounted for water.

Impact without Mitigation	
Severity of impact	-4
Spatial scope of impact	-3
Duration of impact	-2
Frequency of activity / duration of activity	-1

Frequency of impact	-2
Result	**-27 low to medium**

Mitigation Measures

- The piping material should be resistance to abrasions from external elements to prevent leakages
- Establish a monitoring system to allow for prompt detection of leakages and repairs
- Create awareness among project beneficiaries on the need to use water judiciously.
- Build the capacity of the water utility to continuously improve the efficiency of the water supply system including reduction of non-accounted water, installation of efficient technologies e.g. automated water points in water kiosks

(iv). Impact of climatic changes

Climatic changes in the area are manifested through unpredictable rains, intense floods, prolonged drought. Such extreme weather events may result to a reduction of water in Rive Daua and hence limited water supply or destruction of infrastructure in case of floods.

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-2
Duration of impact	-5
Frequency of activity / duration of activity	-5
Frequency of impact	-1
Result	**-72** Medium to High

Mitigation

- ✓ Climate proof all project infrastructure e.g. provide for drainage channels at the intake area
- ✓ IWASCO should integrate climate information applications in water supply scheduling

(v). Energy Use

The proposed project will utilize diesel to pump water for supply. Due to increased water capacity, MANDAWSCO will require more fuel to run the operation.

Impact without Mitigation	
Severity of impact	-3
Spatial scope of impact	-2
Duration of impact	-1

Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-12 Very low**

Mitigation Measures

- Adopt alternative fuel sources for pumping such as solar installation or use of wind energy
- Install a monitoring system to track the performance of the overall system.
- Ensure all electrical components are properly weatherproofed and protected from rain, humidity, and extreme temperatures.
- Ensure proper charging and discharging cycles to prolong battery life
- Schedule periodic inspections by qualified technicians to check for wear and tear, corrosion, and other signs of potential problems.

(xv). Impact on vulnerable and marginal groups

Inefficient water supply systems often lead to high cost of water, intermittences and revenue losses which can impact water availability for vulnerable communities and ecosystems dependent on this water.

Mitigation Measures

- Involve vulnerable groups in all stages of project planning, construction, and management to ensure their needs and concerns are addressed.
- Ensure equitable access to water by implementing transparent allocation mechanisms and considering the needs of vulnerable groups in water distribution plans.
- Implement pro poor water supply programmes to increase water access among the marginally poor groups in Mandera.
- Implement sustainable groundwater management practices to prevent over-abstraction and ensure the long-term availability of water resources.
- Regularly monitor the impact of boreholes on vulnerable groups and adjust management practices accordingly to address emerging issues.

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-2
Duration of impact	-1

Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-10 Very low**

7.2.3 Decommissioning Phase

The project shall bear detrimental impacts if necessary measures are not put in place to prevent environmental hazards and risks resultant of the abandonment. This may include the borehole safety and security issues, the conveyances and the changes to the concerned community.

Mitigation measures

- The Proponent shall subject the project to an abandonment environmental and social impact assessment or risk management in the event of closure of the project.
- The process shall involve all the concerned parties
- The legislations and best environmental practices prevailing then shall apply.

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Introduction

Several impacts have been identified that are likely to affect the project both positively and negatively. They have also been identified based on three different project phases: construction, operation and decommissioning phase. A plan illustrating how the identified impacts will be managed throughout the project cycle has been formulated in Table 8-1 below. However, it is important to note that before the construction commences, the contractor will be required to develop an updated Construction Phase- Environmental and Social Management Plan (CP-ESMP) that will be implemented during the construction phase of the project.

8.1.1 Management Responsibility of ESMMP

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

- MANDWASCO
- NEMA Mandera County
- Contractor
- Design Consultant;
- County Government of Mandera

8.1.2 MANDWASCO

MANDWASCO the project proponent, will be charged with the responsibility of implementing ESMP. This will be achieved by inclusion of the ESMP provisions in the tender documents and conducting ESMP monitoring to ensure the objectives of this ESMMP are met. Monitoring will be done on a daily basis by MANDWASCO ESS unit. The unit will work together with the county's Environment Department to enhance its monitoring capacity.

8.1.3 National Environment Management Authority (NEMA)

NEMA is tasked with overseeing and coordinating all aspects pertaining to the environment, serving as the primary governmental instrument in Kenya for implementing policies related to environmental matters. The Authority has an oversight mandate in ensuring proponents implement project ESMPs.

8.1.4 The Contractor

The person/firm contracted to undertake the rehabilitation works will be required to

develop a CP-ESMP and comply with the requirements of the ESMMP within this report. To ensure strict compliance environmental specifications of this ESMMP should form part of the contract documents.

8.1.5 County Government of Mandera

The relevant departmental officers in Mandera County will provide advisory and institutional monitoring services according to existing guidelines and policies e.g. water quality monitoring by WRA and Department of Water

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Table 8-1 ESMP during the Construction, operational, and decommissioning phases of the project

Impact domain	Mitigation/s Remedial Action/s	Implementation agency/ies	Monitoring Indicators and Freq. (F)	Mitigation target	Mitigation Cost/s (KShs)
Traffic Congestion	• The Contractor should provide temporary road signs or notices to indicate ongoing works • The Contractor should effect traffic controls and cleanliness to avoid congestion and truck accidents on roads; • The Resident Engineer and Contractor should choose traffic routes that will reduce the impact in the neighbourhood avoiding, as far as practical any sensitive areas; • Contractor has to ensure that vehicles park in designated parking areas	-Contractor	**-Temporary Road Signs and Notices:** Indicator: Visibility and clarity of road signs and notices. Frequency: Daily checks during construction hours to ensure signs are in place and legible. **-Traffic Control** Indicator: Traffic flow and congestion levels. Frequency: Continuous monitoring with periodic detailed reviews (e.g., weekly) to assess any changes in traffic patterns or issues. **- Site Traffic Management:** Indicator: Proper vehicle parking and avoidance of blocked routes. Frequency: Daily inspections to ensure vehicles are parked in designated areas and do not	To minimize the impact of construction activities on traffic flow and public safety.	10,000 (road signages)

			obstruct pedestrian or traffic routes. **-Speed Limit Enforcement:** Indicator: Adherence to posted speed limits within construction zones. Frequency: Regular monitoring (e.g., daily) with periodic speed checks (e.g., weekly) to ensure compliance.		
Site Related Oil Spills.	• Sensitize workers on management of spills and leaks from oil storage tanks for the construction machinery • In case of spillage the Contractor should isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent material and/or other materials approved by the Resident Engineer; • All vehicles and equipment should be kept in good working order, serviced regularly and stored in an area approved by the Resident Engineer;	Contractor	**-Employee Awareness and Training** Indicator: Number of employees trained on spill and leak procedures. Frequency: Regularly, with documented records for each training session (e.g., quarterly or biannually). **-Spill Response Procedures** Indicator: Presence and condition of spill containment materials (e.g., sandbags, sawdust, absorbent materials).	To effectively reduce the risk of environmental contamination and ensure a swift, organized response in the event of a spill.	10,000 (spill containment material at the intake sites)

	• The Contractor should assemble and clearly list the relevant emergency telephone contact numbers for staff, and brief staff on the required procedures. • All vehicle works should be done in a centralized location to avoid chances of spillage in different sites		Frequency: Daily checks to ensure availability and adequacy of materials on-site. **-Absorbent Materials Supply** Indicator: Inventory of absorbent materials (e.g., sawdust). Frequency: Weekly inventory checks to ensure a sufficient supply. **-Vehicle and Equipment Maintenance** Indicator: Maintenance records and condition of vehicles and equipment. Frequency: Regular maintenance as per schedule (e.g., monthly or per manufacturer's guidelines) with inspections documented. **-Emergency Contact Information** Indicator: Up-to-date list of emergency contact numbers and staff briefings. Frequency: Update contact information as needed, with a		

			review of the list and briefing documentation at least quarterly. **-Centralized Vehicle Work** Indicator: Vehicle work being conducted in the designated centralized area. Frequency: Daily inspections to confirm compliance with the centralized location policy.		
Air Quality.	• Workers should use dust masks • Construction sites and transportation routes will be water-sprayed on regularly up to three times a day, especially if these sites are near sensitive receptors, such as residential areas or institutions (schools, hospitals, etc.). • All the vehicles and construction machinery should be operated in compliance with relevant vehicle emission standards and with proper maintenance to minimize air pollution.	Contractor	**-Protective Clothing Usage** Indicator: Compliance with safety gear requirements (dust masks). Frequency: Daily or as part of regular site inspections. **-Vehicle and Machinery Emissions Compliance** Indicator: Compliance with vehicle emission standards and maintenance records. Frequency: Regular checks as per local regulations (e.g., monthly or quarterly).	-Reduce the negative impacts of construction activities on both the environment and the surrounding community.	25,000 (PPEs, water boozers)

