COMPREHENSIVE PROJECT REPORT

FOR

PROPOSED REMOVAL, HANDLING AND DISPOSAL OF ASBESTOS ROOFING SHEETS FROM KIPEVU WASTEWATER TREATMENT PLANT (KWWTP) AND PUMPING STATIONS IN MOMBASA COUNTY

PROJECT PROPONENT

THE MANAGING DIRECTOR.

MOMBASA WATER SUPPLY AND SANITATION COMPANY LTD
P.O BOX 1100-80100
MOMBASA

GPS COORDINATES

4^0 02'20.2" S 39^0 37'49.0" E

(Latitude -4.0389420 Longitude 39.6302790)

The World Bank through and MOMBASA WATER

DOCUMENT CERTIFICATION

DOCUMENT CERTIFICATION

EIA/EA EXPERTS' DECLARATION

We, the undersigned experts; submit this Environmental and Social Impact Assessment Summary Report for the Proposed Safe Removal and Disposal of Asbestos Roof at Kipevu Wastewater Treatment plant (KWWTP) and associated sewerage pumping stations namely Mikindani SPS, Miritini World Bank SPS, Jomvu screw pump SPS, Port Reitz SPS, and Port Reitz Screen Chamber Station, Mombasa County. The ESIA project report has been carried out in accordance to the Environmental Management and Coordination Act, 1999 and Environmental (Impact Assessment and Audit) Regulations, 2003. All the information contained in this report is accurate to the best of our knowledge and a truthful representation of all findings relating to this project.

Details of Consulting Firm

CEMEA LTD CEMEA LTD. *EHS Consultancy Services* 0726397739/07397739 info@cemea.co.ke CEMEA LIMITED P. O. Box 42550 - 80100 MOMBASA			**REGISTRATION NO. 10408**
NAME OF EXPERTS	**NEMA REGISTRATION NUMBER**	**SIGNATURE**	**STAMP/ DATE**
Mr, Evans K. Totona	Reg. No 8049		9th May 2025
Ms. Venlensa A. Odhiambo	Reg. No 9899		9th May 2025

PROPONENT'S DECLARATION

I,.....HABIBA ALI.....on behalf of **Mombasa Water Supply & Sanitation Company Limited** submit this Environmental and Social Impact Assessment Summary Project Report for the Proposed Safe Removal of Asbestos Roof at Kipevu Wastewater Treatment plant (KWWTP) and Pumping Stations, Mombasa County to NEMA in compliance with EMCA of 1999 and Environmental (Impact Assessment and Audit) Regulations, 2003. To the best of my knowledge, the information contained in this report is accurate and a truthful representation of all findings as relating to the project.

Signature. .....

Signed on this..11th.....day of..July..025

MOMBASA WATER SUPPLY & SANITATION CO. LIMITED P. O. Box 1100 - 80100 MOMBASA

PROPONENT DETAILS

The Managing Director,

Mombasa Water Supply & Sanitation Company Limited

P.O BOX 1100-80100, Mombasa

Email: info@mombasawater.co.ke

ACKNOWLEDGMENT

We would like to acknowledge the Managing Director Abdirahim Farah, Mombasa Water Supply and Sanitation Company Limited for providing all the necessary support to facilitate the undertaking of this Environmental Impact Assessment Comprehensive Project Report (CPR) for the proposed Safe Removal and Disposal of Asbestos Roof at Kipevu Wastewater Treatment plant (KWWTP) and Pumping Stations (PortReitz 1&2, Miritini, Jomvu, and Mikindani) in Mombasa County. We express our gratitude to Cristom Mwalimu who gave all the data we required to undertake the Environmental and Social Impact Assessment and facilitated site visit.

We also give our thanks to the project site neighbors for creating time to participate in the consultative meetings and providing comments and suggestions which were included in this report.

PROJECT DETAILS

<table>
<tr><td>Project Proponent</td><td>The Managing Director, Mombasa Water Supply & Sanitation Company Ltd</td></tr>
<tr><td>Contact</td><td>P.O BOX 1100-80100
MOMBASA
Email: info@mombasawater.co.ke</td></tr>
<tr><td>Project Location:</td><td>Kipevu Wastewater Treatment Plant (KWWT) and Pumping Stations (PortReitz 1&2, Miritini, Jomvu, & Mikindani)</td></tr>
<tr><td>Project Nature:</td><td>Asbestos sheets removal, replacement, wrapping, decontamination, transportation and disposal from Kipevu Wastewater Treatment Plant (KWWT), Four Pumping Stations plus and associated structures, in Mombasa County</td></tr>
<tr><td>Area Coverage</td><td>
<table>
<tr><th>Location</th><th>Area (SQM)</th><th>GPS Coordinates (Lat/Long)</th></tr>
<tr><td>KWWT</td><td>711.74</td><td>-4.0389423, 39.6302796</td></tr>
<tr><td>PortReitz 1</td><td>172.25</td><td>-4.0416559, 39.6190468</td></tr>
<tr><td>PortReitz 2</td><td>44.2</td><td>-4.0409640, 39.6036395</td></tr>
<tr><td>Miritini</td><td>130</td><td>-4.0023908, 39.5792371</td></tr>
<tr><td>Jomvu</td><td>130</td><td>-4.0091030, 39.596866</td></tr>
<tr><td>Mikindani</td><td>130</td><td>-4.010349, 39.628264</td></tr>
<tr><td>TOTAL</td><td colspan="2">1,318.19m^2</td></tr>
</table>
</td></tr>
<tr><td>Estimated Tonnage</td><td>Density: 1,400 kg/m³ (average for asbestos cement products)
Thickness: 6 mm = 0.006 m (common for asbestos-cement sheets)
Volume = Area × Thickness
= 1,318.19 m² × 0.006 m
= 7.90914 m³
Mass = Volume × Density
= 7.90914 m³ × 1,400 kg/m³
= 11,072.796 kg
Total = 11.07 Ton</td></tr>
<tr><td>Project Budget:</td><td>Kshs 3,000,000/=</td></tr>
<tr><td>Details of Licensed Asbestos Handler</td><td>Fadema Company Ltd
Disposal Site: (License No: NEMA/WM/LDS/2516)</td></tr>
</table>

ACRONYMS

ACM	Asbestos Containing Materials
ASL	Above Sea Level
CGM	County Government of Mombasa
DOSHS	Directorate of Occupational Safety and Health Services
EMCA	Environmental Management and Coordination Act
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environment and Social Management Plan
GPS	Global Positioning System
IT5	Industrial Trough 5
JSA	Job Safety Analysis
KWWTP	Kipevu Waste Water Treatment Plant
M	Meters
MoPHS	Ministry of Public Health and Sanitation
MOWASSCO	Mombasa Water Supply & Sanitation Company
NEC	National Environment Council
NEMA	National Environment Management Authority
PCC	Public Complaints Committee
PPE	Personal Protective Equipment
SERC	Standards and Enforcement Review Committee
SQM	Square Meter
TORs	Terms of Reference
WHO	World Health Organization
WRA	Water Resources Authority
WSDP	Water and Sanitation Development Project

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NON- TECHNICAL EXECUTIVE SUMMARY

E.S 1 Introduction

The Government of Kenya received funding from the World Bank through the Ministry of Water, Sanitation and Irrigation to support development of water and sanitation services. This prompted the Government to initiate various projects within the wider coastal region, Mombasa County included. One of the projects in Mombasa County is the Water and Sanitation Development Project (WSDP) which is being implemented by Mombasa Water Supply and Sanitation Company Limited (MOWASSCO), a public company fully owned by the County Government of Mombasa (CGM).

The Cabinet, on 11th March 2025 approved the nationwide removal of asbestos from all public and private facilities with the aim to safeguarding public health. The Initiative aims to mitigate the serious health risks associated with asbestos exposure. Asbestos, widely used in Kenya's construction industry during the 1960s and 1970s, remains present in government buildings, hospitals, schools, and even water supply systems.

As part of WSDP and the Cabinet's directive, the World Bank through the County Government of Mombasa (CGM) and Mombasa Water Supply and Sanitation Company Limited (MOWASSCO), proposes to decommission asbestos roofing sheets at Kipevu Wastewater Treatment Plant and its various pumping stations situated in PortReitz (1&2), Miritini area, Jomvu, and Mikindani respectively. The proposed activities will include the removal of asbestos sheets, and their safe disposal. The project is proposed to start as soon as NEMA approves the ESIA project report and issues a license to the proponent. It is estimated that the project will cost Kshs 3,000,000/= (Kenya shillings three million) or there about.

The project is being undertaken to eliminate environmental health and safety risks posed by deteriorating asbestos-containing materials (ACMs) identified within critical infrastructure components at the facility and its pumping stations. The project will be limited to asbestos sheets removal, wrapping, decontamination of the site, transportation and disposal of the asbestos by a NEMA approved handler in this case M/s Fadema Company Limited *(NEMA License No: NEMA/WM/LDS/2516).* The works will not involve any structural modification of the buildings since re-roofing will be undertaken under a separate contract after clearance is issued and is outside the scope of this ESIA**.** Therefore, any structural repair or alteration required for re-roofing will be separately assessed and permitted. However social issues such as labour and working conditions might become risks if the contractor does not ensure that workers are well compensated and all rights associated with working conditions are respected

including provision of appropriate Personal Protective Equipment. Other social issues of concern include potential impacts on Community Health and Safety including possible spread of HIV and other infectious diseases, lack of proper signages for traffic diversions and control, child and VMG protection against injuries during temporary relocation and risks of gender based violence as well as sexual exploitation and abuse of vulnerable members of the community.

The proposed project will be undertaken in conformance with applicable national and international ESH laws and guidelines as well as conditions to be issued under the NEMA license. An environmental and social management plan which describes the environmental safety, social and health protection strategies to be employed during the undertaking of the project has been prepared. The proposed project aligns with both national legal requirements under the Environmental Management and Coordination Act (EMCA, 1999), the Occupational Safety and Health Act (OSHA, 2007). The Proposed Project aligns with the World Bank Operational Policies specifically OP/BP 4.01 on Environmental Assessment and ESS 5 on Land Acquisition or OP 4.12 on Involuntary Resettlement. It is worth noting that the bank is also transitioning to Environmental and Social Framework (ESF) to which project particularly the Environmental and Social Standard 3 (ESS3): *Resource Efficiency and Pollution Prevention and Management* and the Environmental, Health and Safety (EHS) Guidelines for Wastewater Management and Hazardous Materials.

According to Legal Notice No. 178 of 2024**,** under the Environmental Management and Coordination (Waste Management) Regulations, 2024**,** wastes containing asbestos particularly in the form of fibres or dust are clearly categorized as hazardous waste in the First Schedule**.** As such, their handling, transportation, storage, and disposal must be conducted with strict adherence to prescribed hazardous waste protocols**,** including the use of appropriate personal protective equipment (PPE), secure containment and labelling, and disposal only at licensed hazardous waste facilities. This therefore implies that extra care should be taken when handling them.

E.S 2 Definition of Asbestos

Asbestos is a group of six fibrous minerals that occur naturally in metamorphic deposits located around the world. Of the hydrous magnesium silicate variety, the six types include tremolite, actinolite, anthophyllite, chrysotile, amosite and crocidolite. Asbestos is used in many products because it adds strength, heat resistance and chemical substance. It is a chemically inert mineral

that is fire resistant and does not conduct heat or electricity thus making it a commonly used insulator. It has high tensile strength, insoluble and odourless. Due to these properties, asbestos has been used in a wide range of manufactured goods including roofing materials, ceiling and floor tiles, paper and cement products, textiles, coatings and friction products such as automobile clutch, brake, transmission parts and sewer pipes. When used due to its resistance to fire or heat, it is woven into fabrics or mats while when used for building material such as roofing sheets, it is often mixed with cement.

Why is asbestos dangerous?

Breathing in air containing asbestos fibres can lead to asbestosis and other related diseases, mainly cancers of the lungs and chest lining. It is only a risk to health through respiratory exposure route. Past exposure to asbestos currently kills around 4,000 people a year in Great Britain. There is no cure for asbestos related diseases. There is usually a long delay between first exposure to asbestos and the onset of the disease and can vary between 15-60 years.

Although it is now illegal to use asbestos in the construction or refurbishment of any premises, many thousands of tonnes of it were used in the past and much of it is still in place. As long as it is in good condition and is not being or going to be disturbed or damaged there is negligible risk. If it is disturbed or damaged however, it can become a danger to health, because asbestos fibres are released into the air and people may breathe them in.

Air borne asbestos fibres are normally invisible to the naked eye and due to their small size and light weight may remain in the air for many hours. The air borne fibres enter the human body through inhalation and lodge in the lungs. However, to be a significant health concern, asbestos fibre must be inhaled at high concentrations (lethal dose) over an extended period resulting in the accumulation in the lungs where they can impair normal lung functions and increase the risk of developing lung cancer, mesothelioma or asbestosis.

E.S 3 Objective of the ESIA

The objective of the Environmental and Social Impact Assessment is to identify the potential impacts on the physical, biological and socio-economic environment and subsequently propose appropriate mitigation measures for any negative impacts and enhancement measures for the positive impacts resulting from the proposed removal and disposal of the asbestos.

E.S 4 Methodology

The ESIA report is based on field assessments, document review and discussions with the

project proponent representative and site neighbourhood up to a kilometre radius. The project proponent provided the experts with project details while discussions with the neighbours at the sites involved an explanation of the proposed project and soliciting of their views on environmental and social aspects that need to be considered during project implementation.

The experts employed several renowned methods, such as desktop research, observation, interview and interviews using questionnaires. These methods were used to develop the data in this report.

E.S 5. Project Description

This project involves the safe removal and disposal of asbestos roofing sheets from existing structures, covering a total surface area of approximately 1,318.19 square meters. Asbestos is a hazardous material and must be handled carefully to protect the health of workers, the public, and the environment.

The project will follow strict safety and environmental guidelines throughout the process.

Preparation and Safety; A trained team equipped with full protective clothing (including masks, coveralls, gloves, and boots) will carry out the work, warning signs and barriers will be placed around the work area to keep unauthorized people away, and workers will be briefed daily on safety procedures.

Asbestos Removal; Workers will safely access the roofs using stable ladders, the asbestos sheets will be gently loosened and removed using hand tools and in order to prevent dangerous asbestos dust from being released, the sheets will be sprayed with water before and during removal thereafter, the sheets will be carefully lowered to the ground without breaking.

Packaging and Temporary Storage; The removed sheets will be wrapped in strong plastic sheeting to prevent fiber release; broken pieces will be double-wrapped and labeled separately and all materials will be stored securely on-site in a designated area until transport is availed to the disposal site.

Transport; A licensed company, M/s Fadema Company Limited, will transport the asbestos using approved vehicles *(NEMA/WM/LTW/11897 & NEMA/WM/LTW/11804).* The waste will be tracked with proper documentation to ensure it reaches the correct disposal site.

Disposal; The asbestos will be buried at a certified site in Kilifi County *(Kilifi/Kalumani/5010).* A trench will be lined with plastic sheeting before the asbestos is placed in it and once it is filled, the trench will be covered with soil and vegetation will be planted on top.

Clean-Up and Monitoring; After disposal, all equipment and clothing will be thoroughly cleaned or safely discarded, the transport vehicle will also be cleaned before being reused, and

the disposal site will be monitored and inspected regularly to ensure ongoing safety and compliance. Once asbestos is removed, new, safe, and environmentally friendly roofing materials will be installed.

E.S 6 Legal, Regulatory and Policy Framework

This project involves the removal and safe disposal of hazardous asbestos roofing at the Kipevu Wastewater Treatment and Pumping Stations. Because asbestos is harmful to people and the environment, this work must follow strict laws, policies, and safety guidelines. Kenya has several laws that protect the environment and public health. These laws require that any work involving asbestos must follow strict safety and waste management procedures. Key policies also support the right to a clean and healthy environment, access to safe water, and good sanitation.

Consultations were held with Key stakeholders such as NEMA, DOSHS, and County Government of Mombasa department of Health department through MOWASSCO and they will continue supporting the project during implementation. MOWASCO will oversee and monitor the project to ensure safety, legality, and proper waste disposal.

Since the project involves funding by the World Bank, the applicable Environment and Social Standards (ESS) will be adhered to alongside the Kenya Government applicable laws, regulations and policies. The activity will also follow global environmental and social guidelines. This includes protection of workers, the public, and the environment. The project must ensure: Workers are protected from health risks, water sources, air, and soil are not polluted by asbestos, and proper handling, packaging, transport, and burial of asbestos is done by licensed professionals. The laws and policies also require that the proponent provide equal job opportunities for women, men, and youth, ensure prevention of harassment or abuse at the workplace, and encourages public involvement and awareness about the project to ensure everyone's views are heard.

The Constitution of Kenya 2010 guarantees every person the right to a clean and healthy environment. This project helps fulfill that promise by safely managing hazardous asbestos waste. Environmental Management and Coordination Act (EMCA, 1999; Amended 2015) sets the foundation for environmental protection in Kenya and gives the National Environment Management Authority (NEMA) the power to oversee all environmental matters, including waste and pollution control. Environmental Impact Assessment (EIA) Regulations 2003 require an expert environmental assessment before such a project begins. A licensed firm has been engaged to carry this out in line with the law. Sustainable Waste Management Act (2022)

and Waste Management Regulations 2024 classify asbestos as hazardous waste and set rules for its safe packaging, transport, and disposal. Only licensed professionals and facilities can handle it. Water Quality and Water Acts on the other hand ensure asbestos waste does not contaminate water sources. The disposal method of burying in lined pits has been carefully chosen to avoid pollution. Occupational Safety and Health Act 2007 protects workers from harm. It requires proper training, safety gear (like masks, safety harnesses, helmets, gloves, and suits), and regular health checks for workers handling asbestos. County Laws (Mombasa County Environmental Health and Sanitation Act, Public Participation Act) ensure the county government monitors the project and that the public is informed and involved while the Public Health and Traffic Law support safe removal, handling, and transport of asbestos to avoid risks to the public. Transportation will be tightly controlled and coordinated with traffic authorities. Other Laws such as the Occupier's Liability Act makes the project owner responsible for keeping the site safe for workers and visitors.

