

**REPUBLIC OF KENYA**



**MINISTRY OF WATER & SANITATION**

**MOMBASA WATER SUPPLY AND SANITATION COMPANY LIMITED  
(MOWASSCO)**



**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROJECT REPORT**

**FOR**

**IMPROVING THE EXISTING STORM WATER OUTLETS IN MOMBASA  
ISLAND**

**Works carried out under**

**Contract No.: CWSB/WaSSIP-AF/C/37/2016**

**Report Prepared by:**



**Zamconsult Consulting Engineers**

**NOVEMBER, 2018**

## ESIA EXECUTIVE SUMMARY

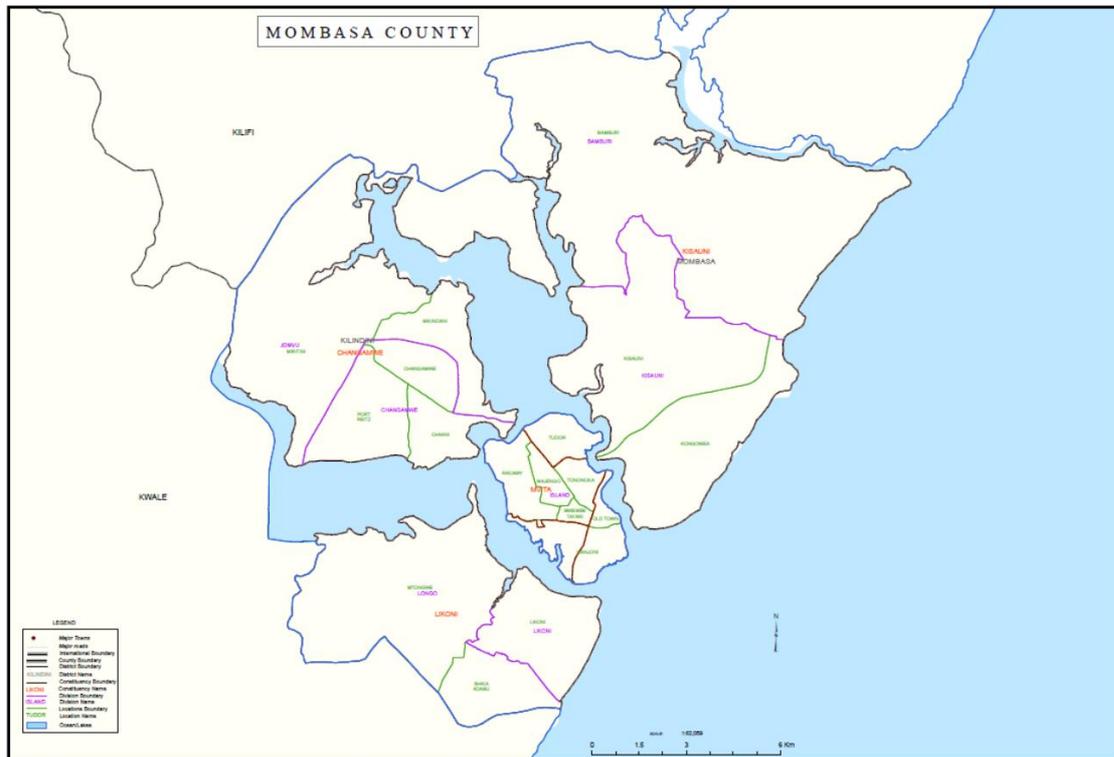
### Background

Mombasa Water Supply & Sanitation Company Limited is a limited liability company that has the mandate to providing cost effective and affordable quality water and sanitation services to the residents of Mombasa County.

As part of its mandate, MOWASSCO intends to reduce the pollution of the Indian Ocean via the improvement of the existing storm water outlets in Mombasa Island under the Kenya Water and Sanitation Development Project. Twelve sites have been selected for improvement. The improvements will involve the construction of grit removal chambers and coarse and fine screens to reduce the amount of waste water making its way to the Indian Ocean, via illegal sewage connections made to the storm water system. The sites selected for improvement are:

1. Makupa
2. Mbaraki
3. Nyali
4. Railways
5. Tudor Minor
6. Buxton
7. Coast General
8. Kizingo
9. Pump Stations (4)

The project area is shown in the map below:



Zamconsult Consulting Engineers has been contracted to undertake the ESIA and RAP for the proposed improvements works as part of the KWSDP projects with funding from the World Bank.

### **Study Methods**

The study approach and methodology adopted included screening to determine the extent of the project and desktop data search and analysis for the baseline bio-physical and social environmental parameters of the project area. In addition, the consultant worked with the project design group and was briefed and obtained design approaches to be used which informed the requirements of the environmental reporting process and for which excerpts have been obtained on salient design information. The Consultant engaged on multi-faceted public consultation process which included ad hoc roadside interviews, household social and environmental surveys using structured questionnaires duly analysed and key informant interviews to institutions and lead agencies and public consultation meetings. Based on these findings and expert judgement, the consultant has compiled the projected social and environmental impacts (positive and negative) likely to emanate from proposed project activities and the Environmental and Social Monitoring and Management Plan (ESMMP) which details how adverse impacts will be reduced or eliminated and by whom.

### **Legislative Framework for this Study**

The principal National legislation governing issues of environmental concern in Kenya is the Environmental Management & Coordination (Amended) Act of 2015 typically referred to as EMCA. EMCA calls for Environmental Impact assessment (EIA) (under Section 58) to guide the implementation of environmentally sound decisions and empowers stakeholders to participate in sustainable management of the natural resources. Projects likely to cause environmental impacts require that an environmental impact assessment study to be carried out. It is under this provision that the current study has been undertaken.

Other legislation adhered to during this study are the regulations borne of EMCA Cap 387 namely the Environmental Impact Assessment and Audit Regulations 2003; The Environmental Management Coordination Act (Waste Management) Regulations 2006; the Environmental Management Coordination (Water Quality) Regulations 2006; and the Environmental Management and Coordination (Noise and Excessive vibration pollution Control) Regulations 2009 (Legal Notice 61), Air quality Regulations 2009 among others.

Sectoral legislation applicable to this Project include The Lands Act (2012), the National Land Commission (2012), the Constitution, The Public Health Act (CAP. 242), among others.

In addition to the local legislation, the Consultant identified the various World Bank operational policies relevant to the project. Some of these policies include Operational Policy (OP) 4.01, OP 4.04, OP 4.12, as well as the World Bank Policy on Access to Information, 2010.