	• Digging of trenches should be done manually (if possible) so as to avoid too many trucks and machines in the area. The use of manual labour will also benefit the community socio-economically. • Use of other dust palliative measures to reduce dust emissions.		**-Manual Digging of Trenches** Indicator: Proportion of trench digging done manually versus mechanically. Frequency: Weekly or per project phase, with documentation of labour methods used. **-Dust Palliative Measures** Indicator: Implementation and effectiveness of dust control measures. Frequency: Implementation Checks: Weekly or bi-weekly.		
Socio - Economic Impacts.	• Unskilled construction and skilled labour to be hired from the local population as far as possible to minimize on influx of foreigners into the community. • Use of manual labour during trenching works where possible to ensure more employment of locals and hence ensure project support throughout the construction process.	Contractor MANDWASCO	**Employment of Local Labor** Indicators: Measure the number of job opportunities created for the local population. Frequency: Monthly Reports: Collect data on the number of local and non-local workers monthly. **HIV/AIDS Awareness and Prevention**	To integrate the project into the local community, fostering local employment, supporting community health, and ensuring that the project benefits the local population both	5,000 (awareness materials)

	• Sensitize workers and the surrounding community on awareness, prevention and management of HIV / AIDS through staff training, awareness campaigns, multimedia, and workshops or during community barazas.		Indicators: Number of Training Sessions Held: Track the number of training sessions, workshops, and awareness campaigns conducted. Frequency: Conduct comprehensive evaluations every three months to assess the impact of the awareness programs and make necessary improvements.	economically and socially.	
Noise Pollution.	• Limit construction to daytime in residential areas and weekends in schools (where pipes are passing through schools) to avoid learning disruption • Limit pickup trucks and other small equipment to a minimum idling time and observe a common sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible; • Maintain noise levels during daytime of maximum 55 dBA in residential and educational areas and 70 dBA in industrial/commercial areas	-Contractor - MANDWASCO	**Construction Timing Compliance** Indicator: Adherence to construction hours (daytime in residential areas and weekends in schools). Frequency: Daily for construction activities, with specific checks during residential and school hours. **Vehicle Idling and Engine Shutdown**	Conduct construction in a manner that respects community needs, protects worker health and safety, and complies with environmental standards, all while minimizing negative impacts related to noise, vehicle emissions,	5,000 (signages on noise limits)

	• Provision of appropriate personnel protective equipment to workers • Observe protocols e.g., use of barricades, notification should be done 14 days to the start of the works.		Indicator: Minimum idling time for pickup trucks and small equipment; frequency of engine shutdowns. Frequency: Daily checks, with spot inspections during different times of day to ensure compliance. **Noise Levels** Indicator: Noise levels measured in dBA during construction activities. Frequency: Residential/Educational Areas: Continuous monitoring during construction hours. Industrial/Commercial Areas: Periodic monitoring, potentially less frequent but still regular to ensure compliance. **Personal Protective Equipment (PPE) Provision** Indicator: Proper PPE provided and used by workers.	and disruption of daily activities.	

			Frequency: Daily checks, especially at the start of each work shift. **Protocols (Barricades and Notifications)** Indicator: Presence and condition of barricades; notification of the public 14 days prior to work. Frequency: Barricades: Daily checks to ensure they are in place and in good condition. Notifications: One-time check to ensure notifications were made 14 days before work began; additional spot checks to verify ongoing awareness if needed.		
Site Safety, Security, and Welfare arrangements.	• Barriers shall be erected to prevent unauthorized access to the project sites by residents, pupils and other persons • Security personnel shall be deployed to secure the safety of the workers and property against vandals and to control access for safety purposes;	-Contractor -MANDWASCO	**Barrier Erection and Maintenance** Indicator: Presence and condition of barriers around project sites.	To create a construction environment where safety, security, and health standards are rigorously maintained,	10,000 (sensitization materials, signages)

	• The Contractor shall have his workers appropriately trained on safety and health matters-safety talks shall be held on a weekly basis; • Construction vehicles will observe the required speed limit of 50 KM/H around schools, residential areas, hospitals, markets etc. • The targeted institutions will be sensitized on safety issues with regard to the proposed project • Any accident, incident or hazardous situation should be reported immediately it occurs or identified; • The Contractor shall ensure that any food served at the sites meets the minimum hygienic conditions; • The contactor shall provide insurance cover for any eventuality during work to the employees; • The proponent/contractor shall provide adequate and suitable sanitary facilities for workers during construction period; • The Contractor shall deploy as EHS officer at the project 'site' to foresee implementation of the EHS and security matter; and		Frequency: Daily inspections to ensure barriers are intact and well-maintained. **Security Personnel Deployment** Indicator: Number and placement of security personnel, their effectiveness, and incident reports. Frequency: Weekly review of security logs and incident reports; periodic checks on personnel deployment. **Sensitization of Targeted Institutions** Indicator: Evidence of sensitization efforts (e.g., meetings, educational materials) and feedback from institutions. Frequency: Monthly reports on sensitization activities and feedback analysis. **Reporting of Accidents, Incidents, and Hazardous Situations**	thereby reducing risks to all stakeholders involved and ensuring compliance with relevant laws and regulations.	

	• The Contractor shall abide by the all the relevant provisions of OSHA, 2007 and other relevant legislations.		Indicator: Number and nature of reported incidents and response actions taken. Frequency: Immediate reporting as incidents occur; weekly review of incident reports. **Hygienic Conditions of Food Served** Indicator: Hygiene standards compliance and food safety inspection reports. Frequency: Daily inspections of food preparation and serving areas; monthly audits of hygiene practices. **Insurance Coverage for Employees** Indicator: Proof of insurance coverage and its adequacy. Frequency: Annual review of insurance policies and coverage; quarterly verification of compliance. **Sanitary Facilities Provision**		

			Indicator: Availability, cleanliness, and maintenance of sanitary facilities. Frequency: Daily inspections of sanitary facilities; weekly cleanliness audits.		
Worker's welfare (hygiene and sanitation).	• The Contactor shall abide by the requirements under OSHA, 2007 in regard to the safety, health and welfare of the workers • The contractors shall provide, free of charge, appropriate PPEs • The Contractor shall provide clean portable drinking water for the workers • The Contactor shall provide first-aid services • Sanitation facilities for both sex including a hand washing facility; • The Contractor shall communicate and implement the contents of the EHS policy of the Company to the employees	Contractor	**Compliance with OSHA Requirements** Indicators: Documentation of OSHA compliance (training records, safety audits, etc.) Observations of safety practices on-site Frequency: Weekly: Site inspections to check for OSHA compliance. Monthly: Review of OSHA compliance documentation and training records. **Provision of Appropriate PPEs** Indicators:	To create a secure and supportive work environment that minimizes risks and promotes the well-being of all employees.	70,000 (PPEs, first aid drinking water,portable toilets)

	• The Contractor shall make available emergency services at the site/ camp; • The Contractor shall retain a well trained and experienced EHS officer at the site.		Availability and condition of PPE (gloves, helmets, goggles, etc.) Records of PPE distribution and replacement Frequency: Daily: Inspection of PPE use and condition on-site. **Provision of Clean Portable Drinking Water** Indicators: Quality of drinking water (tested for contaminants) Availability of water stations Frequency: Daily: Check water availability and cleanliness. **Provision of First-Aid Services** Indicators: Availability of first-aid kits and their contents Records of first-aid training for personnel Frequency:		

			Daily: Inspect first-aid kits for completeness and accessibility. **Sanitation Facilities for Both Sexes, Including Hand Washing** Indicators: Cleanliness and availability of sanitation facilities Functional hand-washing stations with soap and water Frequency: Daily: Check and clean sanitation facilities and hand-washing stations. **Availability of Emergency Services** Indicators: Presence of emergency services on-site or at the camp Emergency response plans and their accessibility Frequency: Daily: Verify readiness and availability of emergency services.		