Since this project is funded by the World Bank, it follows strict environmental and social guidelines such as Environmental assessments which has been conducted to identify and manage risks. It ensures that worker protection is prioritized, including training, PPE, and health checks, pollution control measures are in place to prevent contamination, community health and safety are safeguarded through public awareness, emergency plans, and safe transport procedures, and stakeholder engagement has already taken place, and a system will be put in place for handling public concerns. Public Consultations took place on two different occasions: The first meeting took place on 7th, June 2025 bringing together 33 participants in Chaani and had 20 women and 13 men. The meeting was done at the assistant chief's office in Chaani.

The second one took place on 9th June 2025 where 38 people participated; there 21 women and 17 men, the venue was at Port Reitz pumping station.

Grievance Mechanism.

A grievance mechanism will be established to enable the communities raise and register their concerns regarding the activity. The mechanism will have a chairman and a secretary. The secretary will be the focal person for registering the grievances. It will be free and fair and will support the project in resolving community grievances. There will be a grievance log book where grievances are registered. All grievances will be resolved by the mechanism and any that will not be resolved, will be escalated appropriately.

No one is being displaced by the project. While two employees at Port Reitz Pumping Station live on-site, they will be supported by the water company to relocate temporarily to other housing during the works.

Kenya is part of several international agreements that influence this project:

- Basel Convention: Ensures safe handling and disposal of hazardous waste like asbestos.
- Bamako Convention: Bans hazardous waste imports into Africa and promotes safe waste handling locally although Kenya is not a signatory to.
- Rotterdam Convention: Promotes informed decision-making and safety in handling harmful chemicals, including asbestos.
- ILO Asbestos Convention (No. 162): Provides best practices for protecting workers from asbestos exposure, guiding this project even though Kenya has not officially ratified the treaty.

E.S 7 Baseline Environmental and Social Conditions

This report presents an overview of the environmental and social conditions around the Kipevu Wastewater Treatment Plant (KWWTP) and its five associated pumping stations Jomvu, Miritini, Mikindani, PortReitz 1 & 2 located in Mombasa County. The purpose is to support the safe removal of asbestos-containing materials (ACMs) and ensure minimal impact on the surrounding communities and environment.

Environmental Conditions

The sites are situated in the coastal area of Mombasa, characterized by a warm and humid tropical climate. Temperatures range between 22°C and 34°C, with two main rainy seasons. The terrain is mostly flat and low-lying, with sandy and loamy soils, and proximity to the Indian Ocean.

The area is ecologically sensitive, with mangroves and coral reefs nearby, though no such habitats exist directly on the project sites. Air quality is a concern due to the presence of asbestos materials in deteriorating roof sheets, especially at the main treatment plant. Background noise levels are typical of urban settings, and no excessive noise or vibration levels have been observed.

Hydrologically, the sites are near shallow groundwater and are prone to surface runoff, which could pose a risk if asbestos materials are disturbed without proper precautions.

The sites are located within densely populated urban neighborhoods. KWWTP itself is not directly adjacent to residential areas, but the pumping stations are near homes, businesses, and informal settlements. Many residents rely on small-scale trading and informal employment.

Health and safety risks in the area include potential exposure to asbestos, especially for workers and nearby residents. However, the risk to the general public remains low as long as the asbestos materials are not disturbed. No significant cultural or heritage sites were identified at or near the sites.

Key Considerations

- Safe removal and disposal of asbestos is critical to avoid air, water, and soil contamination.
- Community health and occupational safety measures must be prioritized, especially during demolition or material handling.
- Awareness campaigns will be needed to educate nearby communities on the risks and mitigation measures.
- Coordination with local authorities and adherence to Kenyan laws and international standards will ensure the project is carried out responsibly.

E. S 8 Stakeholder Engagement and Consultation

Public participation is a key legal requirement for environmental projects in Kenya. For this asbestos removal project at the Kipevu Wastewater Treatment Plant and its pumping stations, public and stakeholder engagement was carried out through community meetings (barazas), interviews, and questionnaires. These consultations aimed to inform people about the project and collect their feedback, concerns, and suggestions.

Engagement Activities

- Questionnaires were given to neighbors and stakeholders. Out of 31 issued, 27 were completed, providing insights into community concerns and expectations.
- Two public barazas were held at Kipevu and Port Reitz 1 on 7th June 2025 and the second public consultation was held on 9th June 2025. These brought together local leaders, residents, and two project officials. On 7th June 2025, there were 33 participants while on 9th June 2025, there were 38 participants.
- There were also Key Informant Interviews conducted with 25 respondents. These included individuals working in the county government, community leaders and regulatory institutions.
- Interviews were held with Project Affected Persons (PAPs) particularly those who reside at Port Reitz 1 staff houses, who were assured of safe handling of the asbestos. They will be relocated to Kipevu Staff Quarter and MOWASSCO will help them in relocation. There will be no relocation of PAPs but health and safety mitigation

measures will be put in place including distribution of masks and safe procedures of removal, loading and transportation of the asbestos.

Main Concerns raised during the public consultation included;

- Health and Safety: Fear of exposure to asbestos dust, especially during removal. Community members asked for proper protective equipment, medical screening, and safe procedures.
- Relocation: There will be no evacuation of communities but a prior communication will be given when the works begin so that the community members can arrange to have masks and other protection equipment for prevention of respiratory infection due to dust emanating from the asbestos. The community will be guided on these health and safety protocols.
- Employment: Many locals requested job opportunities during the asbestos removal process. The consultant assured the people that any available job opportunity will prioritize them.
- Awareness and Communication: There was a strong call for better public awareness about the risks of asbestos in homes and public spaces.
- Medical and Infrastructure Needs: Requests included health checks for exposed individuals and minor infrastructure upgrades (e.g., roads).

Positive Feedback

The project received strong community support. Many residents felt the removal of asbestos was long overdue and were happy to see action being taken. Positive expectations included:

- Improved public health and safety
- Better working conditions for MOWASSCO staff
- Job creation and training opportunities
- Enhanced confidence in environmental standards

Key Risks Identified

- Air pollution during asbestos removal
- Health hazards to workers and nearby residents
- Waste management concerns
- Noise and traffic disruption
- Safety risks for workers, such as falls, fatigue, or heat stress

Community Recommendations

- Provide and enforce use of protective gear for workers and visitors

- Limit access to active work zones
- Ensure proper and timely disposal of asbestos waste
- Install warning signs and enforce safety protocols
- Maintain open communication and regular updates to the community

E.S 9 ESMMP

Environmental and Social Management and Monitoring Plan outlines key mitigation measures, timelines, responsibilities, and costs, with the goal of protecting human health and the environment throughout the project.

Key areas of Management and Mitigation

a) General Site Preparation
   - Workers and surrounding communities will be notified in advance.
   - Personal Protective Equipment (PPE) will be provided.
   - The site will be clearly marked and secured.
   - Safety signs will be posted, and a Job Safety Analysis will be completed before work begins.

b) Waste and Asbestos Management
   - All waste will be collected and managed according to national laws so as to avoid illegal dumping and diversion of the ACMs
   - Asbestos will be handled by trained professionals using proper techniques to prevent fiber release.
   - Asbestos will be sealed, labelled, and transported using licensed vehicles to approved disposal sites.

c) Air Quality Control
   - Continuous air monitoring will be done to prevent pollution.
   - Water will be sprayed to reduce dust, and air quality will be kept within safe limits.

d) Health and Safety
   - Access to work zones will be restricted.
   - Residents will be informed and relocated if necessary.
   - Medical screening and PPE will be provided to reduce health risks.

e) Traffic and Pedestrian Safety
   - Signage, safe crossings, and traffic management will be put in place to protect both workers and the public.

f) Community Engagement
    - The community will be kept informed throughout the project.
    - A grievance mechanism will be available and will be publicized so that the community will be aware of its existence. A grievance log book will be available for complaints or suggestions. Grievances will be registered through walk-ins, phone calls, email and short messages. A grievance focal person will be elected by members and his/ or her number will be made available and that of the chairman of the mechanism for communities members to use for communication with the mechanism

g) Workplace Safety
    - Workers will be trained on asbestos risks and safe handling.
    - Work at height will follow strict safety guidelines including use of harnesses and safety gear.
    - Workers will also form their own grievance mechanism through which they can raise their concern. It will operate like the project mechanism and they can also use the project mechanism to raise their concerns.

h) Monitoring and Inspections
    - All work will be monitored regularly, with inspections at each stage.
    - A final clearance inspection will ensure the site is clean and safe after work completion.

Monitoring and Performance Tracking

In order to ensure the effectiveness of the mitigation measures:

- Air quality will be monitored daily.
- Health and safety incidents will be tracked.
- Waste will be tracked per trip to ensure proper disposal.
- Any public complaints or utility disruptions will be logged and addressed through the grievance mechanism which will channel it to the responsible entity.

Roles and Responsibilities

MOWASSCO (Proponent): Funds and supervises the project and engages qualified contractors and submits progress to regulators.

Contractor: Carries out the mitigation measures and ensures compliance and provides PPE, prepares safety reports, and manages waste documentation.

EHS Officer: Monitors environmental compliance and flags any risks.

NEMA: Licenses the work and inspects for compliance.

DOSHS: Ensures health and safety standards are met, especially for asbestos handling.

Air Quality Expert: Oversees dust control and ensures safe air quality levels.

Community Liaison Officer**:** Engages the community, manages complaints, and supports emergency response.

E.S 10 Conclusion and Recommendation

This Environmental and Social Impact Assessment (ESIA) has comprehensively evaluated the proposed removal, transportation, temporary storage, and final disposal of asbestos sheets from the Kipevu Wastewater Treatment Plant and its pumping stations. The assessment has demonstrated that, if properly implemented, the project will yield significant positive outcomes for both the proponent and the surrounding communities. These benefits include the creation of employment and business opportunities, enhanced compliance with national and international environmental and public health regulations including the Waste Management Regulations 2024, and the Public Health Act

Nevertheless, the project is also associated with potential environmental, occupational, and community health risks, particularly related to asbestos handling. These concerns have been thoroughly analyzed, and appropriate mitigation measures have been embedded within the Environmental and Social Management and Monitoring Plan (ESMMP), alongside a detailed risk evaluation framework.

The successful execution of this project will rely on the implementation of a robust ESMP, sustained stakeholder engagement, continuous environmental and health monitoring, and capacity building for all involved parties. Adhering to these measures will ensure that the project is undertaken in an environmentally sound and socially responsible manner, thereby safeguarding public health and environmental integrity.

Recommendations

Based on the findings of this study, the following recommendations are made:

a) The project should be implemented in full alignment with the proposed mitigation and monitoring measures outlined in the ESMP.
b) The proponent should work closely with relevant authorities including the National Environment Management Authority (NEMA), the Directorate of Occupational Safety and Health Services (DOSHS), environmental experts, and the County Government to ensure all legal and technical requirements are met.

c) Continuous engagement with the local community and other stakeholders should be maintained throughout the project lifecycle to promote transparency and responsiveness to emerging concerns.
d) The contractor and site personnel must be adequately trained on asbestos handling, and supervised by qualified health, safety, and environmental personnel to ensure safe practices are consistently followed.
e) Accurate records, including waste tracking forms, air quality reports, disposal certificates, and grievance logs, should be maintained and made available to regulatory agencies as required.

CHAPTER ONE

1.0. INTRODUCTION

The Government of Kenya received funding from the World Bank through the Ministry of Water, Sanitation and Irrigation to support development of water and sanitation services. This prompted the Government to initiate various projects within the wider coastal region, Mombasa County included. One of the projects in Mombasa County is the Water and Sanitation Development Project (WSDP) which is being implemented by Mombasa Water Supply and Sanitation Company Limited (MOWASSCO), a public company fully owned by the County Government of Mombasa (CGM).

The Cabinet, on 11th March 2025 approved the nationwide removal of asbestos from all public and private facilities with the aim to safeguard public health. The Initiative aims to mitigate the serious health risks associated with asbestos exposure. Asbestos, widely used in Kenya's construction industry during the 1960s and 1970s, remains present in government buildings, hospitals, schools, and even water supply systems.

Due to this, **M/s Mombasa Water Supply and Sanitation Company Limited** herein referred to as 'The Proponent', proposes to Safely remove asbestos roofing sheets at the Kipevu Wastewater Treatment plant and its various pumping stations in PortReitz, Miritini, Jomvu , and Mikindani areas so as to safeguard its employees, customers, visitors and the neighbourhood from the health risks associated with inhalation of asbestos fibres. However, utmost care must be employed so that those involved in the removal and disposal of the materials are not exposed to asbestos fibres.

Asbestos is a group of six fibrous minerals that occur naturally in metamorphic deposits located around the world. Of the hydrous magnesium silicate variety, the six types include tremolite, actinolite, anthophyllite, chrysotile, amosite and crocidolite. The major producers of asbestos include Canada, Kazharkstan, Ukraine, Russia, India, South Africa and Zimbabwe. Asbestos also used to be mined in Kenya in the past but was stopped. Once mined it is processed to form very thin fibres which are normally mixed with a binding material so that they can be used in different products. Asbestos is durable, fire retardant, corrosion resistant and a good insulator. It has been used since early 1900s in more than 3000 different construction materials ranging from paper products and decorative spray- on ceiling treatments to vinyl floor tiles and heating system insulation.

From 1999 to 2013, the years for which data are currently available, it is estimated that the number of deaths resulting from asbestos exposure in the U.S. is between 189,000 to 221,000 people, or 12,000 to 15,000 deaths a year. These figures are based on a review of federal records of deaths from diseases caused exclusively by asbestos plus a calculation using a formula developed by international cancer researchers to estimate the number of lung cancer deaths likely caused by asbestos (CDC 2015, McCormack et al 2012).

Asbestos waste is classified as hazardous material in the Environmental Management and Co-ordination (Waste Management) Regulations, 2024 and the proponent is required to undertake an Environmental and Social Impact Assessments (ESIA) and obtain a license from NEMA for its removal and disposal.

1.1. Scope, Objectives and Terms of Reference

The major objectives of the ESIA study are:

- To establish the baseline conditions for the proposed sites.
- To ensure compliance according to the Environmental Management and Co-ordination (Waste Management) Regulations, 2006.
- To identify the potential environmental impacts of the proposed asbestos removal and disposal.
- To assess the significance of these impacts.
- To ensure the safe removal, handling, packaging and transportation of asbestos.
- To propose measures to mitigate the negative impacts, through an ESMP which will be adopted by the contractor.

1.2. Terms of Reference

a. A critical look into project objectives.
b. Assessment of the proposed location of the project.
c. A concise description of the baseline information, national environmental legislative and regulatory framework and any other relevant information related to the project.
d. Evaluation of the technology, procedures and processes to be used, procedures and processes to be used in the implementation of the project.
e. Description, evaluation and analysis of the foreseeable potential environmental effects of the project broadly classified into physical, ecological/biological and socio-economic aspects (direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.

f. An Environmental and Social Management Plan (ESMP) proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment.
g. Propose measures to prevent safety and health hazards and to ensure security in the working environment for the employees and the management in case of emergencies. This encompasses prevention and management of the foreseeable accidents.
h. Such other matters as NEMA may require.

1.3. Scope of the EIA

The EIA project was undertaken under the guidance and in compliance to the TORs above, the EMCA, 1999 (Amendment Act, 2015) the Environmental Management and Co-ordination (Waste Management) Regulations, 2024, the National Guidelines on Safe Management and Disposal of Asbestos and the Environmental (Impact Assessment and Audit) Regulations, 2003.

The study covers the areas detailed in the TORs above.

1.4. Methodology Outline

The following general steps were followed during the assessment to ensure comprehensiveness and completeness of the report:

a) Environment screening in which the project was identified to be among those requiring an environmental impact assessment study.
b) Environmental scoping that provided the key environmental issues.
c) Physical inspection of the site and its environs for baseline data collection and photography.
d) Desktop studies, consultations, questionnaires and extensive interviews with the proponent and stakeholders.
e) Analysis and interpretation of the data collected.
f) Analysis of the available safe removal, transportation and disposal methods.
g) Reporting.

1.5. Project Alternatives

1.5.1. The proposed alternative

The proposed alternative will involve dry stripping of asbestos. Removal will be done under professional supervision and the people involved will be trained and fully equipped with appropriate PPEs.

Prior to the removal, a risk evaluation assessment was conducted to determine which action is

to be taken. The purpose is to identify the location and gauge condition of the material prior to the work as well as any other potential hazards that might affect the workers. The risk evaluation is discussed in details in Chapter Seven of this report. The contractor is required to prepare and submit a JSA before commencing the removals exercise.

The removed asbestos will be disposed appropriately by land filling method which involves burying the asbestos in a pit which must not reach the water table to avoid contaminating the ground water as stipulated in the National Guidelines on Safe Management and Disposal of Asbestos developed by NEMA and the World Bank Standards.

The asbestos sheets will be arranged in the pit that is approximately 3M deep and will ensure that the last sheet will be covered with 1 metre of soil. This proposal will ensure adherence to the conditions given in the asbestos disposal license, with the inclusion of the NEMA guidelines, regulations and procedures.

1.6. Alternative disposal technologies

1.6.1. Available asbestos replacement method

There are four recommended ways to remove asbestos. These methods include dry stripping, controlled wet stripping, high pressured water removal and hot stripping.

a) Dry stripping involves simply removing asbestos without any amount of moisture. This is the simplest method. Since dry stripping produces a large amount of dust, the amount of toxins released during this method is very high. To use this method, it is advisable to evacuate the workers or provide them with protective clothing. Stripping should be done with caution to reduce breakage and dust generation. Sprinkling of water to the roof will reduce dust emissions.

b) Controlled wet stripping is performed by injecting warm water into asbestos with specialized needles. This effectively weighs down the material, which helps to control the amount of dust released during the removal.

c) High pressured water removal is a popular method of asbestos removal. Using a high pressure water hose, asbestos is removed by force. This is a method that is solely reserved for industrial spaces that are hard to reach.

d) Hot stripping techniques include the use of a ventilation system along with hot air. By blowing asbestos fibers with hot air, any residue can be directed towards a powerful ventilation system. This way, any fibers that may be floating in the air are contained.