### **Expected impacts**

The expected impacts emanate from the Planning phase, the Construction Phase, the Operation phase and the De-commissioning Phase of the project.

In general, successful implementation of the project will have high environmental and socioeconomic benefits to the people and will contribute to their health and well-being. Overall, negative expected impacts are related to the construction activities and operation of the projects. These impacts are localized and not considered significant and long-lasting and can be mitigated through appropriate mitigation measures. The severity and duration of these impacts can be minimized by ensuring that the construction and operation activities adhere to

the proper construction and operation standards specified by the design and supervision engineers.

A significant Planning Phase impact will be the displacement of people particularly in the Tudor and Makupa sites where there are informal settlements. Several tenants will lose their domiciles and land lords will lose their sources of income. A detailed Resettlement Action Plan has been prepared and approved for implementation by the client.

Construction Phase impacts are generally significant in magnitude and socially and environmentally adverse but are also reversible, short-term and largely manageable. The Construction phase activities will include trenching, concrete works and laying of pipelines, during the installation of the inlet works, coarse and fine screens and the grit removal chambers. Construction camp impacts include generation and inappropriate disposal of solid and liquid wastes, increased spread of Sexually Transmitted Diseases (STD) and HIV/AIDs, sexual exploitation, and change of cultural norms as a result of labor influx. Construction work impacts include noise, dust, water pollution, loss of flora and fauna among others. Positive construction phase impacts include economic boost from injected construction money which is spent in the local environment for purchasing food and other supplies, rental accommodation and local travel. Also, there will be opportunity for skills transfer and skills acquisition.

Operation phase impacts will largely be positive benefits accruing from operation of improved sanitation. These include less water-borne disease, improved comfort and regional prosperity. However, significant adverse impacts from operations include solid waste and air pollution.

De-commissioning of the Project is not envisaged. Project components however will be rehabilitated over time having served their useful life. If during the de-commissioning, the facilities are inadequate, the facility can be expanded to fit the growing population.

### **Environmental & Social Mitigation and management Plan (ESMMP)**

This was prepared to reduce, minimize or altogether eliminate the adverse impacts. Positive impacts are project enhancements and do not require mitigation.

The ESMMP is fully described in chapter 9 of this report, however the table below presents the identified environmental and social impacts, their mitigation measures and the party responsible for carrying out the mitigation measures, in summary.

<b>Project Phase</b>	<b>Environmental / Social Impact</b>	<b>Mitigation Measure</b>	<b>Responsibility</b>
Pre-construction	Loss of structures	Compensation in accordance to RAP	CWSB/MOWASSC O/County government/National Land Commission
	Loss of livelihoods	Compensation in accordance to RAP	
	Loss of housing	Facilitation to move in accordance to RAP	

<b>Project Phase</b>	<b>Environmental / Social Impact</b>	<b>Mitigation Measure</b>	<b>Responsibility</b>
Construction	Loss of flora and fauna	Re-plant the indigenous vegetation.  Minimise the interference with flora and fauna through proper construction methods.	Contractor  Supervising Engineer  County Officer- Water Energy and Natural Resources  CWSB
	Air quality	Use protective clothing on construction crew.  Water spraying of construction routes.  Proper maintenance of construction plant.	Community Leaders
	Noise pollution	Avoid night time construction with noisy machinery.  Avoid noisy machinery near sensitive areas.  Proper maintenance of construction plant.  Where possible, ensure non mechanized construction.	
	Site Related Oil Spills	Proper procedures for dealing with oil spills.  Proper maintenance of construction plant to prevent oil spills.	
	Soil Related Impacts	Temporary drainage channels, holding ponds or retaining walls employed in areas susceptible to erosion.  Restoration of ground vegetation after construction.  Proper procedures for dealing with oil spills.	

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility
	Impacts on Water resources	Proper solid and liquid wastes disposal.	
	Public Health & Safety	Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS through staff training and safe uses of drinking water.	
	Occupational health and safety risks associated with the Project to workers and community, including sexual harassment that occurs between workers on the project.	<ul style="list-style-type: none"> <li>• Ensure clear human resources policy against sexual harassment that is aligned with national law</li> <li>• Integrate provisions related to sexual harassment in the employee Code of Conduct (CoC)</li> <li>• Ensure appointed human resources personnel to manage reports of sexual harassment according to policy</li> <li>• Provide sex-disaggregated latrines for male and female workers.</li> <li>• Ensure that all construction machines and equipment are in good working conditions to prevent occupational hazards.</li> <li>• Establish a Health and Safety Plan (HASP) for both civil and electromechanical work.</li> <li>• Appoint a trained health and safety team for the duration of the construction work. Use of dust masks while working in dusty</li> </ul>	

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility
		environment to avoid respiratory related sicknesses. <ul style="list-style-type: none"> <li>• Provide workers with appropriate personal protective equipment (PPE).</li> <li>• Provide workers with adequate drinking water and breaks.</li> <li>• Provide workers training on safety procedures and emergency response such as fire, oil and chemical spills, pipe bursts and other serious water loss risks</li> <li>• Work to minimize or altogether eliminate mosquito breeding sites.</li> </ul>	
	Spread of communicable diseases and HIV/AIDS	<ul style="list-style-type: none"> <li>• Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS and sexual health and rights through staff training, awareness campaigns, multimedia and workshops or during community Barazas.</li> <li>• Promote use of existing clinics to provide VCT services to construction crew</li> <li>• Ensure safety of women and girls in provision of VCT services</li> <li>• Provide toilets within the camp</li> <li>• Work to minimize or altogether eliminate</li> </ul>	

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility
		<p>mosquito breeding sites.</p> <ul style="list-style-type: none"> <li>• Provide appropriate human and solid waste disposal facilities</li> <li>• In general, comply with operating occupational health and safety law requirements</li> </ul>	
	<p>Sexual exploitation and abuse (SEA) of community members by project workers including Violation of children's rights by contractor and labour forces on site.</p>	<ul style="list-style-type: none"> <li>• Develop and implement an SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018).</li> <li>• The SEA action plan will include how the project will ensure necessary steps are in place for: <ul style="list-style-type: none"> <li>○ Prevention of SEA: including CoCs and ongoing sensitization of staff on responsibilities related to the CoC and consequences of non-compliance; project-level IEC materials;</li> <li>○ Response to SEA: including survivor-centered coordinated multi-</li> </ul> </li> </ul>	

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility
		<p>sectoral referral and assistance to complainants according to standard operating procedures; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level, including confidential data management;</p> <ul style="list-style-type: none"> <li>○ Engagement with the community: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of PSEA awareness-raising in all community engagement activities; community-level IEC materials; regular community outreach to women and girls about social risks and their PSEA-related rights;</li> </ul>	