			Weekly: Review emergency response plans and conduct drills.		
Effects on flora (plants/vegetation).	• The Contractor must ensure minimal or no disturbance to existing vegetation by marking out access routes and allow for re-vegetation. • The project will make provision for tree planting within the site restoration activity.	-Contractor -MANDWASCO -CGM	Access Routes and Construction Area Marking Indicator: Presence and accuracy of marked access routes and construction areas. Frequency: Daily during the initial setup phase; weekly during construction to ensure compliance. **Tree Planting within Site Restoration** Indicator: Completion and survival rate of newly planted trees; adherence to planting schedules and specifications. Frequency: Post-planting inspections at 1 month, 3 months, and 6 months; annual assessments for survival and growth rates.	To ensure that the project progresses with minimal negative impact on the environment and promotes ecological balance and sustainability.	30,000 (permit, marking, revegetation)

Water Quality.	• Locate storage areas and compounds away from the well site • Designate an equipment servicing location away from the proposed site • Appropriate storage of fuel and materials on site • The contractor should engage a licensed waste collector to manage all the waste in the 7 sites • Undertake water quality monitoring after construction to establish any contaminants in the water.	-Contractor -MANDWASCO -Department of Water-Mandera County	**Water Quality Monitoring:** Immediately Post-Construction: Conduct initial water quality testing to establish baseline conditions. Monthly for the First Six Months: This helps to identify any immediate impacts from the construction activities. Quarterly for the Following Year: To ensure long-term monitoring and detect any delayed effects. **Groundwater Quality Monitoring:** Immediately Post-Construction: Initial testing to check for any immediate contamination. Semi-Annually for Two Years: To assess any delayed impacts on groundwater. **Site Management Inspections:** Weekly Inspections: Regular checks to ensure proper	To safeguard the water quality of the Daua River and surrounding groundwater from contamination due to construction activities, through careful management, regular monitoring, and adherence to best practices.	10,000 (Water testing)

			storage and handling of fuels and materials. Monthly Audits: Comprehensive review of storage and servicing areas to ensure compliance with best practices. **Waste Management:** Monthly Checks: Ensure that the licensed waste collector is performing their duties as required and that waste is managed properly. **Emergency Response Drills:** Bi-Annually: Conduct drills to ensure readiness in the event of a spill or other environmental incident.		
Gender Based Violence and Sexual Exploitation and Abuse	• All workers should attend a mandatory sensitization meeting on code of conduct and sign the code of conduct. • Awareness creation and community outreach to educate	MANDWASCO Contractor	-Sensitization meeting on code of conduct held -Evidence of awareness creation to locals e.g. materials on the site	Zero reports of sexual abuse & exploitation	10,000 (meeting venue)

	locals about their rights and available reporting mechanisms				
Child Labour	• The contractor should adhere to the labour laws; • The client should conduct regular inspections to ensure no children are working on-site. • Using law enforcement agencies to monitor and apprehend those who contravene the laws.	MANDWASCO Contractor	-Employment policy developed	No child is engaged in the project works either directly or indirectly	Inspection/ monitoring fee
Impact on vulnerable and marginal groups.	• Create awareness to the community on the proposed project works to increase preparedness & readiness • Construction materials and debris should not be stored along access routes • Construction vehicles should adhere to recommended speed limits in the sensitive zones • The contractor should have a watering schedule along the access road and on site to minimize dust emissions • The contractor should engage the host community to establish suitable	Contractor MANDWASCO	**Create Awareness in the Community:** Indicator: Number and quality of community engagement activities (e.g., meetings, flyers, online updates). Frequency: Monthly updates on engagement activities; bi-monthly reviews of community feedback and awareness levels. **Storage of Construction Materials and Debris**:	To ensure that construction activities are carried out in a manner that is environmentally sustainable, socially responsible, and minimally disruptive to the community.	N/A

	Corporate Social Responsibility project that will serve the interest of all particularly the marginal groups.		Indicator: Compliance with the protocol for material and debris storage (i.e., none stored along access routes). Frequency: Weekly inspections of access routes and construction site. **Adherence to Speed Limits by Construction Vehicles:** Indicator: Records of speed limit compliance (e.g., through speed monitoring devices or manual checks). Frequency: Daily checks of speed limit compliance; weekly summary reports of violations. **Watering Schedule to Minimize Dust Emissions:** Indicator: Adherence to the established watering schedule and observed effectiveness in dust control. Frequency: Daily verification of the watering schedule; weekly assessment of dust		

			levels on-site and along access roads. **Engagement in Corporate Social Responsibility (CSR) Projects:** Indicator: Development and implementation of CSR projects, particularly those benefiting marginal groups; community feedback on CSR initiatives. Frequency: Quarterly reviews of CSR project progress and community impact; bi-annual evaluations of community feedback and satisfaction.		
Project Related Conflicts.	• The project shall have in place a conflict/issues management strategy including engaging an EHS expert who will manage the project related conflicts • All matters or issues that may arise during construction shall be documented and presented to the relevant persons-MANDWASCO, Contractor, Administration Officers	Contractor	**Conflict/Issues Management Strategy** Indicators: Presence and accessibility of an EHS expert responsible for managing project-related conflicts. Frequency of conflict management reports submitted by the EHS expert.	To ensure that the project progresses smoothly, benefits the local community, and maintains a high level of stakeholder satisfaction.	

	• Sensitive matters beyond control of the relevant persons or institutions shall be referred to the court of law. • The Contractor shall ensure that locals are given first priority during recruitment of workers. Unskilled labour opportunities will be given to the locals • In specialized tasks, the Contractor shall ensure that apprentices are from the local community to allow for skills transfers • The contractor shall hold periodic meetings with community representatives and local administration to communicate the project plan, design and progress.		Number and resolution status of conflicts/issues documented. Feedback from relevant parties (MANDWASCO, Contractor, Administration Officers) regarding the conflict management process. Frequencies: EHS Expert's involvement: Continuous, with regular updates. Conflict management reports: Monthly or quarterly, depending on the project's scale. Feedback collection: Bi-monthly or after each major conflict resolution. **Documentation and Presentation of Issues** Indicators: Completeness and accuracy of documented issues. Timeliness of issue presentation to relevant persons (MANDWASCO,		

			Contractor, Administration Officers). Record of follow-up actions and resolutions. Frequencies: Documentation of issues: As they arise. Presentation of issues: Weekly or as needed, depending on issue urgency. Follow-up actions: Monthly or bi-monthly. **Referral of Sensitive Matters to Court** Indicators: Number of sensitive matters referred to the court. Timeliness of referrals. Status and outcomes of court cases. Frequencies: Monitoring referrals: As sensitive matters arise. Review of court case outcomes: Quarterly or after case resolution.		

Politics and political good will.	• The project will provide for extensive public participation including the political class • The community shall be sensitized on negative political influence on projects implementation • The politicians shall be encouraged to desist from negative politics for the sake of the community economic development.	- MANDWASCO -County Government	**Public Participation** Indicators: Number of public meetings held: Track the total count of organized meetings and forums. Attendance rates: Measure the number of attendees relative to the target audience. Frequencies: Meetings Held: Monthly or quarterly Attendance Rates: After each meeting or forum **Community Sensitization on Negative Political Influence** Indicators: Number of sensitization sessions conducted: Track the total number of sessions held to educate the community.	Achieve effective project implementation and community economic development by ensuring comprehensive public participation, enhancing community awareness about negative political influences, and fostering a positive political environment.	10,000 (Sensitization meetings)

			Audience reach: Measure the number of community members reached through these sessions. Understanding of political influence: Assess the community's knowledge and awareness before and after sensitization sessions (e.g., through surveys). Frequencies: Sensitization Sessions: Monthly or quarterly **Encouragement for Politicians to Desist from Negative Politics** Indicators: Number of engagements with politicians: Track interactions, meetings, or communications with politicians. Politician participation in positive activities: Monitor the involvement of politicians in constructive project activities. Instances of negative political behavior: Record occurrences		

			of negative political influence or behavior. Frequencies: Engagements with Politicians: Monthly or quarterly		
OPERATION PHASE					
Vandalism of installed infrastructure.	• The implementing agency to ensure good relationship with the local community through continuous engagement • Foster household ownership of the infrastructure through payment of water by households • Enforce law against reported cases of vandalism	MANDWASCO	**Ensuring Good Relationship with the Local Community** Indicators: Community Feedback: Frequency and type of feedback or complaints received from the local community (e.g., through surveys, meetings). Engagement Activities: Number and type of community engagement activities conducted (e.g., meetings, workshops). Frequency: Community Feedback: Monthly or quarterly reviews.	Maintaining good community relations, fostering ownership, and preventing vandalism	10,000 p.a (warning signages, community meetings)

			Engagement Activities: Quarterly or biannual reporting. **Fostering Household Ownership of Infrastructure** Indicators: Water Payment Rates: Percentage of households consistently paying for water services. Payment Delinquencies: Number and frequency of households with overdue payments or defaults. Frequency: Water Payment Rates: Monthly or quarterly reporting. Payment Delinquencies: Monthly tracking. **Enforcing Laws Against Vandalism** Indicators: Incident Reports: Number of reported vandalism incidents and response times.		