1.6.2. Available asbestos disposal methods

Asbestos once removed can be disposed in any of the following ways:

a) **Land filling** – a landfill site is selected and pits burrowed to bury asbestos waste. The waste must be covered by at least 1 M of soil. This is the proposed method.

b) **Thermal decomposition** – this is the process of exposing asbestos under very high temperatures to change its chemical form.

- Under heat conditions of between 1000-1250 degrees Celcius it produces a mixture of non-hazardous silicate phases.
- At temperatures above 1250 degrees it produces silicate glass
- Microwave thermal treatment can be used in an industrial manufacturing process to transform asbestos containing waste into porcelain stoneware tiles, porous single- fired wall tiles and ceramic bricks. This method is expensive and is currently not practical in Kenya.

c) **Solidification** – solidification of asbestos waste can be accomplished utilizing cements and other fixation agents such as water-based silicates. Cementation by addition of ordinary cement. Approved pollozanic materials can be cost effective but would also not be suitable in the asbestos roofing. The drawback in this is that cementation into a massive form would result into huge asbestos containing waste constricting on space. This method is therefore not desirable in the case of the proponent who will dispose approximately 11.07 tonnes of asbestos.

1.6.3. The no action alternative

This would imply that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non – interference with the existing conditions. Asbestos is not always dangerous, it becomes dangerous when it deteriorates due to age or it is disturbed and starts breaking.

Asbestos breakage is inevitable. When asbestos starts breaking, fibres become airborne and pose a health hazard to people who are exposed to these fibres over a long-time including employees, visitors and neighbours to the organization. It is therefore not a suitable alternative from an environmental, safety and health perspective because while avoiding immediate intervention, this option is associated with unacceptable long-term public health and environmental risks, violating both national regulations and World Bank environmental safeguards.

1.6.4. The comparison of alternatives

Under the comparison of alternatives, there would be desire to protect the environment and create a safe working environment to employees, visitors, suppliers and neighbours and avoid the long run effects associated with exposure to asbestos.

- In the *no action alternative*, the inevitable breakage would continue and people would continue to be exposed to the associated health hazard. This is not suitable.
- There are various methods of asbestos removal as given above. The thermal decomposition and chemical treatment would be the best methods from an environmental point of view as they would change the chemical nature of asbestos to less harmful compounds. These methods are however not being practiced in Kenya. Solidification would require investment in space and this would still not be viable for the proponent since they are outsourcing the service.
- The proposed action which is land filling is the most suitable and only available method for the proponent (*since it's the commonly used method in Kenya)* provided that the removal and disposal is handled as per the recommendations in this report and the guidelines by NEMA and the World Bank Standards.

CHAPTER TWO

2.0. LEGAL, POLICY, AND INSTITUTIONAL FRAMEWORK

2.1. General overview

The execution of asbestos removal projects, particularly those involving hazardous waste handling and occupational health risks, necessitates strict adherence to a robust legal and institutional framework. This framework provides the regulatory foundation, procedural guidelines, and institutional responsibilities that ensure the project complies with national legislation and international best practices.

This chapter outlines the relevant Kenyan legal instruments, institutional mandates, and international standards applicable to the proposed asbestos removal at the Kipevu Wastewater Treatment and Pumping Stations. It also highlights the alignment of the project with the World Bank Operational Policies and Environmental and Social Framework (ESF), which governs all activities financed under its support.

Given the hazardous nature of asbestos, compliance with environmental protection, public health, and occupational safety regulations is not only a legal obligation but also a fundamental component of sustainable project delivery. Effective coordination with regulatory agencies such as the National Environment Management Authority (NEMA), Directorate of Occupational Safety and Health Services (DOSHS), and licensed hazardous waste handlers is critical in ensuring the project's integrity, community safety, and environmental stewardship.

This chapter therefore presents a detailed review of:

- The national environmental, health, and labor laws governing asbestos management;
- The roles and responsibilities of key institutions involved in regulatory enforcement;
- The applicable World Bank Operational Policies.
- International conventions such as the Asbestos Convention of 1986, Basel Convention that influence cross-border movement and disposal of hazardous waste, Bamako Convention on the Ban of Import into African and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, Rotterdam Convention on Prior Informed Consent

2.2. Policies, legal, and Institutional Frameworks

2.2.1. Policy Paper on Environmental and Development (Sessional Paper No.6 of 1999):

This is a foundational policy document that clearly articulates Kenya's commitment to sustainable development. It highlights the integration of environmental concerns into national planning and decision-making processes. The paper promotes the use of Environmental Impact Assessment (EIA) as a tool for environmental protection and supports the polluter-pays principle, public participation, and inter-generational equity. It provides strategic guidance on sustainable resource use, pollution control, and environmental governance—all critical for managing hazardous materials like asbestos hence its relevance to this project.

2.2.2. National Environmental Action Plan (NEAP)

NEAP was initiated in 1994 and revised periodically; the NEAP provides a broad framework for integrating environmental considerations into Kenya's development process. It was the footing for the enactment of the Environmental Management and Coordination Act (EMCA) and the creation of NEMA. The NEAP emphasizes sustainable development, community participation, and environmental stewardship. It outlines sector-specific environmental priorities, institutional responsibilities, and action plans for key issues including hazardous waste management, making it a vital reference point for the proposed asbestos removal initiative at Mombasa Water Supply and Sanitation Company Limited.

2.2.3. Sessional Paper No. 01 of 2021 on the National Water Policy

The Sessional Paper No. 01 of 2021 on the National Water Policy provides a comprehensive framework for the sustainable development, management, and use of water resources in Kenya. It replaces previous water policy papers and is aligned with the Constitution of Kenya 2010, Vision 2030, and the Sustainable Development Goals (SDGs). The policy emphasizes the right to clean and safe water in adequate quantities and the need for effective pollution control and environmental protection.

The proposed asbestos removal at Kipevu and pumping stations has direct and indirect implications for water resource protection and management. The relevance of this policy to the project includes:

Water Resource Protection: The project involves handling hazardous asbestos materials which, if mishandled, could contaminate surface water or groundwater near the disposal or storage sites. The policy mandates preventive measures to protect water bodies from contamination by construction, industrial, or hazardous wastes.

Pollution Control and Monitoring: The project must put in place strict pollution control mechanisms such as bunding, sealed containers**,** and storm water management systems to

prevent leachate or fiber infiltration into nearby drainage systems. Regular water quality monitoring may be necessary to ensure that nearby aquatic ecosystems and human water sources are not compromised.

Wastewater and Drainage Management: If any decontamination or cleaning of equipment is required, the resultant wastewater must be carefully managed to prevent pollution. The policy encourages reuse and safe disposal of wastewater in line with health and environmental standards.

Institutional Coordination: The policy stresses the need for collaborative governance involving WRA (Water Resources Authority)**,** NEMA**,** WASREB**,** and county governments, all of whom are key stakeholders in monitoring this project's environmental performance.

Compliance with Regulatory Requirements: The proponent must adhere to national standards and permits regarding hazardous waste handling**,** storm water discharge**,** and pollution limits**,** as laid out in the Water Act 2016 and enforced under this policy.

Community and Ecosystem Protection: The policy supports protection of community water sources and public health ensuring asbestos dust or residues do not reach water tanks, boreholes, or open drainage channels used by residents.

2.2.4. Kenya Environmental Sanitation and Hygiene Policy 2016-2030.

The Kenya Environmental Sanitation and Hygiene (ES&H) Policy 2016–2030 serves as a key framework for addressing sanitation and hygiene in Kenya. It aims to promote safe sanitation practices and environmentally sound waste management strategies to reduce public health risks. Key principles include environmental integrity, community hygiene, occupational health, and coordinated governance.

In this case of asbestos removal, the policy reinforces the importance of:

- Ensuring safe collection, containment, and disposal of hazardous waste.
- Protecting sanitation workers and the public from exposure to asbestos.
- Promoting community hygiene through awareness and risk communication.
- Coordinated efforts between stakeholders such as NEMA, DOSHS, and County Governments.

The proposed asbestos decommissioning project directly aligns with this policy by addressing environmental sanitation risks and enhancing public and occupational health safeguards in Mombasa County.

2.2.5. National Policy on Gender and Development (2019)

This policy underscores the importance of integrating gender considerations into all levels of development planning and implementation. It promotes equality and the empowerment of women, men, boys, and girls in social, economic, and environmental sectors.

For the asbestos removal project, relevance includes:

- Ensuring equal opportunity and fair treatment of all genders during stakeholder engagement, employment, and training processes.
- Addressing gender-specific health vulnerabilities in risk communication and exposure mitigation strategies.
- Promoting inclusive public participation, particularly for women and marginalized groups, in consultations and decision-making related to the project.

The proposed project contributes to national goals of equity and social justice.

2.2.6. Kenya Youth Development Policy (KYDP), 2019

The Kenya Youth Development Policy (KYDP) 2019 seeks to harness the potential of the youth by providing an enabling environment for their participation in national development. The policy promotes skills development, job creation, and inclusion of youth in decision-making processes. The proposed project will offer opportunities for youth employment and skills training in safe asbestos handling and environmental health, ensure youth participation in public consultations and environmental awareness initiatives, and empower young professionals through technical involvement in environmental monitoring and community liaison roles.

The project supports the KYDP by engaging youth in productive, skill-building activities aligned with national development and safety goals.

2.2.7. National Policy for Prevention and Response to Gender Based Violence

This policy provides a comprehensive framework for preventing and responding to all forms of gender-based violence in Kenya. It emphasizes the need for coordinated, multi-sectoral approaches to address GBV through legal, social, and health interventions.

The project proponent and the contractor will;

- Ensure a safe work environment free from harassment or abuse.
- Establish and implement a GBV-sensitive grievance mechanism.
- Promote community awareness and staff training on GBV prevention.
- Coordinate with local service providers and authorities in response and referral systems.

The asbestos decommissioning project must integrate GBV risk management into all stages to uphold human rights and ensure a safe, inclusive, and dignified environment for all stakeholders. A GBV focal person will be required in the project to lead the processes which support GBV/SEA mitigation measures including sensitizing the community against gender-based violence and SEA. All workers and contractor managers will be required to sign a Code of Conduct which they will adhere to throughout the project period. Information, Education and Communication materials and merchandize will be developed to create awareness on the risks of both GBV/SEA and HIV.

2.2.8. National Sustainable Waste Management Policy

The National Sustainable Waste Management Policy provides a comprehensive framework for ensuring waste is managed sustainably throughout its lifecycle. It promotes circular economy principles, environmentally sound waste handling, and strong institutional coordination.

The policy puts emphasis on segregation, containment, tracking, and environmentally safe disposal of hazardous wastes, including asbestos. It also strengthens compliance with national and county regulations on hazardous waste, promotes best practices for occupational safety and health, particularly for workers managing hazardous materials, and reinforces the stakeholder roles, including NEMA, licensed waste handlers, and county governments, in ensuring responsible waste management.

The proposed project supports the policy by ensuring safe handling and final disposal of asbestos waste in accordance with environmental, health, and safety requirements. The Asbestos will be removed and disposed off by a NEMA licensed Asbestos Handler M/s Fadema Company Limited.

2.2.9. County Government of Mombasa Public Participation Policy

Under the Mombasa County Public Participation Act, 2017 (No. 6 of 2017) and in accordance with Section 87 and 115 of the County Government Act, 2012, the County Government of Mombasa ensures that public participation in development planning and environmental

governance is inclusive, timely, and meaningful. The policy aims to ensures timely dissemination of project information and inclusion of all stakeholders, especially vulnerable groups, promotes active engagement through forums, consultations, and structured feedback mechanisms, supports transparent decision-making and grievance resolution with coordination from both County Executive and Assembly, and it reinforces community trust and enhances environmental outcomes by incorporating local knowledge and priorities.

This policy strengthens the legitimacy and sustainability of the asbestos decommissioning process through enhanced accountability and inclusive development.

2.3. National Environmental Legislative and Regulatory Framework

2.3.1. The Constitution of Kenya, 2010

The Constitution of Kenya, 2010 provides the legal foundation for environmental governance and the protection of human health and safety. It affirms the right of every Kenyan to a clean and healthy environment and outlines the obligations of the State and individuals in safeguarding environmental resources.

Key Provisions Relevant to the Project include: Article 42: Guarantees every person the right to a clean and healthy environment, including protection of the environment for the benefit of present and future generations. Article 69(1): Places obligations on the State to eliminate activities harmful to the environment, establish systems for environmental impact assessment, and encourage public participation in environmental management. Article 70: Provides a mechanism for any individual to seek legal redress if the right to a clean environment is threatened or violated**.** Article 10**:** Emphasizes sustainable development, inclusiveness, good governance, transparency, and public participation as guiding national values and principles.

The proposed project supports the constitutional obligations by promoting safe waste management, protecting the health of communities and workers, and ensuring public engagement in environmental decision-making. By upholding these constitutional principles, the project contributes to the realization of environmental rights and sustainable development.

2.3.2. Environmental Management and Coordination (Amendment) Act, 2015.

The EMCA (The Environmental Management and Coordination ACT 1999) was enacted in 1999 with Presidential Assent given on January 6, 2000 and date of commencement of the Act being January 14, 2000. The Act was amended in 2015. The EMCA is a framework law containing environmental provisions as well as addressing cross-sectoral law covering

environmental provisions as well as addressing cross-sectoral issues associated with projects. Prior to this Act coming into force, note that environmental issues covered by the sectoral laws have not been superseded by the EMCA. Instead with the introduction of the EMCA, the sectoral laws have been reinforced as far as environmental provisions in them are concerned.

Under EMCA, the National Environment Management Authority (NEMA) is empowered to supervise and coordinate all environmental matters, including waste management, pollution control, and environmental impact assessments.

2.3.3. The Environment (Impact Assessment and Audit) Regulations, 2003

On June 13th 2003, the Minister of Environment, Natural Resources and Wildlife promulgated the Environment (Impact Assessment and Audit) regulations 2003 (EIA/EA Regulations) under section 147 of the EMCA. These regulations provide the framework for carrying out EIAs in Kenya by NEMA licensed Experts and Firm of Experts.

In compliance to this, the proponent contracted a licensed Firm of Experts ***(CEMEA LIMITED REG No. 10408)*** to conduct Environmental and Social Impact Assessment for the removal, transportation, disposal of asbestos sheets from the KWWTP and its four pumping stations for submission to NEMA.

2.3.4. Sustainable Waste Management Act, 2022

The Sustainable Waste Management Act, 2022 provides a robust legal framework for waste management across Kenya, aiming to promote a circular economy and reduce adverse impacts of waste on human health and the environment.

The Act classifies asbestos-containing material as hazardous waste, requiring licensed transporters and disposal at authorized hazardous waste disposal sites and it mandates segregation of waste at source, tracking during transport, and documentation of final disposal. It also requires public and worker awareness and protection measures during handling of hazardous waste and encourages Extended Producer Responsibility (EPR) and stakeholder involvement, ensuring coordinated management of asbestos waste with relevant institutions like NEMA, DOSHS, and County Governments.

This Act aligns closely with the project's goal to safely remove and dispose of asbestos, protecting both environmental and public health.

2.3.5. Environmental Management and Coordination (Waste Management) Regulations, 2024

These regulations define the responsibilities of the waste generators and outline the duties and requirements for transport and disposal of waste. It provides for mitigation of pollution and provides for hazardous and toxic waste. According to the Fourth Schedule, waste containing asbestos in the form of dust or fibres are classified as hazardous wastes and must be disposed in accordance with NEMA's National Guidelines on Safe Management and Disposal of Asbestos.

The Key provisions relevant to the KWWTP asbestos removal project include;

- Mandatory classification and segregation of waste at the source, with asbestos categorized under hazardous waste;
- Requirements for waste generators to ensure proper packaging, labeling, and storage of hazardous waste to prevent environmental contamination or exposure risks;
- Licensing and monitoring of transporters of hazardous waste, including strict documentation and manifest systems to track waste from source to final disposal site;
- Use of NEMA-approved disposal sites with appropriate containment measures for hazardous waste;
- Obligations for reporting waste generation, storage, transport, and disposal activities to NEMA.

The proponent should ensure they contract a licensed asbestos handler (with valid NEMA license for disposal site), ensure the contract has provided appropriate PPEs and have require packaging materials for the handling of asbestos, have a valid license for transportation of asbestos waste, acquire a tracking document, disposal certificate from the contractor once the work is complete and should be duly signed and stamped in accordance with these regulations.

2.3.6. The Environmental Management and Coordination (Water Quality) Regulations, 2024

These regulations set the standards of domestic and waste water. The regulations control pollution and ensure protection of water sources.

The method of disposal of the asbestos after removal will be burying in a pit. This pit will not exceed 3m depth and should not reach the water table, to avoid pollution of the same. It will also be lined with a double folded 500-gauge polythene paper.

2.3.7. The Water Act, 2016

Part II, section 18, of the Water Act, 2002 provides for national monitoring and information

systems on water resources. Following on this, sub-section 3 allows the Water Resources Management Authority to demand from any person or institution, specified information, documents, samples or materials on water resources.

The relevance of this act to the proposed project include the following;

- Ensuring that no activity contaminates surface water or groundwater resources, which aligns with the project's need to prevent asbestos fiber discharge into water bodies or ground water sources.
- Mandating permits for any activity that may affect water quality, particularly during the decommissioning and asbestos removal processes;
- Overseeing the implementation of pollution control mechanisms, particularly important for handling, containment, and transportation of asbestos-laden waste from wastewater treatment infrastructure;
- Promoting coordination among national and county water institutions, ensuring that stakeholders at the Sites, including the Coast Water Works Development Agency, comply with the law;
- Supporting environmental conservation and public health through the integration of safe waste management practices within water services infrastructure.

The method of disposal of the asbestos after removal will be burying at a dumping pit. This pit will not exceed 3m depth and should not reach the water table, to avoid pollution of the same. It will also be lined with a 500-gauge double lined polythene paper.

2.3.8. Occupational Safety and Health Act, 2007

The Act makes provision for the health, safety and welfare of persons employed in factories, construction sites and other places of work. The provisions require that all practicable measures be taken to protect persons employed in a site from dust, fumes or impurities originating from any process within the facility. The provisions of the Act are also relevant to the management of hazardous and non-hazardous wastes.