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility
	Gender-based violence at community level	<ul style="list-style-type: none"> <li>• The contractor will implement provisions that ensure that gender-based violence at the community level is not triggered by the Project, including:               <ul style="list-style-type: none"> <li>○ effective and on-going community engagement and consultation, particularly with women and girls;</li> <li>○ review of specific project components that are known to heighten GBV risk at the community level, e.g. compensation schemes; employment schemes for women; etc.</li> <li>○ Specific plan for mitigating these known risks, e.g. sensitization around gender-equitable approaches to compensation and employment; etc</li> </ul> </li> </ul>	

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility
	Socio-economic impacts	<p>Job opportunities for locals.</p> <p>Sensitize community and schools on labour influx and associated impacts as well as mitigation measures</p> <p>Use of manual labour where possible.</p> <p>Sensitize workers and the surrounding communities on HIV/AIDS.</p> <p>Use of existing clinics to provide VCT services and ARVs.</p> <p>A code of conduct for construction employees</p>	
	Labor influx into the project area	<ul style="list-style-type: none"> <li>• All Contractors to develop &amp; implement a Labour Influx Management Plan and Workers' Camp &amp; Accommodation Management Plans as part of C-ESMP.</li> <li>• All workers to sign employment contract including Code of Conduct.</li> <li>• Establish a Grievance Committee for Workers</li> <li>• Casual workers be employed from host community to reduce labour influx</li> <li>• Sensitize workers on community based social behavior and conduct</li> </ul>	

Project Phase	Environmental / Social Impact	Mitigation Measure	Responsibility
		<ul style="list-style-type: none"> <li>• Sensitize workers to not engage in sexual relations with underage girls and married women</li> <li>• Establish a Grievance Redress Committee to act as link between community and the project; local leadership should always be sought as a first priority in solving issues;</li> <li>• prepare both local communities psychologically and the new comers;</li> <li>• Efforts to be geared toward instilling attitudes of tolerance, support and understanding of labour immigrates by the local communities;</li> <li>• <u>Regular Monitoring</u> by Local Government</li> </ul>	
	Traffic Congestion	Provision of Signage and traffic controls. Provide a traffic management plan. Designates loading/unloading areas.	
	Gender empowerment	Ensure equitable distribution of employment opportunities between men and women. Mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by	

<b>Project Phase</b>	<b>Environmental / Social Impact</b>	<b>Mitigation Measure</b>	<b>Responsibility</b>
		<p>Gender Policy 2011 and 2/3 gender rule.</p> <p>Ensure safe employment for women, including training for all staff on SH COC, regular consultation with female employees and other measure to ensure physical safety and dignity of female employees</p>	
	Disability mainstreaming	Offer job opportunities to and or hire services from people living with disability	
	Impacts on Cultural Heritage	Use of “chance find” procedures provided in the appendices	
	Security within the Project Site	<p>Fencing around project area.</p> <p>Working with local committees (e.g. “nyumba kumi) to provide security within the site in addition to the Contractor’s own security.</p>	
Operation	Generation of solid waste	Continuous collection of generated waste and disposal at designated disposal sites	MOWASSCO
	Noise Pollution	<p>Proper maintenance of transportation vehicles</p> <p>All transportation vehicles should be licensed by NEMA</p>	
	Air Quality	Continuous removal of debris from the screens reducing foul odours.	

Decommissioning on the plants is not foreseen however improvements and expansion can be done after the project has reached its design year.

### **Conclusion**

As has been alluded in this report, the following can be said in summary.

The implementation of the proposed improvements to the storm water outlets will have the following benefits:

- i) Reduced Pollution of the Indian Ocean.
- ii) Improved hygiene within the project area
- iii) Improved socio-economic benefits via improved tourism opportunities and fishing grounds
- iv) The recommendations of the public consultation and participation was incorporated into the findings of this report.

The ESIA concludes that the project will have substantial positive environmental benefits. It will supply will improve the environment within the ocean ecosystem.

The adverse impacts on the physical and natural environment will be “in sum total,” not significant, and can be handled through the recommended mitigation measures at a cost of K.Shs. 17,527,200.00 for all twelve sites. Compensation for demolition of structures and livelihood will be done through a detailed Resettlement Action Plan which is provided under a separate report.

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**ACRONYMS AND ABBREVIATIONS**

AIDS	Acquired Immunodeficiency Syndrome
CBO	Community Based Organization
CH <sub>4</sub>	Methane
CO <sub>2</sub>	Carbon Dioxide
CWSB	Coast Water Services Board
EIA	Environmental Impact Assessment
EMCA	Environment Management Coordination ACT
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Mitigation and Management Plan
ESMP	Environmental and Social Monitoring Plan
GHG	Greenhouse Gases
GoK	Government of Kenya
HIV	Human Immunodeficiency Virus
IC	Individual Service Connection
ID No.	Identity Card Number
Kshs.	Kenya Shillings
KAPP	Kenya Agricultural Productivity
KFS	Kenya Forestry Service
KWS	Kenya Wildlife Service
m <sup>3</sup>	cubic metres
Mbgl	metres below ground level
MDG	Millennium Development Goals
MOWASSCO	Mombasa Water Supply and Sanitation Company Ltd
MWI	Ministry of Environment Water and Irrigation
NC	Communal Service Connection
NEMA	National Environment Management Authority
NGO	Non-Governmental Organization
NMK	National Museums of Kenya
NPEP	National Poverty Eradication Plan
O&M	Operation and Maintenance
PAP	Project Affected Person
PEC	Poverty Eradication Commission
PPE	Personal Protective Equipment
SEA	Sexual Exploitation and Abuse

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SH	Sexual Harassment
STD	Sexually Transmitted Diseases
VOCs	Volatile Organic Compounds
WRMA	Water Resources Management Authority
WSB	Water Services Board
WSP	Water Services Provider
WSS	Water Supply and Sanitation Services
WSSD	World Summit for the Social Development
WTP	Water Treatment Plant

## **1 INTRODUCTION**

### **1.1 MOMBASA WATER SUPPLY AND SANITATION COMPANY LIMITED (MOWASSCO)**

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. This was after finalizing negotiations on the water Service Agreement with the Coast Water Services Board and appointing the first Board of Directors. Owing to Corporate Management challenges under the appointed board of directors, the company failed to attain key performance indicators in the provision of water and sewerage services and was taken over by the Ministry of Water and Irrigation. Thereafter, it was incorporated in March, 2011 under the companies Act chapter 486 Laws of Kenya, and was finally operationalised in 25th July, 2011 under a new Board of Directors.