			Enforcement Actions: Number of legal actions taken or fines imposed for vandalism. Preventive Measures: Implementation and effectiveness of preventive measures against vandalism. Frequency: Incident Reports: Monthly or as incidents occur. Enforcement Actions: Quarterly or semi-annual reviews. Preventive Measures: Quarterly assessments of preventive measures.		
Water quality.	• Provide for periodic water quality monitoring at strategic points including the source, WTP and along the distribution lines • Use high-quality casing materials and properly seal the annular space between the well and casing • Implement a regular monitoring program to assess water quality parameters such as pH, turbidity, total	MANDWASCO	**1.Water Quality Parameters: pH:** Frequency: Monthly or quarterly Rationale: Regular monitoring ensures that water remains within the acceptable pH range, which is crucial for both water safety and treatment processes.	To protect public health and maintain the safety and reliability of the water supply system through proactive monitoring, maintenance, community	30,000 p.a(water testing)

	dissolved solids (TDS), microbial contamination (e.g., coliform bacteria), and chemical contaminants (e.g., nitrates, heavy metals) • Maintain the well and pumping equipment regularly to prevent build-up of sediment, biofilms, and other sources of contamination that could affect water quality. • Educate local communities on the importance of water quality protection, proper sanitation practices, and the potential sources of contamination that could impact their borehole water • Develop an emergency response plan to address sudden water quality issues or contamination incidents including: protocols for water testing, notification of stakeholders, and remediation actions. • Secure borehole area to prevent accidental or deliberate water contamination.		**Turbidity:** Frequency: Monthly or quarterly Rationale: Turbidity levels can affect water quality and indicate the presence of particulate matter, which can harbor pathogens. Total Dissolved Solids (TDS): Frequency: Quarterly or biannually Rationale: Regular checks help in monitoring water salinity and overall water quality, impacting taste and usability. **Microbial Contamination (e.g., coliform bacteria):** Frequency: Monthly or after significant events (e.g., heavy rainfall, floods) Rationale: Frequent testing is essential to ensure that microbial contamination is detected and managed promptly.	involvement, and preparedness.	

			Chemical Contaminants (e.g., nitrates, heavy metals): Frequency: Biannually or annually Rationale: Regular testing for chemical contaminants ensures that the levels are within safe limits and that potential health risks are managed. **2. Well and Equipment Maintenance**: **Sediment and Biofilm Build-up:** Frequency: Annually or based on operational observations Rationale: Regular maintenance and inspection of well and pumping equipment are necessary to prevent contamination and maintain efficiency. **3. Borehole Area Security:** Inspection and Security Checks: Frequency: Monthly or quarterly Rationale: Regular inspections ensure that the borehole area		

			is secure and free from potential sources of contamination. **4. Community Education and Emergency Response:** **Community Education Sessions**: Frequency: Annually or as needed Rationale: Periodic educational programs help in raising awareness about water quality and sanitation practices. **Emergency Response Plan Drills:** Frequency: Annually or after major changes in the system Rationale: Regular drills ensure that all stakeholders are prepared to respond effectively to contamination incidents.		
Water Conservation.	• The piping material should be resistance to abrasions from external elements to prevent leakages	MANDWASCO	**Piping Material Resistance to Abrasions** Indicator: Number of leakage incidents reported.	To create a more resilient, efficient, and sustainable	50,000p.a (sensitization meetings)

	• Establish a monitoring system to allow for prompt detection of leakages and repairs • Create awareness among project beneficiaries on the need to use water judiciously. • Build the capacity of the water utility to continuously improve the efficiency of the water supply system including reduction of non-accounted water, installation of efficient technologies e.g. automated water points in water kiosks.		Frequency: Monthly **Monitoring System for Leak Detection and Repairs** Indicator: Number of leakages detected and repaired by the monitoring system. Frequency: Monthly **Awareness Creation Among Project Beneficiaries** Indicator: Number of awareness campaigns conducted. Frequency: Quarterly **Capacity Building of Water Utility** Indicator: Improvement in water supply system efficiency (e.g., reduction in non-accounted water). Frequency: Quarterly.	water supply system.	
Energy Use.	• Adopt alternative fuel sources for pumping such as solar installation • Install a monitoring system to track the performance of the overall system.	MANDWASCO	**Alternative Fuel Sources (e.g., Solar, Wind)** Performance Metrics: Solar Panels: Power output (kW or MW)	To create a reliable, efficient, and environmentally friendly system with minimized	100,000 (periodic inspections)

	• Ensure all electrical components are properly weatherproofed and protected from rain, humidity, and extreme temperatures. • Schedule periodic inspections by qualified technicians to check for wear and tear, corrosion, and other signs of potential problems.		Energy production (kWh or MWh) Efficiency of conversion Wind Turbines: Wind speed (m/s) Power output (kW or MW) Energy production (kWh or MWh) Monitoring Frequency: Daily: Track energy production and efficiency. Monthly: Review performance data and compare against expected values. **Monitoring System for Overall Performance** Performance Metrics: System efficiency and output Battery charge and discharge levels Operational status and error logs Monitoring Frequency: Real-time/Continuous: For critical systems, ensure real-time monitoring.	risk of failures and extended operational longevity.	

			Daily/Weekly: Review logs and performance reports. **Electrical Component Protection** Indicators: Integrity of weatherproofing (e.g., seals, covers) Condition of insulation and enclosures Signs of wear due to environmental conditions (e.g., corrosion) Monitoring Frequency: Weekly: Quick visual inspections for immediate issues. Quarterly: Detailed inspections to assess the condition of weatherproofing and insulation. **Battery Charging and Discharging Cycles** Indicators: Charge and discharge cycles count Battery voltage and capacity		

			State of health and state of charge Monitoring Frequency: Daily: Track charge/discharge data and battery performance. Monthly: Assess battery health and adjust charging/discharging schedules if needed. **Periodic Inspections by Qualified Technicians** Indicators: Wear and tear on mechanical components Corrosion levels on electrical connections General operational efficiency and potential issues Inspection Frequency: Quarterly: Schedule inspections for routine checks and maintenance. Annually: Comprehensive inspection and assessment.		

Impact on vulnerable and marginal groups.	• Involve vulnerable groups in all stages of project planning, construction, and management to ensure their needs and concerns are addressed. • Ensure equitable access to water by implementing transparent allocation mechanisms and considering the needs of vulnerable groups in water distribution plans. • Implement pro poor water supply programmes to increase water access among the marginally poor groups in Mandera. • Implement sustainable groundwater management practices to prevent over-abstraction and ensure the long-term availability of water resources.		**Involve Vulnerable Groups in All Stages** Indicators: Stakeholder Engagement: Number and proportion of vulnerable group representatives involved in planning, construction, and management stages. Frequencies: Quarterly: Review and document engagement activities. Biannual: Assess and report on feedback and actions taken. **Ensure Equitable Access to Water** Indicators: Allocation Transparency: Presence and accessibility of documented allocation mechanisms. Access Equity: Number of vulnerable individuals or households with access to	Achieve a well-balanced approach where water access is both fair and sustainable, specifically benefiting and addressing the needs of vulnerable and marginally poor communities.	N/A

			water compared to non-vulnerable groups. Frequencies: Monthly: Monitor and review allocation mechanisms. Quarterly: Assess and report on access equity and updates to distribution plans. **Implement Pro-Poor Water Supply Programmes** Indicators: Program Reach: Number and percentage of marginally poor households benefiting from the water supply programs. Program Effectiveness: Improvements in water access among targeted marginally poor groups. Funding and Resources: Adequacy and timeliness of resources allocated to pro-poor programs. Frequencies: Quarterly: Review program reach and effectiveness.		

			Annually: Assess funding and resource allocation. **Implement Sustainable Groundwater Management Practices** Indicators: Groundwater Levels: Monitoring of groundwater levels to detect over-abstraction. Usage Rates: Volume of groundwater extracted compared to sustainable yield. Frequencies: Monthly: Monitor groundwater levels and usage rates. Biannual: Review and assess adherence to management practices.		
					TBD
End of project strategy.	• The Proponent shall subject the project to an abandonment environmental and social impact	MANDWASCO	Decommission strategy/Plan Freq: End of Project.	Environmental protection.	

	assessment or risk management in the event of closure of the project. • The process shall involve all the concerned parties • The legislations and best environmental practices prevailing then shall apply.				