For developments such as construction projects, the Act is important as it requires project proponents to have adequate management procedures of occupational safety and health at the work places. For safe asbestos removal, transportation and disposal, and replacement works, the contractor and project managers should ensure the following:

- **Workplace Risk Assessment:** OSHA mandates that all workplaces conduct comprehensive risk assessments to identify hazards such as asbestos exposure. This ensures that proper control measures are implemented before removal activities commence. A Risk Evaluation has been done and discussed in details in Chapter 7 of this report. Further the contractor should prepare a Job Safety Analysis and submit to the proponent.
- **Worker Training and Competency:** The Act requires employers to ensure that workers involved in hazardous operations, including asbestos handling, are adequately trained and certified in safety procedures and emergency response protocols. The proponent should ensure that the contractor has trained its employees and are competent in removal, handling, and disposal of asbestos.
- **Personal Protective Equipment (PPE):** OSHA enforces the provision and proper use of PPE, including respirators, protective suits, gloves, and goggles, which are essential in preventing worker exposure to airborne asbestos fibers.
- **Monitoring and Medical Surveillance:** The Act mandates regular health monitoring and medical examinations for workers exposed to hazardous substances. This provision ensures early detection of asbestos-related diseases such as asbestosis, mesothelioma, and lung cancer. Contractor should subject the its staff to annual medical examination conducted by a DOSHS approved DHP.
- **Emergency Preparedness and Response:** OSHA requires the implementation of emergency preparedness plans, including containment procedures in case of accidental asbestos release.
- **Enforcement and Penalties:** The Directorate of Occupational Safety and Health Services (DOSHS) is empowered to inspect worksites, issue improvement notices, and prosecute non-compliance, thereby ensuring accountability.

The proponent and contractor should ensure to take all the above measures to manage emission of asbestos dust into the atmosphere. All workers in risky areas will be trained, provided with PPE, trained on PPE and sensitized on the need to put them on.

2.3.9. County Governments Act, 2012

The sections of the County Governments Act, 2012 that are relevant to this project include, part IX, sub-section 110, sub-section 2 c (vi) which gives the county the mandate to do a

strategic assessment of the environmental impact of any spatial development. In the same part of the act, the county is mandated to provide for and ensure public participation pertaining to any development and access to information for the same.

To comply with the Act, EIA project report has been drawn up and submitted, including the proposed effective mitigation measures as provided in the environmental management and monitoring plan; and the environmental management framework as given elsewhere in the report. The chapter has highlighted the key issues of environmental concern anticipated during the implementation and operational phases of the proposed project. A thorough public participation has also been carried out within a 500m radius of the proposed project. More Key Informant Interviews were conducted to complement the public consultations. The consultations will also continue with the communities and project affected persons. The grievance mechanism is also a system which helps in consultation with communities as they interact with the project it promotes project governance.

2.3.10. Mombasa County Environmental Health and Sanitation Act (No. 12 of 2017)

This Act establishes a legal framework for environmental health management within Mombasa County. It designates the County Government as the sanitary authority responsible for ensuring reasonable standards of sanitation, clean water, and healthy environments. The Act provides for the formation of county, ward, and village-level Environmental Health and Sanitation Committees to oversee community-based environmental health initiatives.

Key provisions include regulation and oversight of waste management, sewerage systems, storm water drainage, pollution control, and protection of public water supplies. It enforces the polluter-pay and precautionary principles, requiring licensing of all sanitation service providers.

Relevance to the Project:

- Provides mandate for licensing and supervision of hazardous waste handling, including asbestos management.
- Enables county inspections and enforcement during asbestos removal and disposal activities.
- Supports community engagement and awareness to ensure site hygiene and address grievances.

- Promotes proper storm water management to prevent contamination from asbestos fibres.

2.3.11. County Government of Mombasa Public Participation Act, 2017

Enacted as Mombasa County Act No. 6 of 2017, this law operationalizes constitutional mandates and the County Government Act by providing a legal framework for structured public involvement in planning, budgeting, policy formulation, and environmental governance at the county level.

The Act ensures early and inclusive consultations with stakeholders, including women, youth, and vulnerable populations, mandates structured dissemination of environmental and project-related information, provides mechanisms for community feedback, grievance redress, and engagement through forums and documented input processes as well as Reinforcing transparency, community trust, and alignment of the asbestos removal activities with local development priorities.

2.3.12. Public Health Act (Revised 2012)

Under this Act, the proponent and the contractor of the proposed project are required to adapt practicable measures to prevent injurious conditions in the site. The Act requires the proponent to enhance effective management of Nuisances i.e. noxious matter or hazardous waste. The relevance of this Act to the proposed project include the following;

- **Hazardous Materials Control:** The Act empowers medical officers of health to inspect and stop public health nuisances, which includes the improper handling, storage, and disposal of hazardous substances such as asbestos.
- **Preventing Health Hazards:** The Act provides for measures to prevent the spread of conditions that may be injurious to human health, including airborne contaminants like asbestos fibers, particularly within residential or workplace environments.
- **Enforcement of Sanitation Standards:** Public health officers have the mandate to enforce sanitary conditions during and after asbestos removal, ensuring affected areas are adequately decontaminated and safe for future use.
- **Health Notifications and Warnings:** The Act supports dissemination of public health alerts and guidelines, a crucial aspect during asbestos abatement to notify communities and workers of potential risks.

2.3.13. Occupier's Liability Act, Cap 34

This act regulates the duty that an occupier of premises owes to the visitors in respect of danger due to the state of the premises or due to things done or omitted to be done by them. It requires that the occupier of premises warns the visitors of the likelihood of any danger within their premises to enable them to be reasonably safe.

- **Duty of Care:** The Act imposes a duty of care on the occupier (in this case, MOWASSCO) to ensure that the premises are reasonably safe from foreseeable hazards, including the presence of hazardous materials such as asbestos.
- **Liability for Harm:** If an individual is exposed to or harmed by asbestos due to negligence in its management or removal, the occupier can be held liable under the Act. This emphasizes the importance of thorough risk assessments, proper signage, restricted access, and strict adherence to safety protocols that should be implemented by the contractor and the proponent.
- **Safe Access During Operations:** During asbestos removal activities, the occupier must ensure safe access routes and environments for authorized personnel and contractors, minimizing risks through proper supervision and health and safety planning.

2.3.14. Traffic Act (Cap 403)

This Act regulates road safety, the operation of vehicles, and the management of road transport in Kenya. Its relevance to the proposed project includes:

- **Safe Transportation of Hazardous Waste:** The Act governs the movement of vehicles, including those transporting asbestos-containing materials (ACMs) from the Kipevu site and the pumping stations to designated disposal or treatment facilities. Compliance ensures secure, traceable, and risk-mitigated transportation. The contractor should ensure that the truck to transport the asbestos is in good condition and well covered.
- **Driver and Vehicle Requirements:** Vehicles used in the transportation of ACMs must meet safety standards, including the use of covered and clearly labeled containers. Drivers must be properly licensed and trained in handling hazardous materials.
- **Minimizing Traffic Risks:** The Act supports the need to plan traffic routes and schedules to minimize congestion and public exposure, particularly around populated or sensitive areas such as schools, markets, or residential neighborhoods. Journey Management plan (JMP) should be available before the journey starts.

- **Coordination with Authorities:** Project implementers must coordinate with the National Transport and Safety Authority (NTSA) and local traffic police to ensure escort, emergency preparedness, and compliance with route restrictions or traffic regulations.

2.4. Institutional Framework of the EMCA

In order to make the Act operational, EMCA has established various administrative structures. These include the NEC, NEMA, PCC, NEMA Board, County Environment Committees, the SERC and the National Environment Tribunal. The apex body under the Act is the NEC, which among other things is charged with the responsibility of developing the national environmental policy in Kenya as well as to set annual environmental goals and objectives.

NEMA (National Environmental Management Authority) is the organ that has been established to exercise general supervision and coordination over all matters relating to the environment in Kenya. Further the NEMA is the government's principal instrument in the implementation of all policies relating to the environment.

The PCC (Public Complaints Committee) was formed to investigate environmental complaints against any person, submit their findings/recommendations to the NEC and to submit periodic reports of its activities to the NEC. The SERC (Standards and Enforcement Review Committee under EMCA) has been established under the Act to advise the NEMA on the criteria and procedures for the measurement of water quality in Kenya. Additional the SERC is required to recommend to the NEMA minimum water quality standards for waters of Kenya and for different uses.

For the proposed safe asbestos removal project, these institutions are essential in ensuring that asbestos is managed according to national standards, workers and communities are protected, and the environmental integrity of the project area is upheld throughout the implementation cycle.

a) **National Environment Management Authority (NEMA):** NEMA is the lead agency responsible for coordinating environmental management in Kenya. It reviews ESIA reports, issues licenses for hazardous waste transportation and disposal, and monitors compliance.

b) **Directorate of Occupational Safety and Health Services (DOSHS):** This directorate under the Ministry of Labour ensures implementation of occupational health and safety

laws, including enforcement of safe asbestos handling procedures and worker protection protocols. Risk Assessment should be conducted and submitted to DOSH.

c) **Ministry of Health (MoH):** Oversees the public health implications of asbestos exposure and works closely with NEMA and DOSHS in response to health risks posed by environmental hazards.

d) **County Government of Mombasa:** Facilitates local stakeholder engagement, supports community health outreach, and ensures alignment with county environmental action plans. The contract should acquire County Permit for the removal of asbestos before commencing the works.

e) **Licensed Hazardous Waste Transporters and Disposal Facilities:** These are private sector actors licensed by NEMA to transport and dispose of hazardous waste in compliance with national regulations. The contracted asbestos handler should have all the valid licenses *(for disposal site and transportation, Workplace registration certificate).*

2.5. National Guidelines on Safe Management and Disposal of Asbestos

These guidelines were developed by NEMA in consultation with relevant lead agencies namely the Ministry of Public Health and Sanitation (MoPHS), Directorate of Occupational Safety and Health Services (DOSHS) and the Mombasa County.

These guidelines provide direction for safe management of asbestos waste and are the main regulatory reference material for asbestos waste in Kenya. The document shows common approaches on safe handling, packaging, transportation and final disposal of asbestos waste. The guidelines were necessitated by the need to safeguard human health and environment from adverse impacts related to asbestos materials. According to the Legal Notice No. 121 of The Environmental Management and Coordination (Waste Management) Regulations, 2006, wastes containing asbestos in the form of dust or fibres are classified as hazardous wastes.

The proponent has agreed to comply with these regulations and other worldwide best practices.

2.6. World Bank Operational Policies, ESF, and EHS Guidelines

The proposed project is a World Bank funded projected being implemented through County Government of Mombasa and Mombasa Water Supply and Sanitation Company Limited under the WSDP (Water and Sanitation Development Project).

i. Operational Policies

The World Bank Operational Policies (OPs) provide a framework to ensure that projects financed or supported by the World Bank meet stringent environmental and social safeguards. These policies are designed to promote sustainable development, protect communities, and minimize adverse environmental impacts.

For the asbestos decommissioning project at Kipevu Wastewater Treatment and Pumping Stations, the following OPs are particularly relevant:

- **OP 4.01: Environmental Assessment**

This policy requires a thorough environmental and social impact assessment (ESIA) of projects to identify potential risks and impacts. It ensures appropriate mitigation measures are integrated into project design and implementation. The asbestos decommissioning project has complied by assessing hazards, health risks, and environmental effects related to asbestos handling and disposal as provided for in this report.

- **OP 4.11: Physical Cultural Resources**

Requires that projects identify and manage impacts on cultural heritage. Any archaeological or cultural sites near the project area must be protected during asbestos removal. However, from the site visit conducted, there are no cultural or archaeological sites within the project areas.

ii. Environmental, Health, and Safety (EHS) Guidelines

The World Bank Group EHS Guidelines (General EHS Guidelines, 2007) provide technical standards for managing environmental, occupational health, and community safety risks. For this proposed asbestos decommissioning project, the most relevant provisions include:

- Air quality and dust suppression measures to minimize asbestos fiber release into the air
- Worker safety protocols, including the use of appropriate Personal Protective Equipment such as respirators, masks, gloves, overalls etc. and safe work-at-height procedures.
- Waste management practices, ensuring asbestos is packaged, labeled, and transported for disposal at licensed hazardous waste facilities.
- Emergency preparedness and response, including fire safety, medical aid, and accident reporting.

2.7. International Conventions and Agreements

The project is further guided by international environmental conventions to which Kenya is a signatory. These agreements inform national legislation and promote global standards in environmental management and public health protection:

2.7.1. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

The Basel Convention, adopted in 1989 and entered into force in 1992, is the principal international treaty that governs the transboundary movement of hazardous wastes and their disposal. Kenya is a party to this Convention and is therefore obligated to adhere to its principles and procedures.

The primary objectives of the Basel Convention are:

- To reduce the generation of hazardous waste at source.
- To minimize transboundary movements of hazardous wastes.
- To ensure that any such movements are conducted in an environmentally sound manner.
- To protect human health and the environment against the adverse effects of hazardous wastes.

Relevance to the Asbestos Removal Project: Asbestos is classified under the Convention as a hazardous waste due to its toxicity and long-term environmental and health risks. The Kipevu asbestos removal project aligns with the objectives of the Basel Convention in the following ways:

- Environmentally Sound Management (ESM): The project ensures that asbestos-containing materials (ACMs) are handled, transported, and disposed of using techniques that minimize environmental and health risks, in accordance with ESM principles.
- Documentation and Tracking: The project will involve strict documentation and tracking of ACMs, from removal at site to final disposal, including manifests and disposal certificates, in line with Basel Convention requirements.
- Prohibition of Illegal Dumping**:** The project prohibits illegal disposal of hazardous waste, in accordance with the Convention's ban on the dumping of hazardous waste in unauthorized locations or developing countries without proper consent.

- Capacity Building and Technical Cooperation: By engaging trained and licensed contractors, and strengthening local institutional capacity, the project supports the Convention's call for technical cooperation in managing hazardous wastes.

Overall, compliance with the Basel Convention ensures that the Kipevu asbestos removal project upholds international best practices for the safe, transparent, and responsible management of hazardous materials, reinforcing Kenya's commitment to global environmental governance.

2.7.2. Bamako Convention Bamako Convention on the Ban of Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa

The Bamako Convention was adopted in 1991 and came into force in 1998 under the auspices of the Organization of African Unity (now the African Union). It complements the Basel Convention by prohibiting the import of all hazardous wastes into Africa, regardless of the country of origin.

Key Objectives of the Convention include:

- To ban the importation of hazardous and radioactive wastes into African countries.
- To minimize and control transboundary movements of hazardous waste within the continent.
- To promote environmentally sound management of hazardous wastes generated within Africa.
- To reinforce the right of every individual in Africa to a healthy environment.

Relevance to the Asbestos Removal Project:

- Asbestos, classified as hazardous waste, must be managed in line with the Convention's principles.
- The project will ensure no importation of asbestos-containing waste from other countries.
- It supports environmentally sound disposal of locally generated asbestos waste within authorized facilities.

- The project emphasizes strict regulatory oversight, manifest documentation, and accountability to prevent illegal dumping.

Compliance with the Bamako Convention enhances the credibility and safety of the asbestos removal project while affirming Kenya's commitment to regional environmental protection standards. However, Kenya signed the convention on 17th December, 2003 but has not yet ratified it.

2.7.3. Rotterdam Convention on Prior Informed Consent

The Rotterdam Convention, adopted in 1998 and entered into force in 2004, promotes shared responsibility and cooperative efforts among parties in the international trade of certain hazardous chemicals, including pesticides and industrial chemicals. It enables countries to make informed decisions about the import and use of such substances through the Prior Informed Consent (PIC) procedure.

The objectives of the convention include;

- Promoting transparency and information exchange in the trade of hazardous chemicals.
- Providing a legally binding mechanism for prior informed consent before cross-border movements of listed chemicals.
- Reducing risks to human health and the environment by controlling exposure to hazardous substances.

Relevance to the Proposed Project:

- Several forms of asbestos (e.g., crocidolite, amosite, anthophyllite, actinolite, and tremolite) are listed in Annex III of the Convention as industrial chemicals subject to the PIC procedure.
- Although the project does not involve import or export, the Convention reinforces the need for informed handling, labeling, and disposal practices.
- Supports national efforts to track, document, and regulate the use and disposal of asbestos in compliance with international standards.

By aligning with the Rotterdam Convention, the project demonstrates a commitment to informed, responsible management of hazardous materials and promotes international best practices in chemical safety.

2.7.4. Asbestos Convention, 1986 (ILO Convention No. 162)

Provides for the protection of workers from risks related to asbestos exposure at work. The Asbestos Convention, 1986 (Convention No. 162) was adopted by the International Labour Organization (ILO) to protect workers from the health risks associated with occupational exposure to asbestos. It establishes a framework for the safe use of asbestos, including exposure control, medical surveillance, training, and information sharing.

The key provision of this convention include;

- Requires employers to adopt preventive and protective measures to reduce worker exposure to asbestos to the lowest practicable level.
- Prohibits the use of certain forms of asbestos and asbestos-containing materials when safer alternatives exist.
- Mandates regular monitoring of asbestos levels in workplaces.
- Emphasizes proper labeling, transport, storage, and disposal of asbestos waste.
- Requires ongoing medical monitoring and training for workers involved in asbestos-related activities.

This convention is relevant to the proposed project in the

- Guides the establishment of stringent safety protocols for asbestos removal activities at KWWPT and pumping stations.
- Ensures that workers are protected through engineering controls, appropriate PPEs, and medical oversight.
- Reinforces the project's commitment to international best practices in occupational health and safety, even though Kenya has not ratified the convention.
- Supports compliance with World Bank environmental and social safeguard policies and national occupational safety regulations.

The integration of the Asbestos Convention’s principles contributes to the safe, ethical, and health-conscious execution of the asbestos decommissioning project.

CHAPTER THREE

3.0. BASELINE INFORMATION

3.1.Introduction

Baseline conditions of the proposed project site were assessed and documented for the purposes of determining the future impacts of the proposed project on the environment and the public. This section details on the findings of the survey which will form a basis for impact monitoring plans and improvement of the environmental and social performance of the project during implementation.

3.2.Demographics

According to 2019 Population and Housing Census, Mombasa County has a total population of 1,208,333 people and a population density of 5,495people per squared kilometers. The population growth of Mombasa has been on the rise according to the 2019 population and housing census report which is attributed to the increased fertility rate, improved health services and rural-urban migration.