The company has the mandate to providing cost effective and affordable quality water and sanitation services to the residents of Mombasa County. In discharging the mandate the company is expected to undertake the following responsibilities:

- Provide quality and economical water and sanitation services to consumers.
- Billing for water and sanitation services and ensure timely collection of dues.
- Routinely maintain water and sanitation services and infrastructure.
- Ensure that standards and licensing requirements are complied with as stipulated by the Service Provision Agreement (SPA) signed with Coast Water Services Board.

### **1.2 KENYA WATER AND SANITATION DEVELOPMENT PROJECT (KWSDP)**

Based on the good implementation progress of WaSSIP 1 and the need for additional investments the Government has requested the World Bank for additional financing for KWSDP. The KWSDP project is targeted at investments on rehabilitation and expansion of existing water supply schemes, design and development of bulk water supply systems, drought mitigation measures, planning and development of sanitation infrastructure and institutional strengthening.

Further support would consolidate the gains in sector institutional arrangements and help these institutions to improve and expand actual WSS delivery to Kenyans through sustainable infrastructure investments.

The proposed KWSDP will complement and build on the gains and achievements already made through the implementation of WaSSIP 1. The development objectives of the project are therefore to:

- i. Increase access to reliable, affordable and sustainable water supply and sanitation services; and
- ii. To improve the water and wastewater services in the areas served by MOWASSCO
- iii. Mitigate the effects of drought through response measures

This will be achieved by:

- Rehabilitating selected existing water production, transmission, storage and distribution facilities and wastewater collection, treatment and disposal facilities,
- expanding piped water supply services to under-served areas through a balanced program including the involvement of communities in decision making and extension of primary and secondary distribution pipes where required, and
- Refining and strengthening the institutional structure, emphasizing on increasing accountability and transparency of the institutional and governance and management framework for CWSB, NWSB.

### **1.1.1. The Improving of Existing Storm Water Outlets in Mombasa Island under KWSDP**

One of the projects under KWSDP will be the improvement of the twelve (12) existing storm water outlets within Mombasa Island. This project's main aim is to reduce the pollution of the Indian Ocean via the existing storm water outlets located at several locations within the island. The project is further described in chapter 2 of this report.

## **1.3 METHODOLOGY OF WORK**

The ESIA was undertaken at a level that was considered to be commensurate with the scale, complexity and sensitivity of the project. The key stages in the process included proposal definition, screening which included key informant & household consultations, impact assessment, mitigation, review, decision-making and monitoring, as part of the preparation of this project report. For this ESIA to be good, recommendations have been integrated into the project development process. This should not be seen as a barrier to development or as an unnecessary cost. As well as being a stepping-stone to consent from environmental regulators and financial backers, it is a management tool for use during project planning and execution and will help avoid unnecessary impacts, delays and unexpected costs.

The consultant used a holistic approach to obtain the necessary baseline data and information on the below-listed aspects of the ESIA. An in-depth desk study, field observation, and wide consultation with stakeholders, key informant interviews and structured socio-economic interviews were carried out so as to obtain the requisite data and information on the following themes:

- Human Environment including; Socio-economic, Socio-cultural and Socio-legal
- Natural Environment including; Flora, Fauna, Soil, Water, Air, Climate and Landscape
- Built environment including; Material Assets, Historical /Archaeological Sites and Monuments and
- Aesthetic Environment

The consultant used the available information to derive or predict or assess impacts and classify them under human, natural and built environment at pre-construction stage, Construction Stage and Operation stage of each project sub-component.

Any negative impact was widely assessed and the most suitable mitigation measure apportioned as a solution to the problem. Positive impacts were noted as such and further reinforced by statements of actions that enhance their productivity and sustainability in the development process during and after the implementation of the project.

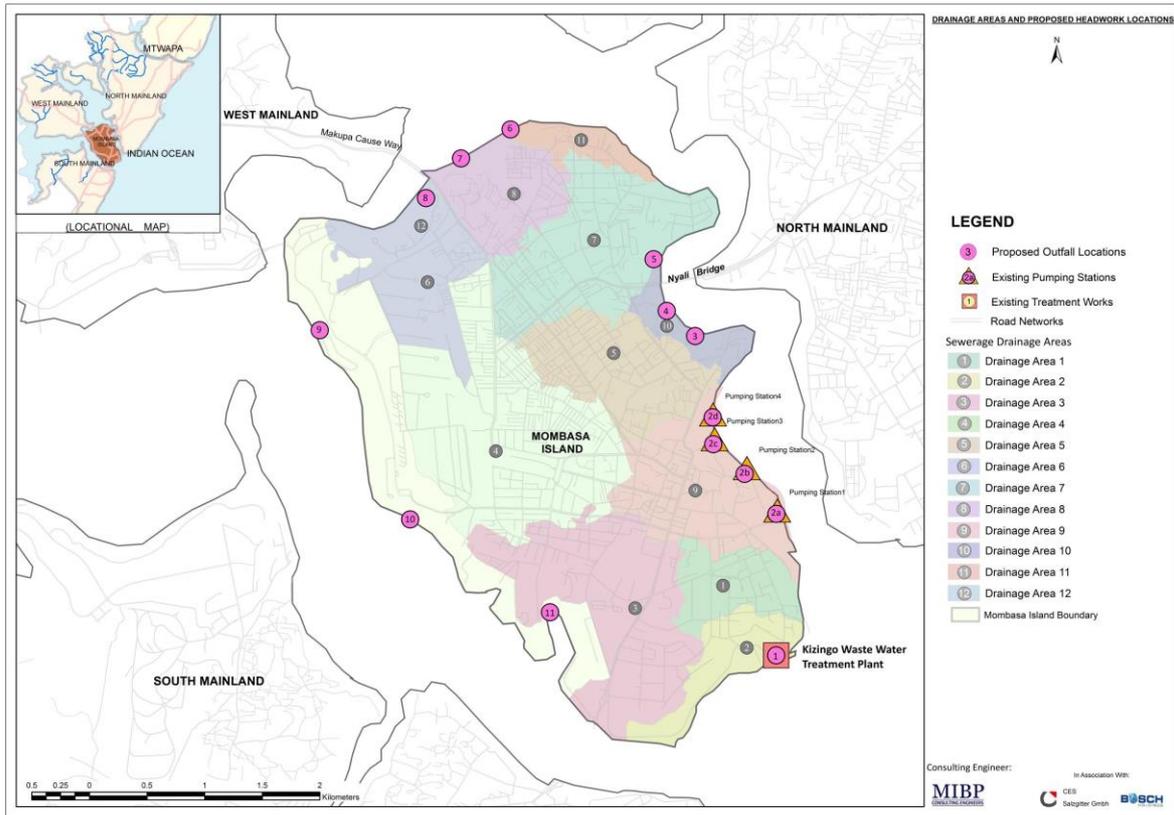
ESIA was done for all the stages of the project including planning, construction, operation and decommissioning.