9 CONCLUSION AND RECOMMENDATION

9.1. Conclusion

The proposed project will be implemented against a background low water access in Mandera town, dilapidated water supply infrastructure, low water supply network coverage all which are compounded by the climatic changes including prolonged drought seasons. MANDWASCO, the project proponent, seeks to rehabilitate and upgrade the existing water supply infrastructure including wells, pipelines and installation of meters.

The project will entail a broad stakeholder participation to sensitize people on the proposed project, delineation of wells to be rehabilitated and the pipelines to be upgraded, site clearance, masonry works at the wells (intake area), excavation, laying of pipes, installation of meters and landscaping for site restoration. Water quality testing in accredited laboratories ensures compliance with consumption standards will be conducted before operationalization.

Without intervention of the project, MANDWASCO would continue facing irregular water supply, poor hygiene, increased water cost. Furthermore, without the project, local skills would be underutilized, and risks of water-related conflicts would increase, hindering overall development and service distribution.

The construction phase is expected to provide local economic benefits and job opportunities but requires measures to mitigate environmental risks and community conflicts. During operations, benefits include regular water supply, reduced waterborne diseases, contingent upon strict water quality monitoring and sustainable management practices.

9.2 Recommendations

The recommendation of this study is that the proposed project be allowed to proceed on strict condition that the environmental management plan is implemented, and follow-up is made to ensure compliance as may be directed by NEMA. Recommendations for the prevention and mitigation of adverse impacts are as follows:

i. Environmental and Social Management Plan should be communicated to all the responsible actors
ii. The proponent should establish an environmental and social unit to oversee the implementation of the Environmental and Social Management Plan
iii. The proponent should institute a periodic monitoring plan to ensure regular reporting on environmental and social indicators
iv. The proponent should document all environmental and social incidences occurring during project construction and operation

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APPENDIX A: BILL OF QUANTITIES

TENDER No. BILL No. 1 SUPPLY OF PIPES, FITTINGS, ELECTRICAL FITTINGS & O&M TOOLS

ITEM No.	DESCRIPTION	UNIT	QUANTITY	RATE incl. VAT (Kshs)	AMOUNT incl. VAT (Kshs)
	Under this item, the contractor will supply pipes, fitting, appurtenances, electrical and mechanical components and Operation and Maintenance Tools				
	Supply, Transport to Site and Hand over to the Water Company stores as directed by the Engineer				
1	Pipes (GI and UPVC)				
1.1	UPVC Pressure Pipes, Class C				
1.1.1	160 mm Dia. UPVC	Nr	50	9,000.00	450,000.00
1.1.2	110 mm Dia. UPVC	Nr	50	4,800.00	240,000.00
1.1.3	90 mm Dia. UPVC	Nr	200	3,600.00	720,000.00
1.1.4	75 mm Dia. UPVC	Nr	20	2,600.00	52,000.00
1.1.5	50 mm Dia. UPVC	Nr	300	1,300.00	390,000.00
1.1.6	32 mm Dia. UPVC	Nr	40	800	32,000.00
1.1.7	25 mm Dia. UPVC	Nr	500	500	250,000.00
1.1.8	20 mm Dia. UPVC	Nr	800	400	320,000.00
1.2	GI Pipes, Class C				
1.2.1	160 mm Dia. GI	Nr	100	18,500.00	1,850,000.00
1.2.2	110 mm Dia. GI	m	100	14,000.00	1,400,000.00
1.2.3	90 mm Dia. GI	m	100	12,500.00	1,250,000.00
1.2.4	63 mm Dia. GI	Nr	100	10,500.00	1,050,000.00
1.2.5	50 mm Dia. GI	Nr	100	9,685.00	968,500.00
2	Fittings				
2.1	Saddle Clamps				

2.1.1	75mm x 50mm Dia.	Nr	50	840	42,000.00
2.1.2	75mm x 32mm Dia.	Nr	50	700	35,000.00
2.1.3	75mm x 25mm Dia.	Nr	50	700	35,000.00
2.1.4	75mm x 20mm Dia.	Nr	50	700	35,000.00
2.1.5	50mm x 32mm Dia.	Nr	50	450	22,500.00
2.1.6	50mm x 25mm Dia.	Nr	50	450	22,500.00
2.1.7	50mm x 20mm Dia.	Nr	50	450	22,500.00
2.1.8	25mm x 20mm Dia.	Nr	50	450	22,500.00
2.2	**G.I Bends, 90°**				
2.2.1	160mm Diameter	Nr	20	9,000.00	180,000.00
2.2.2	110mm Diameter	Nr	30	8,000.00	240,000.00
2.2.1	90mm Diameter	Nr	50	5,200.00	260,000.00
2.2.2	75mm Diameter	Nr	10	2,200.00	22,000.00
2.2.3	50mm Diameter	Nr	80	1,600.00	128,000.00
2.3	**G.I Equal Tee**				
2.3.1	160mm x 160mm Dia.	Nr	10	6,000.00	60,000.00
2.3.2	110mm x 110mm Dia.	Nr	20	5,200.00	104,000.00
2.3.3	90mm x 90mm Dia.	Nr	50	3,500.00	175,000.00
2.3.3	50mm x 50mm Dia.	Nr	50	2,000.00	100,000.00
2.4	**G.I Reducing Bush**				
2.4.1	160mm x 110mm Dia.	Nr	20	1,600.00	32,000.00
2.4.2	110mm x 75mm Dia.	Nr	30	1,300.00	39,000.00
2.4.3	75mm x 50mm Dia.	Nr	70	900	63,000.00
PAGE TOTAL CARRIED TO BILL COLLECTION PAGE					10,612,500.00

TENDER No.

BILL No. 1

SUPPLY OF PIPES, FITTINGS, ELECTRICAL FITTINGS & O&M TOOLS

ITEM No.	DESCRIPTION	UNIT	QUANTITY	RATE incl. VAT (Kshs)	AMOUNT incl. VAT (Kshs)
				750.00	
2.4.4	50mm x 32mm Dia.	Nr	30		22,500.00
2.4.5	50mm x 25mm Dia.	Nr	100	750	75,000.00

2.5	**G.I Elbow**				
2.5.1	90mm Diameter	Nr	50	900	45,000.00
2.5.2	75mm Diameter	Nr	30	700	21,000.00
2.5.3	63mm Diameter	Nr	20	350	7,000.00
2.6	**G.I Hexagonal Plug**				
2.6.1	75mm Diameter	Nr	20	600	12,000.00
2.6.2	63mm Diameter	Nr	40	300	12,000.00
2.6.3	50mm Diameter	Nr	60	300	18,000.00
2.7	**G.I Sockets**				
2.7.1	110mm Diameter	Nr	50	900	45,000.00
2.7.2	75mm Diameter	Nr	50	600	30,000.00
2.7.3	50mm Diameter	Nr	50	300	15,000.00
2.8	**G.I Unions**				
2.8.1	160mm Diameter	Nr	80	6,500.00	520,000.00
2.8.2	110mm Diameter	Nr	120	2,210.00	265,200.00
2.8.3	90mm Diameter	Nr	200	1,680.00	336,000.00
2.8.4	75mm Diameter	Nr	40	1,190.00	47,600.00
2.8.5	63mm Diameter	Nr	40	1,190.00	47,600.00
2.8.6	50mm Diameter	Nr	350	800	280,000.00
2.9	**G.I Nipples**				
2.9.1	75mm Diameter	Nr	400	950	380,000.00
2.9.2	50mm Diameter	Nr	400	300	120,000.00
2.1	**Air Valves, Class C Heavy Duty**				
2.10.1	DN50 Double Orifice	Nr	50	13,000.00	650,000.00
2.10.2	DN50 Single Orifice	Nr	50	5,000.00	250,000.00
2.10.3	DN25 Single Orifice	Nr	50	3,500.00	175,000.00

2.11	**Gate Valves (Peglers)**				
2.11.1	Diameter 4"	Nr	20	16,000.00	320,000.00
2.11.2	Diameter 3"	Nr	60	11,000.00	660,000.00
2.11.3	Diameter 2 1/2"	Nr	120	5,000.00	600,000.00
2.11.4	Diameter 2"	Nr	20	1,500.00	30,000.00
2.11.5	Diameter 1 1/2"	Nr	200	1,000.00	200,000.00
2.11.6	Diameter 1"	Nr	200	800	160,000.00
2.12	**Non Return Valves Class C Heavy Duty**				
2.12.1	110mm Diameter	Nr	50	8,000.00	400,000.00
2.12.2	90mm Diameter	Nr	50	7,000.00	350,000.00
2.12.3	50mm Diameter	Nr	50	3,200.00	160,000.00
2.13	**V.J Coupling**				
2.13.1	110mm Diameter	Nr	50	2,500.00	125,000.00
2.13.2	75mm Diameter	Nr	50	2,000.00	100,000.00
2.13.3	50mm Diameter	Nr	50	1,400.00	70,000.00
PAGE TOTAL CARRIED TO BILL COLLECTION PAGE					6,548,900.00

TENDER No.