3.3. Topography and climatic conditions

The general topography of the proposed project site is approximately KWWTP 18m, PortReitz1 29m, PortReitz2 36m, Miritini 46m, Jomvu 62m, Mikindani 41m above sea level. The climate of the area is greatly influenced by the Migratory Inter-Tropical Convergence Zone (ITCZ) characterized by monsoon winds which create a bimodal rainfall pattern (Figure 6). The long rain season occurs from April to July and the short rains from October to December. The average annual rainfall for the area has been recorded as 940mm. Temperatures are fairly constant throughout the year ranging from 23°C to 28^0C. The warmest temperatures are generally recorded during the months of November to April (mean daily temperature of 27^0C) while slightly cooler temperatures are experienced from May to October (mean daily temperature of 24.5^0C). The average annual evaporation rate within the project area is 2300mm and the climate is generally classified as semi to sub-humid as the ratio of rainfall to evaporation ranges from 57-68%.

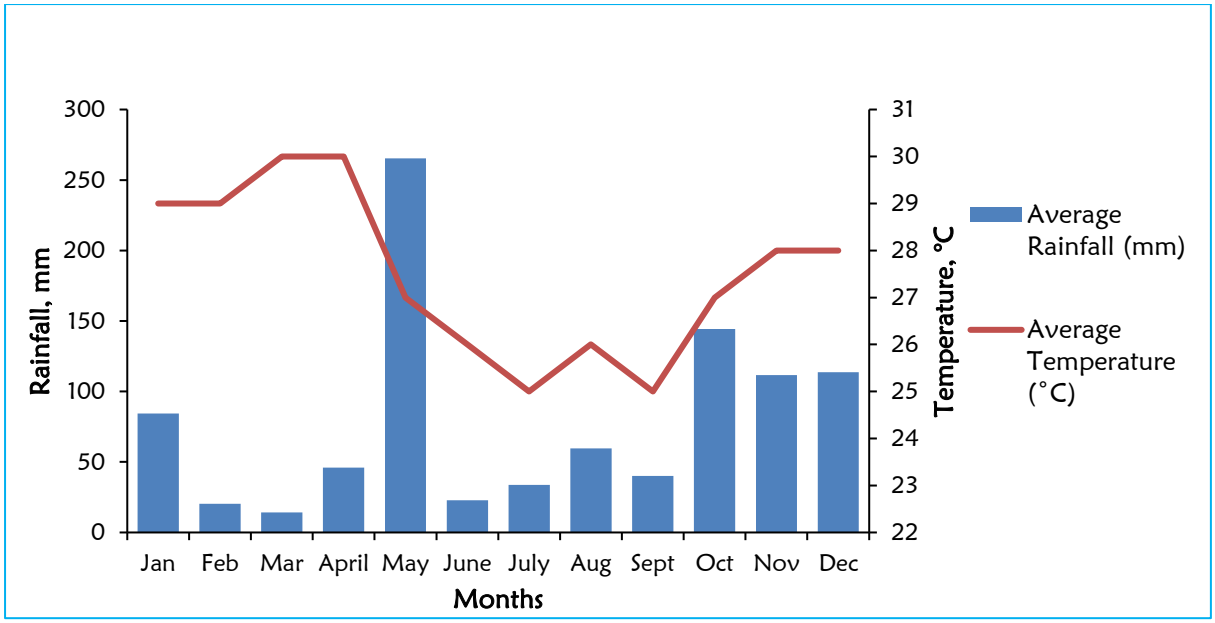

Figure 1: Average rainfall and temperature distribution of Mombasa County in 2019 (Data Source: World Weather Online)

3.4.Hydrology and Water Resources

The hydrological characteristics of the project sites across Kipevu, PortReitz, Miritini, Jomvu, and Mikindani reflect the broader coastal hydrological zone but vary in localized features.

Kipevu and PortReitz: These sites are in close proximity to the Indian Ocean and the Kilindini Harbour, which are tidal and saline environments. The proximity to the ocean results in a high groundwater table and brackish groundwater in some parts. The area is served by drainage channels linked to the port infrastructure. Improper asbestos management could lead to leaching into storm drains, which ultimately discharge into the ocean.

Miritini: Located inland compared to Kipevu, Miritini has a slightly lower water table. Groundwater here is a key resource for domestic and small industrial use. Seasonal surface runoff and poorly maintained drainage systems increase the risk of surface water contamination during heavy rains.

Jomvu: Jomvu area features manmade canals and culverts draining into larger catchment basins. Informal settlements and unregulated waste disposal have contributed to water pollution. If asbestos material is exposed during removal or transport, runoff water could carry fibers into these local waterways.

Mikindani: This area is characterized by small seasonal streams and drainage ditches that pass near the pumping station. There is a potential risk of asbestos fibers being transported by surface runoff, particularly during the rainy season. Additionally, shallow wells are a common

water source and may be vulnerable to contamination if asbestos debris infiltrates through permeable soils.

Across all sites, water resources are critical for both human consumption and ecological stability. Therefore, ensuring that no asbestos particles reach surface or groundwater systems is imperative. Protective measures such as wrapping, proper waste handling protocols, and emergency spill response plans must be in place.

3.5. Noise and Vibration

Noise and vibration levels at the project sites, Kipevu, PortReitz, Miritini, Jomvu, and Mikindani are largely influenced by adjacent industrial facilities, port operations, and heavy vehicular traffic. Baseline noise assessments indicate elevated ambient levels, especially during peak operational hours at nearby ports and highways.

The asbestos removal activities, though not inherently high-noise operations, may involve the use of power tools, machinery, and transportation trucks that contribute to temporary noise increases. Vibration impacts are expected to be minimal, as there will be no pile driving, excavation, or blasting associated with the removal works.

3.6. Air Quality

Air quality in the Kipevu region and surrounding locations such as PortReitz, Miritini, Jomvu, and Mikindani is influenced by industrial emissions, vehicular exhaust from major roads, marine activity from the nearby port, and localized dust from unpaved access roads and ongoing construction.

The asbestos removal process poses a potential risk of airborne asbestos fiber release if not properly controlled. Disturbance of asbestos-containing materials (ACMs), particularly during cutting, dismantling, or transport, may elevate fiber concentrations, which are hazardous when inhaled.

An Asbestos Abatement Plan should be enforced to ensure that ambient air quality does not pose a public health risk.

3.7.Land Tenure and Settlement Patterns

i. Kipevu

The project site is situated on land owned and administered by public institutions and designated for industrial and public utility use. The surrounding area exhibits a mix of formal and informal settlement patterns, with established industrial estates, port-related infrastructure,

and growing residential neighborhoods. Informal settlements have emerged within a 1 km radius of the facility, typically on marginal land, sometimes lacking formal tenure or land titles. These informal areas are occupied by economically disadvantaged populations, often working in nearby industries or in informal trades.

Land tenure in the broader Kipevu area is complex and includes leasehold, freehold, and government trust land. Disputes over land ownership and use are not uncommon, particularly in areas adjacent to port expansion projects and industrial growth zones. This dynamic necessitates a cautious approach to any physical intervention on or near such settlements. Coordination with local authorities, including the County Government of Mombasa and the National Land Commission, will be critical in ensuring that asbestos removal activities do not infringe upon the rights or safety of nearby residents.

ii. Miritini pumping station

The land tenure and settlement patterns in Miritini, particularly near the KPC estate, are characterized by a mix of formal and informal arrangements, influenced by historical allocations, industrial growth, and infrastructural developments

iii. Jomvu pumping station

The Jomvu pumping station is located near African Line and Terminal Logistics. This area is characterized by a dynamic landscape of informal settlements, industrial growth, and infrastructural development.

iv. Mikindani Pumping Station

The pumping station is located near Coast Silos (K) Ltd. This area is characterized by a mix of formal and informal settlements. The region has experienced rapid urbanization due to industrial growth and infrastructural developments, leading to complex land tenure dynamics.

v. PortReitz 1 & 2 pumping station

PortReitz's evolution from a colonial residential area to an industrial and logistics hub has significantly altered its land tenure and settlement patterns. The interplay between infrastructural development, industrialization, and informal settlements presents both opportunities and challenges.

The proximity of informal settlements to the sites highlights the importance of strict environmental controls and public engagement during the removal process. Communication

strategies must be developed to inform residents of health risks and to ensure their safety throughout the project lifecycle.

3.8. Solid waste management

The main sources of solid waste in Mombasa County include domestic, commercial ventures, hotels, markets, industrial, institutional among others. The types of solid waste generated include biodegradable waste such as; food remnants, wooden debris, natural rubber, paper, biomedical waste and non-biodegradable waste such as; plastic products, metals, disposable diapers, rubber tires, among others.

The solid waste generated is estimated at 700 metric tons per day. Currently, collection of solid waste is approximately 68% of the generated waste and 32% ends up being burnt or thrown on the streets, in the drains, at the seashores and in open grounds hence detrimental to health of the environment and the population. This is a growing concern due to the rising population and having the gateway of Kenya's tourism industry drown under mountains of trash is not economically sound. All types of solid waste materials in the County are collected from point sources and/or County dustbins in a mixed state and transported to the Mwakirunge dumpsite.

3.9. Community Health and Safety

The removal of asbestos from the KWWTP and Pumping stations presents a significant health risk to surrounding communities if not carefully managed. Asbestos fibers, when airborne, can be inhaled and lead to serious illnesses such as mesothelioma, lung cancer, and asbestosis. The risk is heightened in densely populated neighborhoods and informal settlements near the project site.

Communities in these areas may have pre-existing health vulnerabilities due to industrial emissions and inadequate access to healthcare services. Moreover, awareness of the dangers posed by asbestos is often low, which increases the likelihood of accidental exposure.

During the project, there will be increased movement of trucks and personnel, which may disrupt traffic and elevate risks of road accidents, particularly in informal areas lacking proper infrastructure. Noise and dust emissions may also affect public health and comfort.

To mitigate these risks, a Community Health and Safety Plan will be developed and implemented. Measures will include public awareness campaigns on asbestos hazards, establishment of safety perimeters around the work area, air quality monitoring, and emergency

response planning. Traffic management strategies and stakeholder engagement forums will also be instituted to keep residents informed and safe.

Coordination with local health facilities is essential to ensure preparedness in case of accidental exposure. A Grievance Redress Mechanism (GRM) will be established to allow the public to voice concerns or report incidents. These integrated safeguards are necessary to ensure community safety and uphold public health standards.

3.10. Livelihood and Economic Activities

The economic fabric surrounding this project area is multifaceted, incorporating both formal and informal sectors. Formal employment is dominated by port-related activities including cargo handling, logistics, shipping, and warehousing. The presence of the Kenya Ports Authority, oil refineries, and logistics firms in the vicinity contributes significantly to job opportunities for skilled and semi-skilled labor.

Additionally, a substantial portion of the population is engaged in small-scale and informal economic activities. These include roadside vending, retail shops, informal transport (e.g., boda boda and tuk tuk services), food kiosks, and artisanal services. Women and youth are particularly active in these segments, relying on daily income from these ventures to meet household needs.

Fishing and subsistence farming, though less prevalent in the immediate project area due to industrialization, remain relevant for residents of adjacent coastal neighborhoods. Day labor in construction and dock-related casual work also forms a significant part of the livelihood strategy for low-income households.

The proposed asbestos removal project is unlikely to cause long-term disruption to these activities. However, temporary access restrictions, road diversions, or increased vehicular movement during project execution may inconvenience traders and transport operators. To minimize such disruptions, the project will incorporate traffic management plans, scheduled work hours, and effective stakeholder engagement to communicate timelines and alternative access routes.

Furthermore, the project has the potential to create short-term job opportunities during the removal and transportation phases, particularly for skilled personnel trained in hazardous waste handling, safety compliance, and logistics. Priority should be given to local labor where feasible, in line with inclusive development goals.

3.11. Infrastructure and Social Services

The five areas surrounding the project site, Kipevu, PortReitz, Jomvu, Miritini, and Mikindani are each served by varying levels of infrastructure and social services, with disparities largely influenced by urban development patterns, proximity to industrial facilities, and historical investments.

In **Kipevu**, infrastructure is characterized by robust port-related transport networks, including road and railway connectivity. Social services include several health facilities such as Port Reitz Hospital, public primary and secondary schools, and access to piped water, although informal settlements may experience intermittent service. Sanitation systems, while present, are under pressure due to high industrial activity.

PortReitz is largely a mixed-use area with residential estates, light industries, and critical institutions like the Port Reitz District Hospital. Access to electricity and water is generally reliable, and educational services are offered through both public and private institutions. Public transport is accessible via matatus and boda boda operators.

Jomvu, being a transport corridor, has significant infrastructure in terms of roads and fuel depots. However, social services are strained due to increasing population density. Informal housing dominates, and sanitation remains a challenge in some parts. Access to healthcare is available but limited, requiring residents to rely on clinics or travel to larger hospitals.

Miritini is undergoing rapid urbanization and benefits from strategic location near the Standard Gauge Railway (SGR) terminal. It has growing infrastructure including markets, schools, and health centers. However, pockets of informal settlements still lack adequate drainage and solid waste management.

Mikindani is a densely populated suburb with mixed residential and commercial use. It has relatively good access to roads, electricity, and public transport. Education and healthcare services are moderately distributed, though quality and access remain uneven across neighborhoods.

Across all these areas, waste management services are provided by both county authorities and private collectors. This highlights the need for expert waste transport and disposal mechanisms during the asbestos removal project. Emergency services such as fire departments and ambulances are present but require coordination for quick response in case of hazardous material exposure.

3.12. Cultural and heritage resources

The area surrounding the Kipevu Wastewater Treatment and Pumping Stations is steeped in rich cultural heritage and diversity. Mombasa County, as a whole, has a historical significance that dates back to the pre-colonial era, being a focal point of the Indian Ocean trade routes, and later a strategic center during the Portuguese, Arab, and British occupations.

In **Kipevu** and **PortReitz**, cultural resources include historical Swahili settlements, Islamic architecture, and colonial-era structures. While no gazetted heritage sites lie directly within the project footprint, there may be undocumented cultural assets or places of spiritual or communal significance such as mosques, churches, shrines, or community meeting points that require consideration and respect.

Jomvu, traditionally inhabited by Swahili and Mijikenda communities, reflects a blend of indigenous and coastal cultural practices. Informal social structures and community cohesion remain strong, and the presence of communal land or religious sites could necessitate cultural sensitivity during project implementation.

Miritini and **Mikindani** are also culturally diverse, hosting communities with roots in upcountry Kenya, coastal tribes, and a growing number of migrant populations due to industrial development. Mikindani, in particular, has remnants of old railway and port infrastructure, which may have cultural or historical interest, albeit not formally recognized.

The asbestos removal project is not anticipated to disturb any known or gazetted cultural heritage sites. However, precautionary measures should be instituted to prevent inadvertent damage to any newly discovered artifacts or culturally sensitive areas. This includes adherence to the Chance Finds Procedure as recommended under World Bank Environmental and Social Standard 8 (ESS8), which mandates the cessation of work and notification of relevant authorities upon discovery of any cultural or archaeological material.

Community engagement will be essential to identifying non-documented sites or culturally important areas, and incorporating traditional knowledge into project planning. Respect for local customs and ensuring minimal disruption to community practices during removal and transportation of asbestos will further foster trust and cooperation with residents.

In summary, while no formal heritage sites have been identified within the project area, the region's cultural depth and community structures warrant careful planning and responsive mitigation strategies to preserve cultural integrity throughout the project lifecycle.

3.13. About the proponent

Mombasa Water Supply & Sanitation Company Limited is a limited liability company that was established in March 2011. The company took over the operations of water and sewerage services provision in Mombasa County as from 1st September 2005. Under the Water Act 2016, the Company is now under the jurisdiction of the County Government of Mombasa. The company has the mandate to providing cost effective and affordable quality water and sanitation services to the residents of Mombasa County hence the company assumes the roles of provision of quality and economical water and sanitation services to consumers and routine maintenance of water and sanitation services and infrastructure.

The proposed project sites include the KWWTP and its various pumping stations located in Mikinda, PortReitz, Jomvu, and Miritini and managed by the proponent. These facilities are mostly Staff Quarters (two units each) at the pumping stations, staff quarters (3units), laboratory/office, electromechanial building, pump house (sludge thickening tank and outlet to ocean), and main pump house at the KWWTP. These facilities are within both Changamwe and Jomvu Sub-Counties.

GPS Coordinates

Table 1: GPS Coordinates of the sites

Location	Latitude	Longitude	Altitude/elevation	Facilities
KWWTP	-4.0389423	39.6302796	18m ASL	staff quarters (3units), laboratory/office, electromechanically building, pump house (sludge thickening tank and outlet to ocean), and main pump house
PortReitz 1	-4.0416559	39.6190468	29m ASL	Two Units Staff Quarters Transformer room
PortReitz 2	-4.0409640	39.6036395	36m ASL	1unit staff quarters
Miritini	-4.0023908	39.5792371	46m ASL	2units Staff quarter
Jomvu	-4.0091030	39.596866	62m ASL	
Mikindani	-4.010349	39.628264	41m ASL	

3.14. The disposal company

Removal, transportation and disposal of the asbestos will be done by M/s Fadema Company Ltd, a NEMA Licensed Asbestos handler, License No. NEMA/WM/LDS/2516 *(Annex 1)*. The Company strives to be the all-inclusive port of call for those with asbestos containing material. The company operates a NEMA licensed asbestos landfill *(over 10 acres of land)* in Kilifi Kalumani/5010 in Mnyenzeni, Kilifi County to meet the growing need for safe and expertise disposal of asbestos. All activities are planned to strictly follow NEMA guidelines on safe management and disposal of asbestos and the safety and health regulations as stipulated by the Directorate of Occupational Safety and Health Services. The company's approach to asbestos removal and disposal is designed to cause minimum inconvenience to the proponent and public. It is well planned and proactively managed.

Figure 2: Fadema Disposal Site

Figure 3: Mikindani Pumping Station

Figure 4: Jomvu Pumping Station (google Extract)

Figure 5: Miritini Pumping Station

Figure 6: PortReitz 1 pumping Station

Figure 7: Portreitz 2 pumping station

KIPEVU WASTE WATER TREATMENT PLANT

Figure 8: KWWTP (Facilities with asbestos)

CHAPTER FOUR

4.0. PROJECT DESCRIPTION AND ACTIVITIES

4.1. Description of the project area and project processes

There exist several structures roofed using sheets containing asbestos. The approximate total surface area for the asbestos is approximately 1318.19m^2.