No.	Outfall Name	Easting	Northing
1	Makupa	575427.96	9550131.58
2	Mbaraki	572206.75	9551314.49
3	Nyali	574334.32	9553596.40
4	Railways	572339.19	9554114.70
5	Tudor Minor	573058.24	9554700.59
6	Buxton	574671.61	9552941.82
7	Coast General	574518.25	9553121.17
8	Kizingo	575427.96	9550131.58
9	Pump Station 1	575197.76	9551720.70
10	Pump Station 2		
11	Pump Station 3		
12	Pump Station 4		

## 2.2 THE BACKGROUND OF PROPOSED PROJECT

Mombasa Island is currently served by storm water drainage which drains into the Indian Ocean via storm water outfalls placed all over the island as shown in the map below:



**Table 22: Existing Storm Water Outlets and the areas they serve**

Over time, some properties within the island have connected to the storm water system which is purely a conveyance system that drains directly into the Indian Ocean. The use of the storm water system by properties without any form of treatment has led to the pollution of the Indian Ocean, affecting the biodiversity within the ocean. As part of KWSDP, MOWASCO intends to provide treatment of the storm water outlets.

### 2.3. OBJECTIVES OF THE PROJECT

The proposed project is aimed at preventing the pollution of the Indian Ocean by providing treatment of the storm water from the outlets before discharge into the ocean.

### 2.4. DESIGN COMPONENTS

#### 2.4.1. Waste Water Generation

To quantify the wastewater generated by each of the storm water discharge points, the service area within Mombasa Island has been divided into drainage areas. The contribution of each drainage area has been determined based on its population, land-use and the adopted per capita water consumption rates and sewage generation factor. The wastewater generation for each drainage area has also been projected for the initial year (2018) and future horizon (2025).

Key parameters adopted in the population projection and water consumption for wastewater generation are given the table below:

**Table 2.2: Primary Data Adopted for Computation of Water Consumption**

Base Population	Projection Method	Growth Rate	Per Capita Domestic Water Demand (l/c/day)			
			Low Density	Medium Density	High Density with Connection	High Density without Connection
2009 census	Exponential growth	3%	200	120	60	50

The dry weather flows for the initial and future years for the drainage zones highlighted in figure 2.2 were determined based on the data summarized in the table above. An assumption of 100% of the waste water goes into the storm water system. The table below summarises the total dry flow for the various drainage regions.

**Table 2.3: Waste water flow into storm water system**

Contributing Drainage Area	Q <sub>dwf</sub> – 2018 (m <sup>3</sup> /day)	Q <sub>dwf</sub> – 2025 (m <sup>3</sup> /day)
1 & 2	501	617
9	2632	3292

Contributing Drainage Area	Q <sub>dwf</sub> – 2018 (m <sup>3</sup> /day)	Q <sub>dwf</sub> – 2025 (m <sup>3</sup> /day)
10	2153	2696
5	4219	5282
7	3826	4793
11	35	42
8	450	558
12	296	395
6	3356	4204
4	1352	1685
3	165	202

#### 2.4.2. Storm Water Flows

During wet weather, the storm water sewers convey combination of the wastewater and storm water.

The storm water component of the wet weather flow for individual drainage areas has been determined based on the rational formulae given by the expression: -

where: -

Q = Storm water run-off in m<sup>3</sup>/s

C = Run-off coefficient (Ranging from 0.70 – 0.95 for concrete pavements)

i = Rainfall intensity in mm/hr (Read from Rainfall Atlas for nearest Station)

A = Gross contributing area (Ha) i.e. area of drainage area

For economic considerations with adequate provisions for conveyance of storm water flows, a 5-year storm was adopted and values presented in the table below.

**Table 24: Estimated Storm Water Peak Flows for the Drainage Areas**

Contributing Drainage Area	Area (Ha)	Storm Duration (min)	5 Year Design Storm Flow (m <sup>3</sup> /day)
1 & 2	125.5	120	7.47

Contributing Drainage Area	Area (Ha)	Storm Duration (min)	5 Year Design Storm Flow (m <sup>3</sup> /day)
9	171.87	120	8.23
10	83.07	120	3.98
5	220.04	120	10.53
7	39.79	120	1.9
11	132.25	120	6.33
8	37.37	120	1.79
12	34.7	120	1.66
6	115.21	120	5.51
4	148.6	120	7.11
3	53.07	120	2.54

### 2.4.3. Combined Storm Water and Sewage Flows

The total flow in a combined sewer system is a summation of the storm water flow and the wastewater flow. During wet weather, maximum total flow is experienced and size of sewer system become critical. The contribution of storm water also become a significant component while the wastewater flow is rendered negligible. The advantage of such a scenario is that the polluting load from the wastewater is substantially diluted.

The worst case scenario of combined sewer flows for a 5-year storm and 100% sewer connection has been adopted in the design of the outlets, with the maximum flows summarized in the table below:

**Table 25: Combined Flows per Drainage Area**

Contributing Drainage Area	Q <sub>comb</sub> – 2018 (m <sup>3</sup> /s)	Q <sub>comb</sub> – 2025 (m <sup>3</sup> /s)
1 & 2	7.476	7.477
9	8.260	8.268
10	4.005	4.011
5	10.579	10.591

<b>Contributing Drainage Area</b>	<b>Q<sub>comb</sub> – 2018 (m<sup>3</sup>/s)</b>	<b>Q<sub>comb</sub> – 2025 (m<sup>3</sup>/s)</b>
7	1.944	1.955
11	6.330	6.330
8	1.795	1.796
12	1.663	1.665
6	5.549	5.559
4	7.126	7.130
3	2.542	2.542

#### ***2.4.4. Project Components***

A standard design concept was adopted for the headworks structures at each of the storm Water Discharge Points. The headworks structure has been designed to provide diversion of storm water flows into a storm water drainage system that discharges directly into the sea, while providing preliminary treatment to the wastewater through screening and grit removal.