BILL No. 1

SUPPLY OF PIPES, FITTINGS, ELECTRICAL FITTINGS & O&M TOOLS

ITEM No.	DESCRIPTION	UNIT	QUANTITY	RATE incl. VAT (Kshs)	AMOUNT incl. VAT (Kshs)
2.14	**UPVC Bends, 90°**				
2.14.1	160mm Diameter	Nr	50	4,500.00	225,000.00
2.14.2	110mm Diameter	Nr	50	1,300.00	65,000.00
2.14.3	90mm Diameter	Nr	50	1,000.00	50,000.00
2.15	**UPVC Valve Sockets**				
2.15.1	110mm Diameter	Nr	50	650	32,500.00
2.15.2	90mm Diameter	Nr	50	450	22,500.00

2.15.3	50mm Diameter	Nr	50	300	15,000.00
2.15.4	25mm Diameter	Nr	50	150	7,500.00
2.16	**UPVC Equal Tee**				
2.16.1	110mm Diameter	Nr	50	2,500.00	125,000.00
2.16.2	90mm Diameter	Nr	50	1,300.00	65,000.00
2.16.3	50mm Diameter	Nr	50	500	25,000.00
2.16.4	25mm Diameter	Nr	50	150	7,500.00
2.17	**UPVC Reducing Bush**				
2.17.1	160mm x 110mm Dia.	Nr	50	1,800.00	90,000.00
2.17.2	110mm x 90mm Dia.	Nr	50	1,200.00	60,000.00
2.17.3	90mm x 75mm Dia.	Nr	50	900	45,000.00
2.17.4	75mm x 50mm Dia.	Nr	50	800	40,000.00
2.17.5	90mm x 50mm Dia.	Nr	50	900	45,000.00
2.17.6	50mm x 25mm Dia.	Nr	50	450	22,500.00
2.17.7	25mm x 20mm Dia.	Nr	50	200	10,000.00
2.18	**UPVC Elbow**				
2.18.1	110mm Diameter	Nr	30	2,200.00	66,000.00
2.18.2	90mm Diameter	Nr	50	1,600.00	80,000.00
2.18.3	50mm Diameter	Nr	100	1,400.00	140,000.00
2.18.4	25mm Diameter	Nr	100	1,000.00	100,000.00
2.19	**Rubber Gaskets**				
2.19.1	Rubber Gaskets 4mm thick	kg	10	1,800.00	18,000.00
3	**Jointing Materials**				
3.1	Solvent Cement for UPVC Pipes & Fittings	kg	200	1,500.00	300,000.00
3.2	PTFE Seal Tape	Doz.	100	220	22,000.00
4	**Electrical Fittings & Tools**				

4.1	250A Tripple Pole Molded Case Circuit Breaker (Fixed)	Nr	10	5,000.00	50,000.00
4.2	200A Tripple Pole Molded Case Circuit Breaker (Fixed)	Nr	10	4,500.00	45,000.00
4.3	160A Tripple Pole Molded Case Circuit Breaker (Fixed)	Nr	10	4,000.00	40,000.00
4.4	80A Tripple Pole Miniature Circuit Breaker	Nr	25	4,000.00	100,000.00
4.5	Cable Splicing Kit	Pkts	30	5,000.00	150,000.00
4.6	Electric Toolbox (Complete set)	Nr	3	25,000.00	75,000.00
4.7	Drill with tool kit	Nr	2	18,500.00	37,000.00
4.8	Grease Gun (Pneumatic)	Nr	6	7,500.00	45,000.00
4.9	Grease Gun (Electrical)	Nr	1	95,000.00	95,000.00
4.1	Digital Multimeter	Nr	6	5,000.00	30,000.00
4.11	50mm copper cable lugs (heavy gauge)	Nr	30	400	12,000.00
4.12	35mm copper cable lugs (heavy gauge)	Nr	30	400	12,000.00
4.13	25mm copper cable lugs (heavy gauge)	Nr	30	400	12,000.00
PAGE TOTAL CARRIED TO BILL COLLECTION PAGE					2,381,500.00

TENDER No.

BILL No. 1

SUPPLY OF PIPES, FITTINGS, ELECTRICAL FITTINGS & O&M TOOLS

ITEM No.	DESCRIPTION	UNIT	QUANTITY	RATE incl. VAT (Kshs)	AMOUNT incl. VAT (Kshs)
4.14	3 phase - phase failure relay	Nr	20	5,000.00	100,000.00
4.15	Float Switches	Nr	15	7,000.00	105,000.00
4.16	2.5mm2 flexible cable 4 core	Roll	4	23,000.00	92,000.00
4.17	4mm2 flexible cable 4 core	Roll	4	25,000.00	100,000.00
5	**Operation & Maintenance Tools**				
5.1	Complete Box Spanner Set	Nr	3	35,000.00	105,000.00
5.2	Pipe Wrench (Record) 36"	Nr	3	7,500.00	22,500.00
5.3	Pipe Wrench (Record) 24"	Nr	3	6,000.00	18,000.00
5.4	Pipe Wrench (Record) 18"	Nr	3	3,500.00	10,500.00
5.5	Pipe Wrench (Record) 16"	Nr	3	2,800.00	8,400.00
5.6	Pipe Wrench (Record) 12"	Nr	3	2,500.00	7,500.00
5.7	Pipe Wrench (Record) 10"	Nr	3	1,800.00	5,400.00
5.8	Pipe Wrench (Record) 8"	Nr	3	1,200.00	3,600.00
5.9	Complete Dye Stock Set	Nr	2	15,000.00	30,000.00

5.1	Axe 3 pounds with handle	Nr	12	1,200.00	14,400.00
5.11	Mattock with handle	Nr	20	1,800.00	36,000.00
5.12	Panga 16 inch	Nr	20	1,500.00	30,000.00
5.13	Spades Heavy Duty	Nr	30	1,500.00	45,000.00
5.14	Jembe 9 inch with handle	Nr	10	1,500.00	15,000.00
5.15	Hacksaw Blade (Sandflex)	Set	50	150	7,500.00
5.16	Hacksaw Frame (Eclipse)	Nr	30	900	27,000.00
5.17	Gloves Heavy Duty	Pkts	30	750	22,500.00
5.18	Repair Clamps 6"	Nr	5	4,500.00	22,500.00
5.19	Repair Clamps 4"	Nr	10	3,000.00	30,000.00
5.2	Repair Clamps 3"	Nr	20	2,500.00	50,000.00
5.21	Repair Clamps 2"	Nr	20	2,000.00	40,000.00
PAGE TOTAL CARRIED TO BILL COLLECTION PAGE					947,800.00

TENDER NO.:

SUPPLY OF PIPES, PIPE FITTINGS, ELECTRICAL FITTINGS & O&M TOOLS GRAND SUMMARY

SECTION	DESCRIPTION		TOTAL AMOUNT (Kshs.)
1	Page Total, Page 1 of 4		10,612,500.00
	Page Total, Page 2 of 4		
2			6,548,900.00
	Page Total, Page 3 of 4		
3			2,381,500.00
	Page Total, Page 4 of 4		
4			947,800.00

	Bills Total Inclusive of VAT		**20,490,700.00**

APPENDIX B: GRIEVANCIES REDRESS MECHANISM

Grievances Redress Mechanism

Grievance Redress Mechanism (GRM)

A grievances and redress mechanism will be instituted by the Contractor & Proponent during the construction and operation phases respectively. With regard to this project, GRM will entail:

a) A grievances and redress policy which will be availed by the both the Contractor and proponent prior to project commencement
b) A unit or section or personnel responsible for handling grievances e.g. EHS officer
c) Grievances recording system-which will involve availing grievances record book on site (construction) and at the office during operation

The procedure for handling GRM will entail

a) A liaison or EHS officer will receive a grievance from a community member either at a personal level through or as presented in a community meetings; Record date, complainant details, nature of grievance, and any evidence provided.
b) Assessment of the grievance presented and review to categorize the grievance based on severity.
c) Acknowledge receipt of grievance to the complainant within a specified time
d) Gathering information and conduct Investigations
e) Analysis of the information provided to authenticate the cause of the grievance
f) Development of a proposal of action plans and response to the aggrieved
g) Invite the complainant to discuss the proposed resolution to ensure it addresses their concerns.
h) Carry out the agreed-upon action (e.g., compensation, project modification, public apology).
i) Monitor Implementation to ensure that the resolution is adhered to as agreed.
j) Get feedback of whether the complainant is satisfied with the resolution.
k) Close the grievance file if the complainant is satisfied
l) Appeal & escalation Process: If the complainant is dissatisfied, the appeal process should start or the issue presented to a higher level office
m) There should be documentation and detailed records of all grievances, investigations, resolutions, and communications.