Table 2: Summary Asbestos Coverage per site

Site	Staff Quarter	Pump houses	Lab/office/electro	Transformer room	TOTAL (SM)
KWWTP	239.94 SM	138.24 SM	333.56 SM	-	**711.74**
PortReitz 1	130 SM	-	-	42.25 SM	**172.25**
PortReitz 2	44.2 SM	-	-	-	**44.2**
Miritini	130 SM	-	-	-	**130**
Jomvu	130 SM	-	-	-	**130**
Mikindani	130 SM	-	-	-	**130**
GRAND TOTAL					**1318.19 SM**

Figure 9: Mikindani Site (Both Units Occupied)

Figure 10: Jomvu Site (Houses not occupied)

Figure 11: Miritini Site (Not occupied)

Figure 12: Unit 2 (occupied by 1 person and was

interviewed)

Figure 13: PortReitz 2 Site (Not occupied)

Figure 14: Access to PortReitz Site 2

Figure 15: PortReitz 1 (Staff houses both occupied)

Figure 16: Transformer Room (Port Reitz 1)

Figure 17: Access to the transformer (challenge -Manual carrying of sheets)

Figure 18: KWWTP Office

Figure 19: KWWTP Main pump house

Figure 20: KWWTP Staff Quarter

Figure 21: Other pump house

4.2. Handling of the asbestos waste (sheets and breakages)

4.2.1. Tools and materials

The following tools and equipment will be used for this work:

- Nail punch, hammers, knapsack water sprayer
- Adequate polythene sheets with a minimum thickness of 500 microns to wrap the asbestos.
- Same gauge poly bags to safely keep the protective clothing and tools after use and for containing asbestos breakages.
- Enclosed/containerized transportation truck.
- Labels.

4.2.2. Workers

The contractor intends to deploy approximately 10-15 workers for removal, loading and unloading procedure and this includes the driver. They should be provided with adequate

protective gear (respirators, eye shields, coveralls with head cover, safety harnesses and safety boots) at least a pair of these for each worker. Protective equipment washing/decontamination facilities and running water and drying lines may be adequate. Ensure sleeves/cuffs are sealed to avoid skin contact.

4.2.3. Removal procedure

Workers will access the roof using stable and secured ladders placed on firm ground and supported at both ends. For safety, workers will use personal protective equipment, including safety harnesses. Asbestos sheets will be carefully detached and lowered using ropes to prevent breakage and the release of fibers. Only trained and authorized personnel will be allowed in the work area, which will be clearly demarcated with warning signage and physical barriers. Daily safety briefings will reinforce ladder use, safe handling procedures, and emergency protocols, ensuring minimal risk of injury or exposure during asbestos removal activities.
Other measures that will be put in place include;

- Wetting the asbestos targeted for removal using water to reduce chances of fibres coming into contact with the workers.
- Where the sheet is fastened on the timber or metal frame of the cabin by j-bolts, use a spanner to unfasten.
- Where the sheets are fastened by screws, which cannot be unscrewed, use a bigger punch to cut a hole around the screws.
- Using a pinch bar or similar tools, prise away the sheet from the roof and lower it to the ground cautiously to avoid banging or breakages.
- Place the asbestos sheet on polythene sheets spread on the floor, wrap them and then move them to the temporary storage site and subsequently to the transportation vehicle.

4.2.4. Temporary storage

The waste asbestos, before disposal, must be stored in such a way that its bags are secure from accidental damage, access by staff and the public. According to EMCA (Waste Management) Regulations 2024 Part IV Section 18 (Legal Notice No. 178), every generator of hazardous waste shall ensure that every container or package for storing such waste is labelled in easily legible characters. The label on the asbestos waste bags shall contain the name and identity of the generator of waste:

The following are some of the precautions that should be observed during storage:
Storage of asbestos breakages

- Must be placed in double wrapped polythene sheets and sealed

- Any broken pieces of the asbestos should be put in polythene bags of the same gauge, sealed and labelled but separated from the unbroken sheets.
- As soon as the bags are full they should be sealed.

4.2.5. Transportation of hazardous waste (asbestos)

Transportation of asbestos waste will be undertaken by M/s Fadema Company licensed vehicles either ***KBP 851Q (NEMA/WM/LTW/11897) or KBK 626X (NEMA/WM/LTW/11804)*** accompanied by tracking documents in the prescribed NEMA format. The asbestos waste will be temporarily stored on-site until all asbestos roofing sheets have been fully removed. This approach minimizes the risk of illegal dumping and prevents potential misuse or redirection of the hazardous material.

After loading adequate bundles of the sheets onto the truck, close the truck and transport the asbestos material to the designated disposal site. Unload onto the disposal site starting with the furthest corner of the site from the entry first.

Figure 22: Vehicle to be used for Asbestos Disposal

4.2.6. Disposal

The disposal site is located at Kilifi Kalumani/5010 in Mnyenzeni, Kilifi County The following should be observed during disposal:

- Lining the trench with double folded 500-gauge polythene sheets.
- Gentle lowering of the asbestos materials.
- Re-filling the trench with soil.
- Establish adaptable vegetation

Figure 23: Sample Cells to be prepared during disposal

4.2.7. Post disposal

This phase includes decontamination of the tools and PPEs through thorough washing and vacuuming before reusing. Also monitoring of the site will be phased in this section.

1. **PPE**
   - Use decontamination rooms to change and decontaminate personnel and PPE.
   - Use of coveralls which should be disposed like asbestos.
   - Those decontaminating team must wear protective PPE.
2. **Tools and equipment**
   - After use, wash with water or vacuum cleaners to decontaminate, store and reuse.
   - Those decontaminating them must wear PPE.
3. **Post transport decontamination**
   - Carefully wash thoroughly before re-entry or re-use.
   - Those re-entering before decontamination must wear protective clothing.
   - Never leave truck that is not decontaminated open, always close them.
4. **Monitoring**

Monitoring of the site should be carried out throughout and documenting information at the disposal site. The reporting should entail environmental legislation, conformity, site maintenance, repairs and modification, safety and health review.

4.3. Asbestos Sheets Disposal and Replacement Activities

4.3.1. Asbestos sheets disposal

The asbestos material is to be stored in 500-gauge polythene bags, sealed and stitched with a binding wire. These shall then be buried in an approved disposal site, in this case, Kilifi Kalumani /5010 in Mnyenzeni,

Kilifi County. Disposal should be done as soon as is feasible.

4.3.2. Asbestos roof replacement

If the proponent intends to re-roof the facilities, the replacement should be carefully examined to ensure there will be minimal unforeseen impacts on the economic, biological and physical resources in the Project sites and area around it. The existing asbestos sheets will be replaced with roofing materials specifically recommended for wastewater treatment plant facilities. Preference should be given to transparent or non-hazardous alternatives that pose minimal environmental risk.

4.3.3. Waste production and management

The types of waste that is likely to be generated during this process include the asbestos sheets, j-bolts offcuts, wastepaper, metals and plastic which can be recycled. The asbestos waste will be handled as per the guidelines set out by NEMA and International standards.

4.4. Cost of the proposed project

As provided under section 58 (1) of EMCA, 1999 (amendment 2019), the project proponent is required to submit an ESIA report to the Authority, in the prescribed form, giving the prescribed information. The estimated cost of the proposed project based on an evaluation done by a Supervision Engineer is almost Kenya Shillings three million (KShs. 3,000,000/=).

CHAPTER FIVE

5.0. PUBLIC PARTICIPATION

Public and stakeholders' participation in the ESIA process is a legislative requirement under Part Section 69 (1d) of the Kenya Constitution 2010 and Regulation 17 of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003 and subsequent Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019. The aim of public and stakeholders' consultations was to obtain and document comments, views and concerns that the neighbors and stakeholders have regarding the proposed project. For the proposed project, public and stakeholders' consultations were undertaken using three methods; administration of questionnaires, interview, and public consultative meetings. This facilitated inclusive participation from MOWASSCO staff, neighboring community members, and local leaders.

- Administration of questionnaires to the neighbors and stakeholders
- Stakeholder consultative meetings held on 7th June 2025 at the project sites.
- One-on-one interview with the PAP during site visit

Interviews with the Project Affected Persons (PAPs) were conducted during site visits. They were informed about the proposed project and assured that they would receive support in relocating to alternative houses where roof replacements would have been completed beforehand and thereafter, they have an option of either to return or relocate as they prefer.

A total of 31 questionnaires were administered between 5th May and 7th June 2025, out of the total number of questionnaires administered, 27 questionnaires were filled and collected. The questionnaire responses provided valuable qualitative data on the awareness, expectations, and apprehensions of the stakeholders regarding the asbestos removal project. These insights informed the development of appropriate mitigation measures and social safeguards. *(The filled questionnaires are annexed herein for reference.)*

Two public barazas were conducted in the Kipevu and Port Reitz 1 areas, which served as key forums for community engagement and awareness-raising on the asbestos removal project. These meetings brought together MOWASSCO representatives, local administration officials, community leaders, PAP, and residents to discuss the nature, scope, and anticipated impacts of the project. During the sessions, community members were encouraged to voice concerns, ask questions, and provide suggestions on how best to implement the project in a safe and inclusive manner.

Summary of Community Concerns and Feedback

During the public barazas, the majority of community members expressed strong concerns about the health and environmental risks posed by asbestos exposure, particularly contamination through air and rainwater. Key concerns included the safety of occupants during asbestos removal, medical screening for staff, and the need for proper relocation procedures.

- **Employment Opportunities:** Stakeholders like Mr. Hassan Juma (Nyumba Kumi Leader) and Mr. Teddy Nyambu emphasized the importance of creating job opportunities for local youth during the asbestos removal, handling, and disposal process.
- **Health and Safety Risks:** Several members, including Madam Salma Garama, Madam Mariam Chari, and Mr. Wilfred Kithome, raised concerns about direct exposure to asbestos dust and requested proper handling using personal protective equipment (PPE) and adherence to NEMA regulations.
- **Relocation and Evacuation:** Concerns were raised about the presence of MOWASSCO staff and residents during asbestos removal, with requests for advance notices, proper relocation, and support during temporary evacuation, particularly from Mr. Rashid Salim and Madam Valentine Samba.
- **Public Awareness and Precaution:** Madam Everline Dama emphasized the need to remove asbestos used in other structures like fences and kitchen shelters, due to lack of awareness among residents.
- **Infrastructure and Medical Concerns:** Mr. Vincent Wanjala requested road rehabilitation, while Madam Samba and others inquired about medical screening for exposed residents.

These consultations informed the project's safeguard strategies, including proactive relocation, strict adherence to occupational health and environmental safety protocols, engagement of local labor, and continuous community liaison support throughout implementation.

The barazas ensured transparency in information-sharing and promoted community buy-in. Specific issues raised included timelines for relocation, health and safety measures, and long-term site restoration. Participants appreciated the efforts made by the proponent to include them in the planning process. However, some of the key outcomes of the consultation was the endorsement of the project by stakeholders. This is due to the nature of the project which involves removal of asbestos which is considered as hazardous to public health. Minutes of the two barazas are annexed herein for reference and documentation.

The outcomes of the public consultation portray an image of a project that was well received. The stakeholders alluded that this project was long overdue, and they offered full support for its implementation. They noted the following key positive impacts:

- Removal of a significant health hazard from public infrastructure;
- Improved working conditions and health safety for wastewater treatment plant staff;
- Compliance with international best practices and enhancement of public confidence;
- Creation of short-term jobs and capacity building for workers involved in asbestos abatement.
- Public health improvement

Potential negative impacts identified by the community include:

- Air pollution due to asbestos fiber release during removal;
- Health risks to workers and adjacent communities;

- Improper waste handling could contaminate soil and water sources;
- Noise and traffic disruptions during transportation of hazardous materials;
- Potential labor and occupational safety risks for abatement crews i.e. working at height, Asbestos exposure, injuries due to manual handling, slip, trips, and falls, heat stress and fatigue,
- Relocation Stress and Inconvenience

The stakeholders recommended the following measures to mitigate and ensure environmental safeguards

- Use of Personal Protective Equipment (PPE) will be mandatory for all workers involved in asbestos removal, handling, and disposal.
- PPE will also be provided to members of the public visiting the site to reduce exposure risks.
- Strict adherence to environmental regulations will be ensured to protect community health and prevent pollution.
- Access to the project site will be restricted during operations to minimize exposure of the local population.
- The contractor will ensure prompt and efficient handling and disposal of asbestos waste to avoid onsite accumulation.
- Safety signage will be installed around the site to inform and warn workers and visitors.
- Enforcement of PPE use and safety protocols will be continuously monitored on site.

Table 3: Summary of Site Consultations and Social Safeguard Measures

Location	**No. of Occupant**	**How they were consulted**	**Mitigation measure/social safeguard**
KWWTP (Staff Quarters)	Not occupied	Baraza/ Questionnaires/interview	Affected individuals will be assisted using MOWASSCO vehicles to temporarily relocate to other prepared MOWASSCO sites, where roof replacements will have been completed in advance, with the option to return or relocate later as preferred
PortReitz 1	Two occupants	Baraza/Questionnaires/interview	
PortReitz 2	Not occupied	Questionnaire (neighbors)	
Jomvu	Not Occupied	Questionnaire (neighbors)	
Miritini	One occupant *(Contractor Security Staff) - Not PAP*	Questionnaire/Interview	
Mikindani	2 occupants *(Contractor Security Staff) – Not PAP*	Questionnaire/Interview	

Table 4: Summary of comments from questionnaires administered to respondents

No	Respondent's Profile **Name**	**Comments**
1.	Mr. Faraj Kibwana (Chief, Port Reitz Location)	– No objection to the proposed project – Clean and safe environment free from asbestos contamination – Local population should be considered in job opportunities during project implementation
2	Chrisphine Ojijo (Ass. Chief, Migadini)	– Supported the proposed project – Reduction of health hazards associated with asbestos – Temporal employment opportunities to the local community – Pollution of water ways and ocean if not well handled
3	Mariam Chari Kambe	– Supported removal of asbestos since they are harmful to health – Removal will help in enhancing health and safety – Before removal, proponent should ensure health and safety of neighbours is considered
4	Doreen Wanja	– Removal of asbestos will improve health within the area – Asbestos fibres may affect water quality – KWWTP should work on the foul smell from the plant – Supported the proposed project
5	Joan Mdema	– Project will reduce environmental pollution through asbestos contamination – Clean and healthy environment free from asbestos – Water quality may be affected through asbestos contamination – Accumulation of asbestos waste onsite if not well managed – Supported the proposed project
6	Joram Ngala	– Project should be implemented in compliance with regulations and standards – Public should not be allowed to reuse the asbestos roofing sheets – Health risks to the community from asbestos contamination – Proper disposal of asbestos waste from the site – Asbestos dust/fibre pollution should be managed from the site
7	Samuel Tsuma	– Asbestos should be removed and disposed far from the community – Will reduce health issues from asbestos exposure – Asbestos contamination will affect water quality – Supported proposed project
8	Jackson Kilonzo	– Site should be sealed off from members of the public

		during project implementation - Removal will eliminate possible health hazards - Contractor to rehabilitate access road to the site (KWWTP) - Erection of safety signages around the site
9	Brenda Achieng	- Should be removed and disposed immediately to avoid harmful effects to the community - Removal will improve community health and safety - Supported the project
10	Njira Mbui	- It's okay for asbestos to be removed - It will prevent health issues that come with asbestos exposure - Supported the project
11	Sylvia Wamari	- It's good to remove asbestos roofing sheets - It will prevent health issues that come with asbestos exposure
12	Hendrita Manga	- Supported the proposed project - Job opportunities to the local population - Health issues during asbestos removal from exposure - Asbestos should be removed from the site for safe disposal
13	Musa Hezron Manga	- Asbestos should be removed - Project will improve health and safety of the neighbours - Supported the project
14	Abdul Ali Kabanda	- Removal will eliminate health hazards - Health issues associated with asbestos exposure - Supported the project
15	Willy David	- Asbestos removal and disposal should be done as soon as possible - The project will create job opportunities - Asbestos may lead to contamination of plants and water - Supported the project
16	Patrick Nyongesa	- The project is okay for safety concerns - Safe environment free from asbestos - Supported proposed project
17	David Mulwa	- It's okay for asbestos to be removed - Supported proposed project
18	Daniel Matheka	- It's okay for asbestos to be removed for health concerns - Supported proposed project
19	Shaban Mwanganyi Mrombo	- The project should go ahead as planned - Healthy environment free from asbestos - Propper disposal of asbestos waste - Supported the proposed project
20	Anna Saidi	- It's okay for asbestos to be removed - Reduce air pollution through asbestos contamination - Supported the proposed project
21	Lydia Cheptoo Kemboi	- Asbestos should be removed - Reduction of health risks as a result of asbestos

		exposure - Supported the proposed project
22	Mustafa Sadik	- Support asbestos be removed with immediate effect - Safe from asbestos exposure through inhalation
23	Albert Okelo	- Gradual removal of asbestos and replacement with iron sheets to avoid displacement - Reduction of health risks as a result of asbestos exposure - Short term employment opportunities
24	Miriam Kerubo	- Good project, it will reduce environmental pollution - Should be allowed to continue - Health hazards associated with asbestos exposure - Asbestos wastes should be well handled to reduce accumulation in the area - Supported the project
25	Jane Auma	- Good for the asbestos sheets to be removed to prevent health issues - Healthy environment for the proponent and the neighbours - May causse environmental pollution when not well handled - Support the project
26	Denis Muthembwa	- Is a good project - Exposure to asbestos waste - Supported the project
27	Edward Kenga	- In agreement with project to reduce health hazards associated with asbestos exposure - Employment to the local population - Injuries during project implementation to workers involved - Waste generated should be well handled - Supported the project

Table 5: Photographic Evidence

Figure 24: Baraza Session at PortReitz 1 area

Figure 25: Baraza session at KWWTP

CHAPTER SIX

6.0. SOCIAL, ECONOMIC AND ENVIRONMENTAL IMPACTS

6.1. Anticipated impacts

Impacts can be negative or positive, direct or indirect. The magnitude of each impact is described in terms of being significant, minor or negligible, temporary or permanent, long-term or short-term, specific(localized) or widespread, reversible or irreversible. Some impact mitigation has already been addressed in the proactive design and other mitigations can only be guaranteed through active, responsible management, helped by following the guidelines in the project environmental management plan.