The headworks will comprise of the following units: -

1. **Inlet structure;** - for diversion of storm water flows to the ocean,
2. **Coarse and fine screens;** - for preliminary treatment of wastewater, and
3. **Grit removal chamber;** - for preliminary treatment of wastewater.

From the headworks structure, wastewater will be conveyed to a surge chamber to be located within the headworks site for discharge into the ocean at the low-low tide level through an outfall pipe. Each of the units is explained in the sections below:

##### *1) Inlet Structure*

This unit comprises of an inlet channel and an overflow weir. The inlet channel has been designed to convey peak wastewater flows and approximately 10% of storm water flows into the subsequent units of the Headworks. Once the flow builds beyond the design level, the overflow weir enhances diversion of storm water into an overflow chamber to a storm water drainage system discharging at a headwall to be located at the ocean shore.

##### *2) Fine and Coarse Screens*

From the Inlet Structure, the wastewater will enter the screening channels fitted with coarse and fine screens for removal of floating debris and other objects. The coarse and fine screens shall be of respective standard bar sizes and placed adjacent to each other, with the fine screens downstream of the coarse screens. The screens shall be manually cleaned type to minimize electro-mechanical equipment and associated costs.

The installation of bar screens shall be carried out in such a manner that manual cleaning can be carried out with ease, with an operating platform across the channel width.

A screening tray shall be provided next to the inlet structure for holding and consolidating the debris prior to transporting to designated collection skip.

### 3) Grit Removal

Due to the widely range of the combined storm-water and wastewater flow varying flow regimes at the different headworks, two typical Headwork arrangements based on the Grit Removal techniques have been adopted: -

#### **Type 'A' Headworks - Constant Flow Grit Removal Chamber**

For headworks handling less than 700 m<sup>3</sup>/day of peak design influent flow, a constant flow grit removal chambers design has been adopted.

The constant flow grit removal chamber comprises of a rectangular grit chamber designed to provide 5-minute retention time. Grit and heavy particles settle by sedimentation as the supernatant wastewater flow over the outlet wall. An opening at the bottom of the outlet wall connected to drainage pipe fitted with control valve and filled with filter media allows for cleaning of the chamber. The chamber is manually cleaned from retained grits by stopping the inflow and allowing the grit collected to dry.

2 Nr Grit Removal Chambers (Type 'A') will be provided for headworks with design flows less than 400 m<sup>3</sup>/day. For those with design flows ranging between 400 – 700 m<sup>3</sup>/day, a total of 3 Nr. Grit Removal Chambers (Type 'A1') will be provided. Both grit chambers are shown in the figures below:

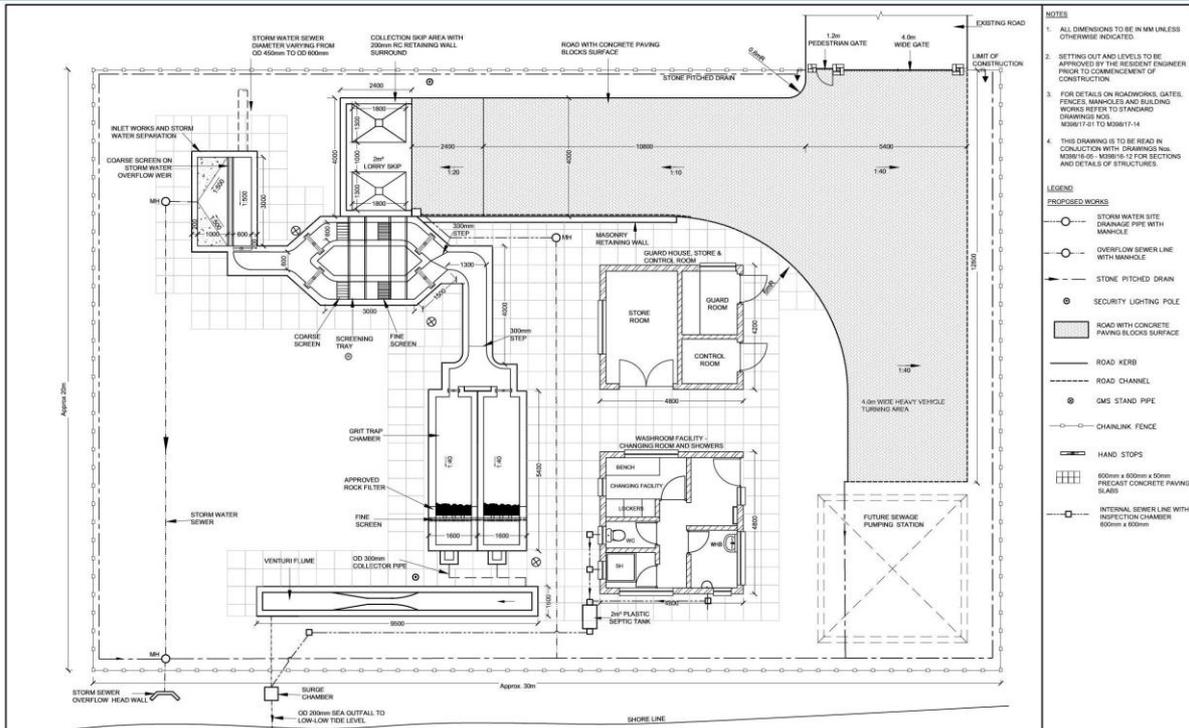


Figure 23: Type 'A' Grit Removal Chamber

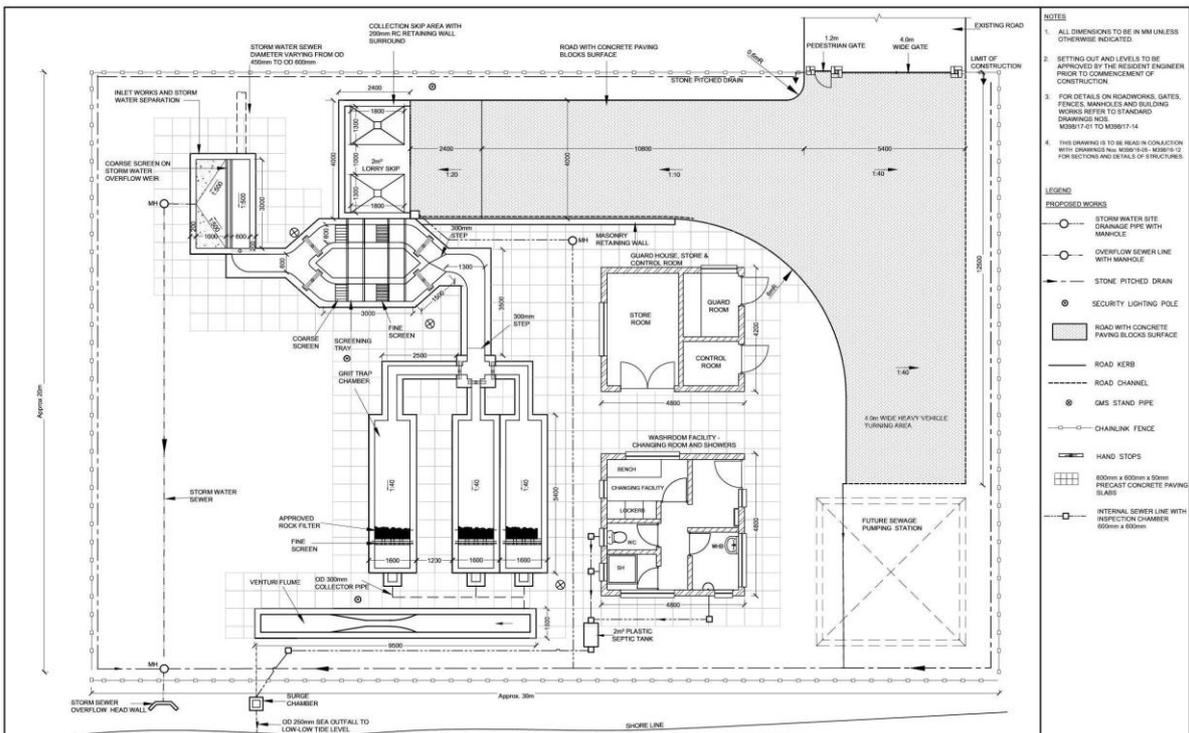


Figure 24: Type 'A1' Grit Removal Chamber

### **Type 'B' Headworks - Constant Velocity Grit Removal Channel**

A constant velocity grit removal channel has been adopted for Headworks with peak design influent flow ranging between 700 m<sup>3</sup>/day to 5,000 m<sup>3</sup>/day.

The venturi flume within the channel structure controls the velocity of flow in the grit removal channel. The parabolic shape of the channel keeps the velocity constant at 0.3m/s and ensures grit settling devoid of volatile suspended solids.

The constant velocity grit removal channel is cleaned manually after closure at the channel inlet and providing adequate time for grit to dry.

A standard design has been adopted, with varying dimensions to suit two general categories of flow regimes. For discharge points with design peak flows less than 3,000m<sup>3</sup>/day, Type 'B' Headworks Grit Removal Channel will be adopted while those with peak flows ranging from 3,000m<sup>3</sup>/day to 5,000m<sup>3</sup>/day will be provided with Type 'B1' Headworks. The figures below show the two grit removal chambers.