SOCIAL SCREENING CHECKLIST

Issues	Answer			If yes, it will trigger World Bank safeguard policy.	If yes, relevant documents shall be provided
	Yes	No	Remarks		
1. **Immigration and land acquisition**					
Does the subproject require land acquisition for development (public or private, temporary or permanent)?		No	The proposed project entails rehabilitation of an existing pipe line which is on the road reserve. It will only require a no objection letter to carry out the pipe replacement works	OP 4.12 Involuntary resettlement	Resettlement action plan
Does the subproject cause house demolition (including operating and non-operating ones) due to development?		No	There is no house structure on the pipe line or intake area that will require demolition	OP 4.12 Involuntary resettlement	Resettlement action plan
Are people prohibited from using their daily economic resources (such as fishing sites, economic forests, planting land)?		No	The project will not interfere with on going activities apart from the short intermittences during pipe replacement	OP 4.12 Involuntary resettlement	Resettlement action plan
Does the subproject result in involuntary resettlement of individuals or families?		No	The existing pipeline set for replacement is along the road with no encroachments	OP 4.12 Involuntary resettlement	Resettlement action plan
Does the subproject result in temporary or permanent loss of crops, fruit trees and facilities?		No	Most of the vegetation along the pipeline is the invasive prosopis juliflora	OP 4.12 Involuntary resettlement	Resettlement action plan
2. **Minorities**					
Whether the subproject has affected ethnic minority communities and population		No	The project is within an urban setting with no specific minorities	OP 4.10 Indigenous People	

3. **Employees**					
Does the subproject cause unemployment?		No	It will create temporary employment during construction		Reemployment plan
Does the subproject result in employee transfer?		No	It does not have any institutional intervention		Job transfer training
Whether the subproject causes the decrease of employee's income		No	It does not have any institutional intervention that would cause income restructuring		

CHANCE FIND PROCEDURES

Policy and Legal Provision

National Museums and Heritage Act 2006 laws of Kenya provides for; *'if you believe that you may have encountered any archaeological materials or any material national importance stop work in the area and follow the procedure box below'*

Chance Find Procedures

(i) All construction activity in the vicinity of the remains is to cease immediately.
(ii) The Supervising engineer or Environment Officer shall contact Kenya National Museums Immediately

Public relations:
E-mail: publicrelations@museums.or.ke
Director General:-
Email: dg@museums.or.ke
Fax: +254 -20-3741424
Tel:+254-20-8164134/35/36

(iii) The find location will be recorded and all remains will be left in place.
(iv) Potential significance of the remains will be assessed and mitigative options will be identified.
(v) If the significance of the remains is judged to be sufficient to warrant further action and they cannot be avoided, then the Director of Kenya National Museums will determine the appropriate course of action
(vi) In the case of human remains, if the remains are assessed to be archaeological, then Director of Kenya National Museums will determine how to handle them.
(vii) Options could include avoidance or respectful removal and reburial.
(viii) If human remains are encountered and they are not archaeological, then the respective County Government will be contacted immediately for appropriate reburial.

APPENDIX C: MINUTES OF THE COMMUNITY

MINUTES OF A COMMUNTY MEETING ON ENVIROMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED INTAKE & PIPELINE REHABILITATION ON 21/6/2024 AT COUNTY WATER DEPERTMENT BOARDROOM

PRESENT

ATTENDANCE (ATTACHED SIGN LIST)

AGENDA

1. Introduction
2. Brief of the proposed project from Mandera Water & Sanitation Company
3. Project Concerns & Recommendations by the beneficiaries and host community
4. A.O.B

MIN 1: PRELIMINARIES

The meeting started at 10.15pm with a word of prayer from Mohamed Ahmed.

MIN 2: BRIEF OF THE PROPOSED PROJECT FROM MANDWASCO

The MANDWASCO engineer welcomed members to the meeting. He outlined the agenda of the meeting. Additionally, he gave a brief of the proposed project for which an environmental and social impact assessment was being conducted. He noted that the existing intakes and the main supply line had degraded over the years causing leakages and inefficiencies in water supply. The proposed project was therefore aimed at improving water access within the town. It would entail replacement of the existing pipeline and renovation of the existing intakes that serve this pipeline.

MIN 2: BRIEF FROM THE CONSULTANT

The Consultant highlighted the need to conduct a environmental and social impact assessment for such a proposed project. She noted that it allows beneficiaries and the wider public to be aware of proposed project and it also provides a platform where the community gives feedback and concerns regarding the project.

MIN 3: PROJECT CONCERNS & RECOMMENDATIONS BY THE COMMUNITY

The Consultant invited the community give their comments, concerns regarding the project. The following issues were raised:

a) The project is timely due to the current water crisis in Mandera town
b) The water supply infrastructure in Mandera town is in a dilapidated state and requires rehabilitation
c) Residents in areas that are not served incur high costs in accessing water as they have to rely on vendors
d) There is need for intake rehabilitation to ensure the capacity of MANDWASCO is enhanced
e) The proposed project should incorporate a component on water treatment which is currently very basic hence compromising the quality of water supplied
f) The locals especially youths should be given first priority in the available job opportunities during construction.
g) There are multiple lagas in the area which could damage pipelines hence the need to make this consideration in the design
h) Provide quality pipes that will withstand the harsh climatic conditions of this area
i) MANDWASCO should consider investing in sanitation once they implement this project as a follow up

MIN 4. A.O.B

MANDWASCO thanked the community leaders for attending the meeting and raising their concerns on behalf of the community. He argued them to disseminate the information to the wider community. There being no other business the meeting ended at 11.50 pm with a word of prayer from Issa Mohammed.

MINUTES SIGNED BY:

Client  Date 11/9/2024

Consultant  Date

---------- ------11/09/2024----..----------
-

APPENDIX D: WATER QUALITY MONITORING DATA

MANDERA WATER AND SEWERAGE COMPANY
(MANDWASCO)

Water Quality Monitoring Data Sheet

Source of Sample: .....SUFTU INTAKE - (*START POINT SAMPLING*) .....

Ref No: .....01/117/24.....

Purpose: ...*Physiochemical and bacteriological analysis*.....

Date Sampled: .....06/05/2024..... Date Analyzed: .....10/05/2024.....