These qualities are indicated in the assessment tables as shown below:

Table 6: types of impacts

Key	Type of impact	Key	Type of impact
++	Major positive impact	+	Minor positive impact
--	Major negative impact	-	Minor negative impact
0	Negligible /zero impact	NC	No change
Sp	Specific /localized	W	Widespread
R	Reversible	Ir	Irreversible
Sh	Short term	L	Long-term
T	Temporary	P	Permanent

Based on information gathered during the field study, potential environmental impacts of the project are tabulated below.

6.2. Anticipated Environmental and Social Impacts

Table 7: Anticipated Env. and Social Impacts

Impacts on or due to the proposed project	Removal and disposal	Replacement	Remarks
Changes in hydrology	0	0	No effect to the hydrology of the area as there will not be any obstruction to the flow of both surface and ground water resources.
Pollution (air /dust)	T Ir	sp	During the removal and transportation, fibres from the asbestos may be released into the air.
Pollution (noise)	T R	-/0	Site activities and commotion of workers will generate noise and vibration which may have little effect to the environs. Sound pollution control measures should be applied.
Water resources	Sh	+	The site activities will depend on the water supply at the project site during the removal phase. There is a likelihood that this will put a bit of strain on the water supply. The proponent should provide a sustainable supply of water during the entire process.
Disturbance of the public	-T R Sp	-	Slight disturbance to the public/neighbours may occur due to noise and asbestos dust during the construction phase.

Safety and Health	-T Ir	NC	During the entire process, increased dust, noise and air pollution levels could impact on health and safety, particularly in the direct impact zone and on the site workers.
Generation of wastes	-ShSp	0	Generation of general waste will be minimal. However, the proper disposal of asbestos waste generated is necessary. The waste should be disposed in the approved dumpsites and in the manner approved by NEMA.
Clean on completion	-Sp	0	The contractor should ensure that when works are completed, the site is left clean and tidy.
Positive impacts	++, T	++,L	Site activities will create jobs for skilled and non- skilled workers. Employment opportunities will be provided during the period. The removal of asbestos will reduce the health risk brought about by asbestos

6.3. MAIN ISSUES OF CONCERN AND MITIGATION MEASURES

These are impacts during the asbestos removal phase, transportation phase and disposal stage which were identified during the scoping process and include the following:

6.3.1. Positive impacts

i. Employment and Income

The proposed project will create employment and business opportunities for experts and suppliers including those of cement, removers, disposers and transporters hence generating wealth and in turn it will improve livelihoods. There will be enhanced income for those who will secure jobs in the activity.

ii. Amelioration of health

Removal and disposal of asbestos will eradicate future health risks to the occupants, employees and environs.

6.3.2. Negative impacts

i. Air quality

Activities on the site may result in release of asbestos dust to the atmosphere. Continuous long term exposure may lead to diseases such as:

a) Lung cancer - is a malignant tumour of the bronchi covering. The tumour grows through the surrounding tissue invading and often obstructing air passages. The time between exposure and the occurrence of lung cancer is 10 to 30 years.

b) Mesothelioma – is a cancer of the pleural lining (lung covering). It is exclusively related to asbestos exposure. By the time it is diagnosed, it is almost always fatal. Mesothelioma has a long latency period of 30 to 40 years.

c) Asbestosis – is scarring of the lung tissue. This scarring impairs the elasticity of the lungs and hampers its ability to exchange gases. This leads to inadequate oxygen intake to the blood. Asbestosis restricts breathing leading to decreased lung volume and increased resistance in the airways. It is a slow progressive disease with a period of 15 to 30 years.

d) Pleural plaques – this is a discrete fibrous or partially calcified thickened area which can be seen on X rays of individuals exposed to asbestos. Although pleural plaques are themselves asymptomatic, in some patients this develops into pleural thickening.

e) Diffuse pleural thickening – similar to the above and can sometimes be associated with asbestosis. Usually no symptoms are shown but if exposure is extensive, it can cause lung impairment.

ii. Community health and safety

The removal and disposal of asbestos roofing sheets from the Kipevu Wastewater Treatment Plant and the pumping stations pose a significant community health and safety risk if not properly managed. This impact arises from both direct exposures to asbestos fibers and indirect consequences of project activities.

Key concerns include:

Airborne Asbestos Fiber Exposure; During the dismantling and handling of asbestos sheets, fibers can become airborne and may be inhaled by nearby residents**,** especially if they are living close to the project site. Asbestos fibers are carcinogenic and long-term exposure is linked to diseases such as mesothelioma**,** asbestosis**,** and lung cancer**.**

Proximity of Residential Areas; some of the facilities i.e. PortReitz 1 are where MOWASSCO staff and their families reside hence considered as residential area. This increases the risk of unintentional exposure if proper controls are not enforced, particularly during the demolition phase.

Use of Contaminated Surfaces; Some community members rely on rainwater collected from asbestos-roofed structures**.** Continued use of such water even during partial project implementation could pose health risks due to potential contamination.

Lack of Awareness; Community sensitization may not reach every individual, especially the vulnerable (children, elderly, informal vendors), leading to uninformed behaviors like lingering near the site, collecting debris, or using contaminated materials.

Risk from Incomplete Site Controls; Inadequate site fencing, signage, and access control can allow unauthorized individuals**,** especially children or passersby, to wander into the project zone, putting them at risk of exposure or injury.

Anxiety and Social Disruption; Health concerns around asbestos exposure even when mitigation measures are in place can cause mental stress and anxiety within the community, particularly if there's poor communication about risks and safety efforts.

iii. Illegal Diversion of AC sheets

Asbestos Cement (AC) sheets, once dismantled from existing structures, become classified as hazardous waste under Kenya's Environmental Management and Coordination Act (EMCA) Waste Management Regulations, 2024. Despite this classification, there exists a significant risk of illegal diversion or repurposing of these hazardous materials during the removal, handling, transportation,

or temporary storage phases of the project. The AC sheets may be stolen from the site for informal Reuse by Community Members i.e. for making of fence, to be used a rood etc. This may occur due to lack of awareness, theft, and weak chain of custody hence leading to environmental contamination of the secondary sites.

iv. Work at height

Work at height is an inherent risk in the removal of asbestos roofing sheets, as much of the activity involves accessing elevated surfaces such as rooftops. This introduces several health and safety hazards for workers involved in the decommissioning process. Such hazard includes; Falls from height which may lead to occupational injuries and fatalities. During asbestos sheet removal, workers may be required to move across fragile or unstable roofs, increasing the likelihood of slips, trips, or falls, unstable or deteriorated roofing structures can collapse under the weight of workers, particularly if weakened by age or prolonged exposure to weather, improper use or absence of safety equipment, such as harnesses, and inspected ladders may exacerbate risks during removal or replacement operations, manual handling of large roofing sheets at height can cause loss of balance, increasing the risk of falls or accidents, and falling tools or debris from height can injure workers or bystanders below, especially in inadequately cordoned-off areas.

If this risk is not taken into consideration may lead to injuries and fatalities, potential legal and compensation liabilities for both proponent and contractor, project delay, and a negative public perception.

v. Illegal dumping of the AC sheets

One of the significant environmental and health-related risks associated with the proposed asbestos removal project is the illegal dumping of asbestos-containing (AC) sheets. If not managed with strict oversight, some portions of the removed AC roofing materials may be disposed of improperly outside of licensed hazardous waste disposal sites. This risk may arise due to: Poor supervision or lack of accountability in the waste transportation and disposal chain, attempts to reduce disposal costs by subcontractors or transporters through avoidance of formal disposal procedures, limited public awareness regarding the dangers of asbestos, which may lead to informal handling or reuse of AC sheets by unaware community members, and gaps in documentation *(e.g., lack of tracking document and vehicle license for transporting asbestos waste)* that make it difficult to trace the full waste journey from the project site to the final disposal site.

This may lead to the following; Environmental contamination i.e. airborne asbestos fibers may pollute the surrounding area, especially if dumped in open areas or near water bodies, public health risks due to improperly discarded AC materials may expose nearby communities, especially children, to chronic inhalation of asbestos fibers, and regulatory non-compliance by the proponent due to illegal dumping violates NEMA regulations and could lead to legal liabilities for the proponent and contractors involved.

6.4. Mitigation measures

The following measures are recommended:

i) Notification

All persons in possession of asbestos in their premises shall notify the National Environmental Management Authority (NEMA) giving the following information;

- Use
- Location
- Plot / LR number
- Quantity
- State of premise

All activities involving handling of asbestos are to be reported to NEMA by the proponent. This ESIA is acting as a report.

ii) Asbestos handling

When asbestos waste is to be generated or removed from a site, parties that may be affected shall be notified on the time and nature of work to be done. The staff within the organization shall also be notified so that they are to avoid exposure. In this case, public participation was done among the neighbours and internally among the staff.

Workers contracted to remove, wrap, collect, transport and dispose the asbestos waste must undergo comprehensive training. Proper precautions to protect the workers according to the Legal Notice No 40, The Factories (Buildings, Operations and Work of Engineering Construction) Rules, 1984 must be employed. All persons involved in the collection, transportation and disposal of the asbestos waste likely to be exposed to the adverse effects of the waste, shall be provided with suitable PPE. Where the services of a contractor shall be used for the disposal of asbestos waste, a provision shall be incorporated in the contract to ensure that the contractor shall also comply with the proposed disposal

methods and use of PPE.

Records of every step undertaken while disposing the asbestos waste shall be kept by the project manager.

iii) Storage

Before disposal, the waste asbestos shall be stored in such a way that it is secure from accidental or deliberate damage, access by staff and the general public. Proper temporary storage must be identified before commencement of the project.

The following precautions should be observed during storage:

- The waste asbestos should be stored in polythene film bags
- Asbestos sheets to be stored in polythene woven bags that are tightly sealed
- The bags should be considered full when half full
- As soon as the bags are full they should be tightly sealed
- The containers should be cleaned externally to remove possible fibre contamination before temporary storage
- The storage area must have restricted entrance and locked or secured on a 24-hour basis.

iv) Preparation for Transportation

Material containing asbestos or contaminated with asbestos must be viewed as hazardous and packaged to keep fibres from getting into the air. Containers used for packaging may be hard or flexible and must be airtight.

The following are some of the precautions to be observed:

- The bags and stacks should be gently loaded into transportation vessel.
- The goosenecks should not be used as handles for carrying the bags, because that might unseal the ends or tear the bags. Tossing the bags into a waste transporting vessel must be avoided because of the risk of rapture.
- The asbestos waste should be transported to a prepared disposal site that is authorized by NEMA.
- Tracking document should be issued after every collection and a representative of the proponent should accompany the disposal team to the authorized site.

v) Transportation

The waste shall be transported to the disposal site in an enclosed vehicle or container, capable of being washed without lodgment of debris and fibers, and secure from escape of fibers to the atmosphere.

Emergency procedures for dealing with spillages or other emergencies whilst in transportation to the disposal site are to be drawn up and arrangements made to implement them. Drivers are to be trained in such procedure.

vi) Disposal Site

Disposal must be at an asbestos landfill duly licensed by NEMA as a hazardous materials disposal site *(M/s Fadema Company Limited disposal site located on Plot L.R No. Kilifi/Kalumani/5010 in Mnyenzeni, Kilifi County).* Disposal site should:

- Be a lined pit that does not reach the water table or according to other standards that may be approved by NEMA.
- Disposal material to be at least one metre below ground level.
- Put up warning signs at several points of the perimeter wall indicating presence of hazardous substances.
- To maintain the site in accordance with the waste management regulations and the National Guidelines on Safe Management and Disposal of Asbestos.

vii) Post disposal

- All transportation vessels, re-useable containers or any other similar article which have been in contact with asbestos waste shall be cleaned at the disposal site.
- The disposal site should be maintained including the warning signs, the fence, the gate among others to prevent vandalism and interference.
- Human activities which might interfere with the buried asbestos waste such as construction and pitting should not be allowed at the disposal site. The waste generator shall notify the Authority in writing on completion of disposal of asbestos waste.
- Asbestos disposal certificate should be issued to the proponent by the contractor so as to indemnify the proponent against any liability of illegal dumping.
- The tracking document should be submitted to NEMA for stamping.

6.4.1. Negative impacts relating to the premises operation and their mitigation

Solid waste

Wastes on the premises include metal rods, waste paper, polythene, used oil, plastics etc. Proper waste management is necessary to avoid unsightliness, accidents due to sharp objects and environmental degradation.

Mitigation

- The proponent should involve the services of a private refuse handler and align with NEMA and the County to facilitate sound waste management.
- All solid waste should be transported to the approved dumpsites and by licensed waste handlers.
- Proper waste segregation should be practiced and recycling and re-use of some wastes encouraged.

Waste water

Pre-treated (*using coagulation/flocculation method)* wastewater, if any will be generated, will be discharged into the county sewer system. Waste water if not properly controlled may contaminate the ground water and cause terminal diseases. Mitigation

- Directing pre-treated asbestos fibres containing water into the county sewer system.
- Ensuring that storm water does not drain into the sewer system.
- Periodically doing inspections for possible and potential leaks.

Occupational safety and health

Various human health hazards and nuisance such as fire, accidents, asbestos fibres etc. due to poor workmanship, lack of protective measures, poor emergency response, poor ventilation and lack of awareness on potential hazards.

Mitigation

- Facilitate regular occupational safety and health trainings for personnel
- Providing adequate and appropriate PPE safety for all the workers (i.e. respirators, eye shields, coveralls with head cover, safety harnesses and safety boots).
- The ladders to be used should be inspected before commencing the works and ropes for lowering the asbestos be fastened well.
- Conducting regular medical examination of workers as required by the Medical Examinations Rules of 2005 under the OSH Act, 2007.

- A first aid kit should be placed strategically within the site and should be fully equipped and a trained first aider on board.
- The proponent/ contractor should arrange effective emergency response plans- ERPs to cater for fire outbreaks, oil spills and other accidents likely to occur.
- Appropriate danger notices should be placed at strategic locations.
- Maintain a record of accidents and incidents.

6.4.2. Fire hazards

Fire risks are likely to be higher in both the removal and replacement phases. Although asbestos itself is fire-resistant, the decommissioning and roofing replacement processes may introduce flammable materials and ignition sources that increase the potential for fire incidents. Such sources of fire may include; Use of electrical tools and cutting equipment during the removal process, Poor site management which can lead to risk of arson etc. It should therefore be ensured that all operations during the construction and occupation phases are in tandem with the Fire Risk Reduction Rules, 2007.

Potential mitigation measures:

- All fire control and fighting strategies laid down in the approved plans should be implemented.
- Conduct regular fire drills and trainings on fire safety.
- Adapt an emergency response plan for the entire project during the operation phase.
- Prohibit smoking and other fire risk habits on the site.
- Ensure that all firefighting equipment is strategically positioned in case of a fire.

6.4.3. Barriers and guards

Contractors and managers should use these to protect the employees from physical hazards. Barriers, guards and warning signs are needed to ensure safety against existing hazards. They include signs like **DANGER ASBESTOS**, **CAUTION ASBESTOS** or **WARNING ASBESTOS,** solid separators like dust barriers, temporary walkways, etc.

6.5. PROJECT COMPLETION

6.5.1. Project completion

On completion of the works at the site, the following measures will be undertaken:

- The structure and surrounding areas will be cleared of any residual asbestos materials.
- All machinery, scaffolding, and project-related equipment will be removed.
- Debris and waste will be collected and disposed of in compliance with the Waste Management Regulations.
- All metallic waste will be decontaminated and delivered to licensed scrap metal handlers for reuse if any.

6.5.2 Disposal Site Operations and Safeguards

All asbestos waste will be transported to a licensed hazardous waste disposal site. The facility operates under NEMA approval and has the following safeguards in place:

- Routine monitoring of air, soil, and groundwater to prevent contamination.
- Waste sealed in impermeable containers or double-lined disposal cells to ensure no leachate or fiber release.
- 24-hour security, fencing, and restricted entry to prevent unauthorized access or scavenging.
- Waste manifests and disposal certificates provided for each consignment.
- Regular inspections by NEMA and County Environment Officers to verify compliance.

By ensuring these safeguards, the project guarantees that asbestos waste is securely and permanently managed, thereby protecting public health and the environment.

CHAPTER SEVEN

7.0. ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS

Environmental monitoring involves and aims at determining the effectiveness of actions to improve environmental quality. The following ESMMP will address the main issues of concern (potential negative impacts) and the mitigation measures, roles, costs and monitoring indicators to help indicate the effectiveness of mitigation measures to maintain the desired environmental quality.

7.1. Risk Assessment Matrix

Hazard Rating: Probability of Hazard Causing Harm

Table 8:Hazard Rating

Rating	Definition
1	Highly unlikely
2	Unlikely
3	Possible
4	Some exposure likely
5	Exposure likely/probable

Exposure Rating: Severity of Harm Caused

Table 9: Exposure Rating

Rating	Definition
1	Slight superficial
2	Over 3 day lost time injury
3	Major injury e.g fractures
4	Permanent disability e.g amputation
5	Fatality

Severity						
1	1	2	3	4	5	
2	2	4	6	8	10	
3	3	6	9	12	15	
4	4	8	12	16	20	
5	5	10	15	20	25	
	1	2	3	4	5	

Key (for total risk)

1-3	Low risk	Little effort required to reduce risk
4-6	Low moderate risk	Provide additional training, supervision and monitoring of agreed controls
8-10	Moderate high risk	Examine areas of exposure and come up with corrective measures to be implemented over a time.
12-25	Unacceptable high risk	Cease work until effective interim controls are agreed and implemented.

7.2. Risk Evaluation

ACTIVITY 1: Removal and disposal of asbestos roofing sheets at Kipevu Waste Water Treatment Plant and Pumping Stations .												
											REVIEW DATE: AFTER THE TASK	
HAZARD	RISK	RISK FACTORS				CONTROL MEASURES CURRENTLY IN PLACE	RESIDUAL RISK			FURTHER ACTION PLAN		
		PERSONS AT RISK	HAZARD EFFECT (HE)	PROBABILITY (P)	RISK RATING (RR)		HAZARD EFFECT (HE)	PROBABILITY (P)	RISK RATING	ACTION	BY WHO	WHEN
Removal of the asbestos roofing sheets from the premises.	Injuries due to falls.	10	5	3	15	• Only trained workers employed. • No unauthorized handling of asbestos. • Workers provided with appropriate PPE. These are helmets, coveralls/overalls, respirators, gloves, safety goggles, safety harness and safety boots. • Provision of a fully stocked First Aid box.	3	2	6	• Maintain mitigation measures in place. • Daily briefing on site safety. • Permit to work system to be put in place. • Close supervision of personnel.	MOW ASSC O	Before and during the whole removal process.

ACTIVITY 2: Arrangement and wrapping of the asbestos sheets at KWWTP and Pumping Stations , by use of 500µ polythene sheets.											REVIEW DATE: AFTER THE TASK
HAZARD	RISK	RISK FACTORS				CONTROL MEASURES CURRENTLY IN PLACE	RESIDUAL RISK			FURTHER ACTION PLAN	
		PERSONS AT RISK	HAZARD EFFECT (HE)	PROBABILITY (P)	RISK RATING (RR)		HAZARD EFFECT	PROBABILITY (P)	RISK RATING	ACTION	WHEN
Heavy asbestos sheets.	Musculoskeletal injuries /Accidents.	10	3	3	9	• Training on safe manual handling of materials. • Issuance of Permits to Work to all employees.	3	2	6	• Wrapping few asbestos sheets according to recommended weights.	During wrapping.
Work at Height	Injuries/fatalities	10	4	3	12	• Conduct risk assessments for all work at height activities prior to execution. • Ensure all workers are trained in fall protection and safe roof work procedures. • Use of appropriate access equipment such as ladders • Mandatory use of fall arrest systems and personal	3	3	9	• Inspection of ladders • Provision of Safety harnesses, helmets	During Removal

						protective equipment (PPE) including harnesses and helmets. • Supervision by qualified safety personnel throughout roof removal activities. • Erection of warning signs and barricades around work zones to protect bystanders.					
Constraints within the encapsulating area in the premises.	Injuries.	10	3	3	9	• Asbestos to be transported to the transfer station without delay as soon as they are removed and wrapped.	3	2	6	• Wrap and transport the asbestos sheets as soon as possible.	During wrapping.
Accumulated dust on the wrapping polythene bags.	Various respiratory diseases.	10	2	3	6	▪ Respirators provided. ▪ Wet spraying of cracking area.	2	2	4	• Use water sprays on specific cracking spots to reduce dust.	During wrapping and before stacking.

ACTIVITY 3: Stacking of the wrapped asbestos sheets.										REF NO.	
										DATE:	REVIEW DATE: AFETR THE TASK
HAZARD	RISK	RISK FACTORS				CONTROL MEASURES CURRENTLY IN PLACE	RESIDUAL RISK			ACTION PLAN	
		PERSONS AT RISK	HAZARD EFFECT (HE)	PROBABILITY (P)	RISK RATING (RR)		HAZARD EFFECT	PROBABILITY (P)	RISK RATING (RR)	ACTION	WHEN
Manual lifting/ stacking of heavy sheets.	▪ Musculoskeletal injuries. ▪ Injury due to falls. ▪ Minor cuts. ▪ Dust inhalation.	10 10	2 1	4 4	8 4	▪ Instruction to workers ▪ PPE provided. ▪ Respirators availed. ▪ Stacking area well ventilated.	2 2	3 2	6 4	Maintain mitigation measures in place. Do not stack the sheets above the breathing area (nose).	During the stacking process.
Mechanical lifting/ stacking of heavy sheets.	Injuries/Accidents by forklift.	2	3	3	9	• Trained workers employed.	2	2	4	Maintain mitigation measures in place.	During lifting for stacking

ACTIVITY 4: Loading, Transportation, and Offloading the Asbestos sheets into trucks; manually										REF NO.	
										DATE:	REVIEW DATE: AFTER THE TASK
HAZARD	RISK	RISK FACTORS				CONTROL MEASURES CURRENTLY IN PLACE	RESIDUAL RISK			FURTHER ACTION PLAN	
		PERSONS AT RISK	HAZARD EFFECT (HE)	PROBABILITY (P)	RISK RATING (RR)		HAZARD EFFECT	PROBABILITY (P)	RISK RATING (RR)	ACTION	WHEN
Manual loading of asbestos sheets into trucks.	▪ Injury due to falls. ▪ Minor cuts. ▪ Dust inhalation.	10 10	3 3	2 3	6 9	▪ Gloves, safety boots and overalls provided. ▪ Respirators availed. ▪ Loading area well ventilated.	3 2	1 3	3 6	Maintain mitigation measures in place. Do not load heavy sheets manually.	During the manual loading process
Mechanical loading of the asbestos sheets into trucks.	Injuries/accidents by forklift.	2	3	3	9	• Trained workers to be utilized.	2	2	4	Adequate number of workers to be utilized.	During the mechanical loading and offloading process

Transport (on-road)	Road traffic accident	2	3	3	9	• Roadworthy vehicle • Trained driver • Route plan hours), • Rest schedule, obey speed limits	2	2	4	Ensure short toolbox talk before departure	Pre-trip and during transportation

ACTIVITY 5: Re-roofing of the area where asbestos sheets have been removed.										REF NO.		
										DATE	REVIEW DATE: AFTER THE TASK	
HAZARD	RISK	RISK FACTORS				CONTROL MEASURES CURRENTLY IN PLACE	RESIDUAL RISK			FURTHER ACTION PLAN		
		PERSONS AT RISK	HAZARD EFFECT (HE)	PROBABILITY (P)	RISK RATING (RR)		HAZARD EFFECT (HE)	PROBABILITY (P)	RISK RATING	ACTION	BY WHO	WHEN
Building's roof.	Injury from falling.	10	5	3	15	• Workers to be retrained and safety harnesses issued on site. • Availability of a fully stocked First Aid kit.	5	3	5	Maintain mitigation in place.	Contracted roofing company.	During the re-roofing period
Galvanized iron sheets.	Cuts.	10	2	4	8	• Experienced workers employed and issued with proper PPE.	2	3	6	Use of appropriate PPE.	Contracted roofing company.	During the re-roofing period.

7.3.ENVIRONMENTALAND SOCIAL MANAGEMENT PLAN

Management Aspect	Mitigation measures	Time frame	Responsibility	Cost (Kshs)	Remarks
General Conditions	a) Notify workers and the neighboring community about the upcoming activity b) Prepare appropriate PPEs complying with international good practice c) Ensure to demarcate the site as required d) Post appropriate signpost of the site that will inform the workers of key rules and regulations to follow e) The contractor to prepare Job Safety Analysis Report before commencing the works f) Identify the asbestos have are broken in order to know how to handle them during removal	During preparation for the proposed activity	Proponent/Contractor	50,000	This will help prepare the workers and community for the asbestos disposal and cleaning process

Waste Management	a) Inform cleaning and disposal workers of their responsibilities in terms of the ESMP. b) Ensure that all waste removal workers comply with the Waste Regulations of 2024 and Sustainable Waste Management Act, 2022 c) Collect waste paper generated at the work site in scrap paper bins. Notify the waste paper removal worker /contractor when the temporary scrap paper storage area reaches capacity, for removal of the scrap paper to a recycling facility. d) Place all general / domestic waste in refuse bins. e) Waste Tracking document be issued after every collection	During the cleaning and disposal process	Proponent/Contractor	150,000	To ensure a clean and healthy environment

Asbestos management	(a) Asbestos disposal site shall be marked clearly as hazardous material (b) The asbestos will be appropriately contained and sealed to minimize exposure (c) The asbestos prior to removal should be treated with a wetting agent to minimize asbestos dust (d) Asbestos should be handled and disposed by skilled & experienced professionals (e) If asbestos material is being stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately. Security measures will be taken against unauthorized removal from the site.	Preparation and disposal of the asbestos	Proponent/Contractor	250,000	To prevent asbestos dust from becoming airborne; To minimize personal exposure to asbestos fibres To ensure good environmental and health status of the facility

	(f) The removed asbestos will not be reused				
Traffic and Pedestrian Safety	(a) Signposting, warning signs, barriers and traffic diversions: site should be clearly visible and the workers warned of all potential hazards (b) Provision of safe passages and crossings for pedestrians be made (c) Active management by trained and visible staff at the site, if required for safe and convenient passage for the workers. (d) Ensuring safe and continuous access to facilities, and residences during disposal and cleaning activities, if the facility is in operation during this activity	At preparation stages	Proponent/Contractor	100,000	To avoid the spread of asbestos dust To reduce the potential to contaminate, as asbestos fibres can be spread through various mediums including living persons To eliminate risks of exposure to asbestos fibres

Air Quality	a) Establish air quality monitoring systems and implement operational management plans to ensure that the system is being maintained properly and that the outputs of the monitoring system are providing suitable data on air quality. b) Appoint a dust monitoring system to monitor and analyse dust and air quality c) Air monitoring should be done continuously in areas related to asbestos removal works.	At preparation and disposal stages of the disposal	Proponent/Contractor	600,000	To minimize air pollution To prevent asbestos fibres from being airborne PM_{10} and fibre count levels below NEMA threshold
Storm water Management	Ensure all storm water from the site is directed towards the established water drains	During disposal process	Proponent/Contractor	20,000	To ensure that there is no ponding on the disposal site or flowing water

Management of temporary waste storage sites	a) Ensure management of temporary waste storage sites is in line set procedures and legal requirements. b) Register and monitor waste volumes at the temporary waste storage site c) Oversee the physical removal of the waste from the temporary waste storage sites d) Label the site as Caution 'Hazardous Waste'	During preparation and disposal stages	Proponent/Contractor	80,000	To ensure that the wastes are removed effectively and in time
Community health and safety	a) Enforce strict access control to all active work areas. b) Conduct community sensitization campaigns before and during project implementation. c) Provide Personal Protective Equipment (PPE) to visitors or affected persons as needed.	At during and after disposal	Proponent/Contractor	50,000	Ensure that site is only accessed by the staff and authorized personnel PPEs should be provided and be available at the sites

	d) Schedule temporary relocation or movement restriction for nearby residents during high-risk periods. e) Install clear signage and physical barriers around work zones. f) Provide medical screening or referral options for at-risk individuals. g) Ensure prompt clean-up and no stockpiling of asbestos waste on-site.				
Illegal Diversion/dumping of AC sheets	a) All removed AC sheets must be stored in a designated, fenced, and access-controlled area until transportation. b) Tracking documents in the NEMA prescribed format must accompany every load, and regular reconciliation of inventory must be done.	After removal, during transportation and after disposal	Proponent/Contractor	300,000	Contractor should provide all the necessary documents such as the transport license, disposal certificate, and tracking document duly filled and stamped

	c) Contractor should ensure that the AC is transported a NEMA licensed vehicle (to transport asbestos) d) Residents should be educated on the dangers of reusing asbestos sheets, including via posters and baraza forums. e) Random spot checks or independent audits should be done to confirm that all waste reaches the licensed hazardous waste disposal facility**.**				
Work at height	a) Conduct risk assessments for all work at height activities prior to execution. b) Ensure all workers are trained in fall protection and safe roof work procedures**.** c) Use of appropriate access equipment such as ladders	During removal of the asbestos	Contractor	30,000	Ladders to be used should be inspected before commencing works Toolbox talks to be held every morning before starting work to sensitize the staff PPE usage should be

	d) Mandatory use of fall arrest systems and personal protective equipment (PPE) including harnesses and helmets. e) Supervision by qualified safety personnel throughout roof removal activities. f) Erection of warning signs and barricades around work zones to protect bystanders.				enforced
Information and training	Training on the potential health risk caused by exposure to asbestos and how to reduce these risks	Before the disposal process commences	Proponent/Contractor	40,000	To provide awareness on the risks of asbestos
Asbestos exposure	The company shall not permit any person to work in an environment in which he or she would be exposed to asbestos in excess of the prescribed occupational exposure limit.	At, during and after the disposal and cleaning process	Proponent/Contractor	80,000 (Air quality monitoring) per site	To minimise risks of contracting diseases associated with exposure to asbestos fibres, e.g. cancer

Medical surveillance	Ensure medical surveillance of an occupational medical practitioner after the disposal exercise	After the disposal exercise	Proponent/Contractor	100,0000	To minimize incidents of occurrence of occupational diseases, notably those caused by exposure to asbestos fibres
Cleanliness of premises	Workplaces are maintained in a clean state and are free of asbestos waste	After the disposal process	Proponent/Contractor	40,000	To eliminate workplace contamination
Disposal Scheduling and Hours	The disposal and cleaning activities should be limited from 7 am or sunrise (whichever is later) to 5 pm or sunset	During the disposal and cleaning exercise	Proponent/Contractor		The prevent risk of inhaling asbestos fibres, which is possible if one does not clearly see the area of work due to darkness
Clearance Inspections	Inspections should be done to ensure that temporary storage site is cleaned to a satisfactory standard.	After the cleaning work	Proponent/Contractor	50,000	To eliminate risk of future contamination and exposure to asbestos
Grievances	Grievance redress book should be availed for lodging in all complaints from the community	At, during and after the disposal and cleaning process	Proponent/Contractor	10,000	To avoid conflict with the neighboring communities

7.3.1. **Summary of the Mitigation Measures and Monitoring Plan**

The table below provides a summary of the key impacts, mitigation measures, indicators, responsible parties, and monitoring frequency.

Impact	Mitigation Measure	Performance Indicator	Means of Verification	Responsible Party	Monitoring Frequency
Air pollution from asbestos fibers	Wetting asbestos before removal, use of sealed containers	PM10 and fibre count levels below NEMA threshold	Air quality monitoring reports	Contractor, NEMA Proponent Air Quality expert	Daily
Occupational health risk	Use of PPE, training, signage, controlled areas	Zero reportable health incidents	Site inspection and health records	Contractor, DOSHS EHS personnel	Weekly
Community safety risks	Public notices, demarcation of the site, emergency access	Zero complaints/incidents logged	Community logbook, grievance redress mechanism	Contractor, County Health Proponent	Weekly
Hazardous waste mismanagement	Track and audit asbestos waste from site to disposal	Validated waste tracking documents, issue disposal certificates after completion of the work	Signed waste chain documentation	Contractor, NEMA, Proponent	Per Trip
Disturbance to public infrastructure	Proper planning, minimal disruption to traffic or utilities	No utility downtime or access complaints	Complaints log, daily site report	Contractor, Utility Companies, Proponent	Ongoing

7.4.Roles and Responsibilities

S/No.	Entity	Role
1.	Proponent (MOWASSCO) [County Govt.]	a) Ensures funds are allocated for ESMP implementation; b) Engages qualified contractors; c) Submits progress reports to NEMA and World Bank. d) Supervise the works e) Supports public health and community liaison.
2.	Contractor	f) Implements all mitigation measures in the ESMP; g) maintains compliance records; h) appoints HSE Officer. i) Prepare a JSA j) Provide workers with PPEs k) Issue Disposal Certificate and waste Tracking documents
3.	EHS Personnel	a) Verifies environmental compliance; b) provides early warning of non-compliance.
4.	NEMA	c) Reviews environmental reports; d) Issue License for the works e) conducts compliance inspections.
5.	DOSHS	a) Oversees workplace health and safety compliance, b) Approves safety plans, c) Inspects worksites, and d) Enforces OSHA 2007 provisions, particularly for asbestos handling and worker protection.
6.	Air Quality Expert	a) Monitors air quality levels, b) Advises on dust control measures, c) Ensures compliance with air standards, and d) Reports findings to NEMA and DOSHS.
7.	Community Liaison Officer	a) Handling accidental spills of asbestos materials. b) Recordkeeping and labelling hazardous materials. c) Emergency evacuation and first aid response. d) Grievance management and community liaison.

CHAPTER EIGHT

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The ESIA study has incorporated the proposed removal, transportation, temporary storage and disposal of the asbestos sheets from Kipevu Waste Water Treatment Plant and various pumping stations.

The analysis of this report has evidenced that the implementation and operation phases of the proposed project will have positive impacts to the proponent and the community at large. These impacts will include creation of jobs and business opportunities, compliance with the Waste Management Regulations, Public Health Act, World Bank OP/ESF, and general amelioration of health at the area. However, there are some environmental concerns associated with this project as has been highlighted in the same. The report has therefore included a comprehensive ESMMP and Risk Evaluation to effectively mitigate these impacts. The implementation of a robust Environmental and Social Management Plan (ESMP), active stakeholder engagement, and ongoing monitoring and capacity-building measures will ensure sustainable execution of the proposed activities and protection of the environment and the community.

Recommendations

The expert's recommendation is that the project should be subjected to the outlined proposed methods, mitigation and, monitoring measures and that they should strictly be adhered to. The project proponent shall work closely with NEMA, DOSHS, Experts, the County Government and the general public to achieve these goals of safe removal of asbestos hence ensuring protection of the environment and public health. Other recommendations made include;

a) The project should be implemented in full alignment with the proposed mitigation and monitoring measures outlined in the ESMP.
b) The proponent should work closely with relevant authorities including the National Environment Management Authority (NEMA), the Directorate of Occupational Safety and Health Services (DOSHS), environmental experts, and the County Government to ensure all legal and technical requirements are met.
c) Continuous engagement with the local community and other stakeholders should be maintained throughout the project lifecycle to promote transparency and responsiveness to emerging concerns.
d) The contractor and site personnel must be adequately trained on asbestos handling, and supervised by qualified health, safety, and environmental personnel to ensure safe practices are consistently followed.
e) Accurate records, including waste tracking forms, air quality reports, disposal certificates, and grievance logs, should be maintained and made available to regulatory agencies as required.

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ANNEXES

1. Certificate of the Disposal site
2. Vehicle Transportation License
3. BOQ/contract with the Asbestos handler
4. Baraza Invitation letters
5. Signed Attendance registers
6. Signed Minutes
7. Public participation filled questionnaires
8. Experts Practicing License

Annex 4: Minutes (PortReitz 1)