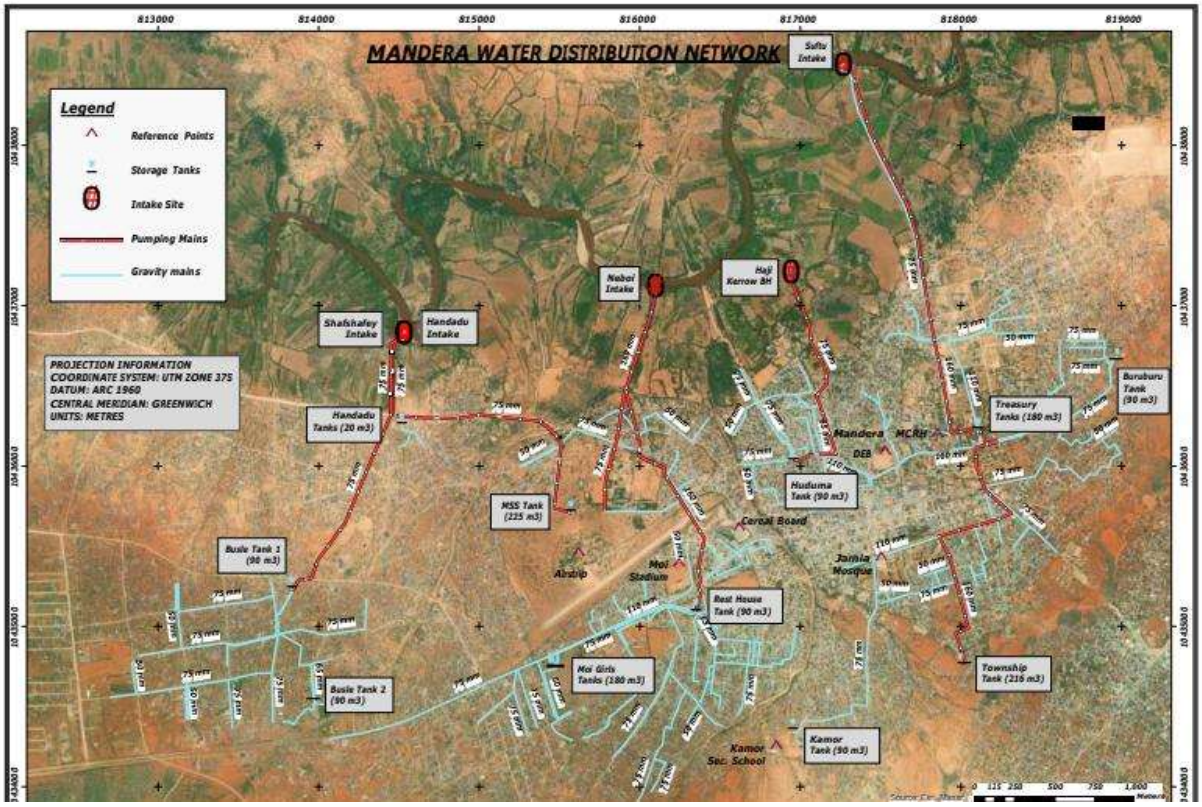
	PARAMETERS	UNIT	RESULTS	WHO GUIDELINES	KEBS STANDARD
1.	Ph	Ph Scale	6.4	6.5-8.5	6.5-8.5
2.	Turbidity	N. T. U	5	0-5	0-5
3.	Conductivity	μS/cm	893	Max 2000	Max 2000
4.	Temperature	°c	37.5	28.5	28.5
5.	Total Dissolved Solids	Mg/L	508	Max 1500	Max 1200
6.	Salinity	g/l	0.50	5	5
7.	FRC	Mg/L	0.75	0.5-1.5	0.5-1.5

8.	Total Coliforms	No/100ml	Nil	Nil/100ml	Nil/100ml
9.	Faecal Coliforms	No/100ml	Nil	Nil/100ml	Nil/100ml

REMARKS: Based on the parameters the water at least met the WHO and KEBS standard ready for consumption.

Analyzed By: **HIBAQ ADAN** Approved By: **YAHYA CHEGE**

APPENDIX D: PROJECT LAYOUT



MEETING ATTENDANCE SHEETS

BARAZA/ INTRODUCTION MEETING WITH COMMUNITY

MANDERA WSC

WaterFund
Financing the Water Sector

WATER SECTOR TRUST FUND

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE REHABILITION OF MANDWASCO WATER SUPPLY NETWORK IN MANDERA COUNTY

MEETING **DATE**

S/N	NAME	DESIGNATION	ID NO	TEL NO	SIGNATURE
1.	Dr. Purity Muthoni	WSTF Consultant	24070617	0725 896329	
2.	Jackson Ngumburu	WSTF Data Analyst	35339317	0729040440	
3.	Mohamed Ahmed	Engineer Handonus (Mandwasco)	36550009	0725655793	
4.	Habiba Abdow Alidu	Women Group	29938970	0741318422	H.A
5.	Mahad Isaack	Chairman Elders Hasi Keeni	01958849	07 27	
6.	Abdia Issack Ahmed	Women Group Member	2110520		A.I.A
7.	Fowzia Adan Hasan	Women Group Secretary	25668653	0741958629	F.A.H
8.	Habiba Mohamed Issack	Women Group Kamor	23424572 10		H.M.I
9.	Mohamed Hussein	Elders Secretary	00132442	0729509200	
10.	Mohamed Adan Shunu	Elders Member	00183376	0716170290	

11.	MOHAMED YUSSUF	YOUTH CHAIRMAN (HANDADUD)	34955918	0745773166	
12.	ADAN FALIR MOHAMED	ELDERS (SUFTU)	00144429	0722432817	
13.	Ibrahim Hassan Robow	(ELDERS) HAJI KEROW	1686460	072865362	
14.	ABDI HUSSEIN EMOI	ELDERS MEMBER	0013882	0702233028	
15.	ABDIFATAH ISMAIL ADAN	YOUTH REPRESENTATIVE	30795062	0722729638	
16.	ABDI ABDIRAHMAN HUSSEIN	YOUTH (SUFTU ZONE)	31198697	0110015533	
17.	HASSAN KOSAN HASSAN	ELDERS	31860506	07277671 40	
18.	SHUKRI ADOW EMMA	YOUTH (SHAFSHAFEY (BUSLE)	35550950	0722274623	
19.	MUSDAF ISMAIL OMAR	SECRETARY HANDADUD ELDERS GROUP	27305110	0701857418	

20.	ABDIRAHMAN IBRAHIM MOH'D	YOUTH VICE CHAIR 0785 (SUFTU ZONE)	29960991	0785285944	
21.	ABDI MOHAMED	ENGINEER (MANDWASCO)	34187486	0722981363	
22.	REBECCA KARANJA	Consultant		0722601845	
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25.					
26.					
27.					
28.					

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WaterFund
Financing the Water Sector
WATER SECTOR TRUST FUND

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE REHABILITION OF A WATER SUPPLY NETWORK IN MANDERA COUNTY

KEY INFORMANT INTERVIEW

RESPONDENT	**ORGANIZATION :** MANDWASCO **DESIGNATION:** TECHNICAL MANAGER
PROJECT AWARENESS	• Feasibility was carried and Public participation • Key stakeholders were engaged.
ANTICIPATED POSITIVE IMPACTS	• Improve water quality • Increase reliability and efficiency • Reduce Maintenance cost
ANTICIPATED NEGATIVE IMPACTS	• Temporary Contamination • Disruption of Services • Ecosystem disturbance and waste generation • Technical challenges e.g Coordnation
PROPOSED MITIGATION MEASURES	• Public awareness • Alternative water supply • Adhere to regulation permits and Approvals • Quality checks and Control

SIGNATURE ..... **DATE** 20/06/2024

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE REHABILITION OF A WATER SUPPLY NETWORK IN MANDERA COUNTY

KEY INFORMANT INTERVIEW

RESPONDENT	**ORGANIZATION:** MINISTRY OF INTERIOR **DESIGNATION:** DEPUTY COUNTY COMMISSIONER
PROJECT AWARENESS	VERY MUCH AWARE.
ANTICIPATED POSITIVE IMPACTS	IMPROVED PORTABLE WATER SUPPLY AND DISTRIBUTION TO MEMBERS OF THE PUBLIC HENCE IMPROVED HEALTHY. REDUCED WATER BORNE RELATED ILLNESSES.
ANTICIPATED NEGATIVE IMPACTS	1. ILLEGAL WATER CONNECTIONS 2. TAMPERING OF WATER METERS. 3. LACK OF PAYMENT OF WATER BILLS. 4 DOMESTIC CONFLICTS.
PROPOSED MITIGATION MEASURES	CONTINUOUS SENSITIZATION FORUMS MUST BE HELD.

SIGNATURE ..... **DATE** 21/6/24

STAMP Deputy County Commissioner
P.O. Box 77 - 70300,
Mandera East

WaterFund
Financing the Water Sector
WATER SECTOR TRUST FUND

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE REHABILITION OF A WATER SUPPLY NETWORK IN MANDERA COUNTY

KEY INFORMANT INTERVIEW

RESPONDENT	**ORGANIZATION :** MANDERA SECONDARY SCHOOL **DESIGNATION:** DEPUTY PRINCIPAL
PROJECT AWARENESS	NOT AWARE.
ANTICIPATED POSITIVE IMPACTS	- The school has over 2000 students we are drawing on water cost. The project will save cost for the school. - 5 types of water = - Access to water for tree growing to maintain a green environment / regulate the micro climate, - Pozzolana & pipeline necessitating tree cutting - The cleanliness of the water supplied should be considered, proper treatment, adequacy, amount =
PROPOSED MITIGATION MEASURES	Need to treat water. Provide reliable water. Provide adequate water. Ensure durability of the system.

SIGNATURE ..... **DATE** 21/06/24

STAMP

MANDERA SECONDARY SCHOOL
SENIOR PRINCIPAL
DATE.....
P.O BOX 36-70300 MANDERA