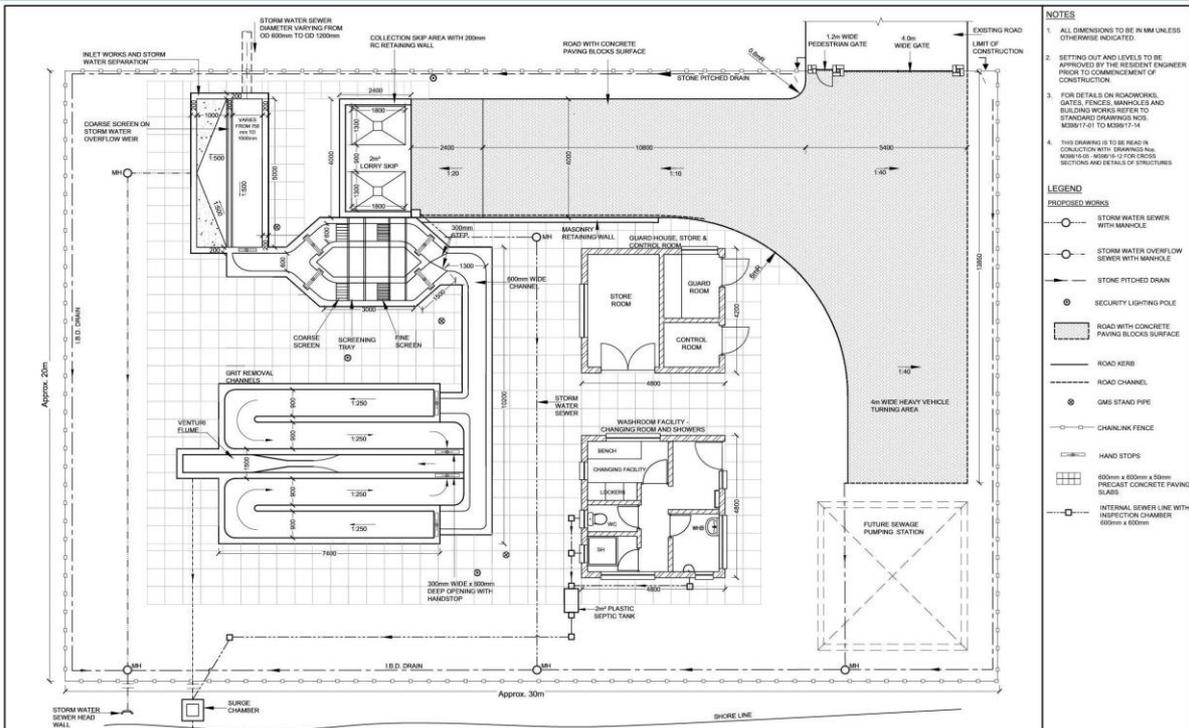


Figure 25: Type 'B' Grit Removal Chamber

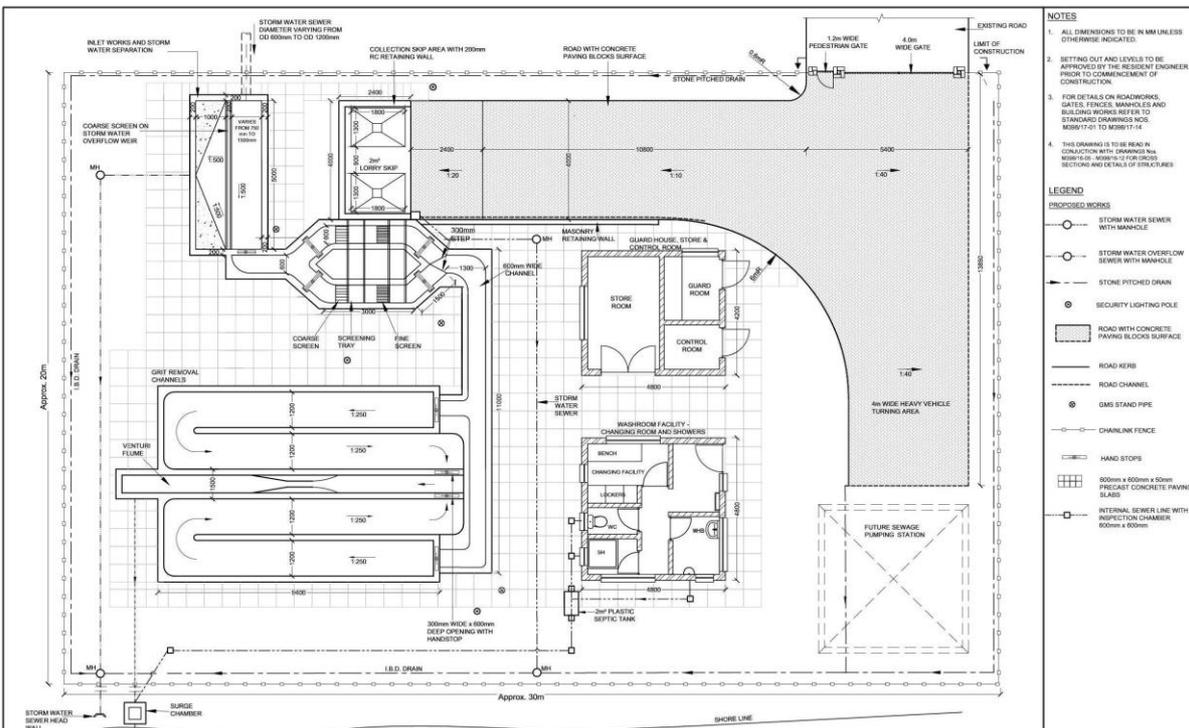


Figure 26: Type 'B1' Grit Removal Chamber

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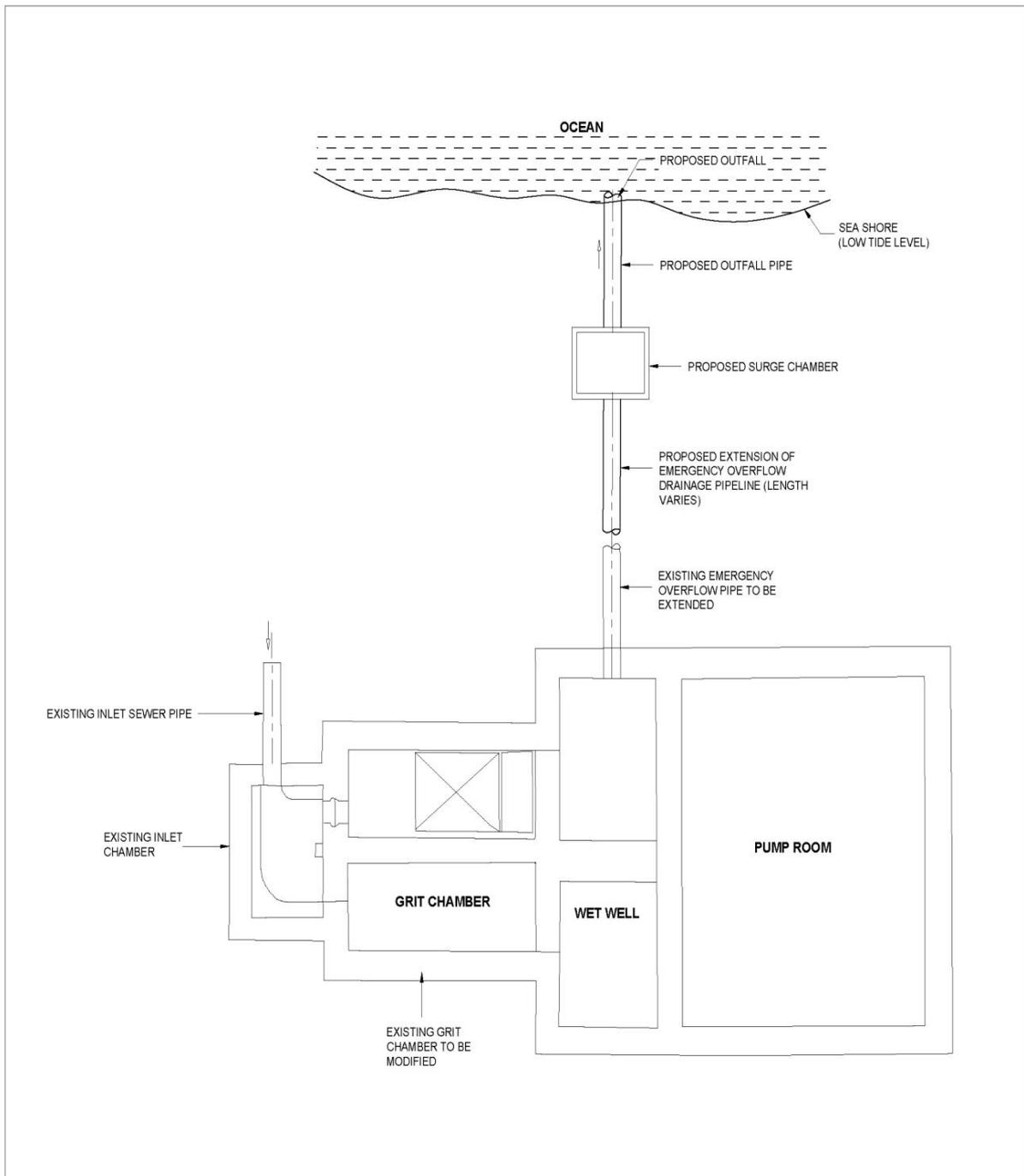
### **Type 'C' Headworks - Modification Works at Existing Pumping Stations**

This will occur on the 4 existing pump stations within Mombasa Island as well as within the Kizingo Treatment Works.

The works at these points will include:

- Installation of coarse and fine screens,
- Modifications of the existing grit removal chamber (for ease of grit handling),
- Provision for screens removal and compaction facilities,
- Rehabilitation of existing emergency overflow, and
- Construction of surge chamber and outfall pipe

The type 'C' grit chamber is shown in the figure below:



**Figure 27: Type 'C' Grit Chamber Modification**

A summary of the different grit chambers for the different storm water outlets is shown in the figure below:

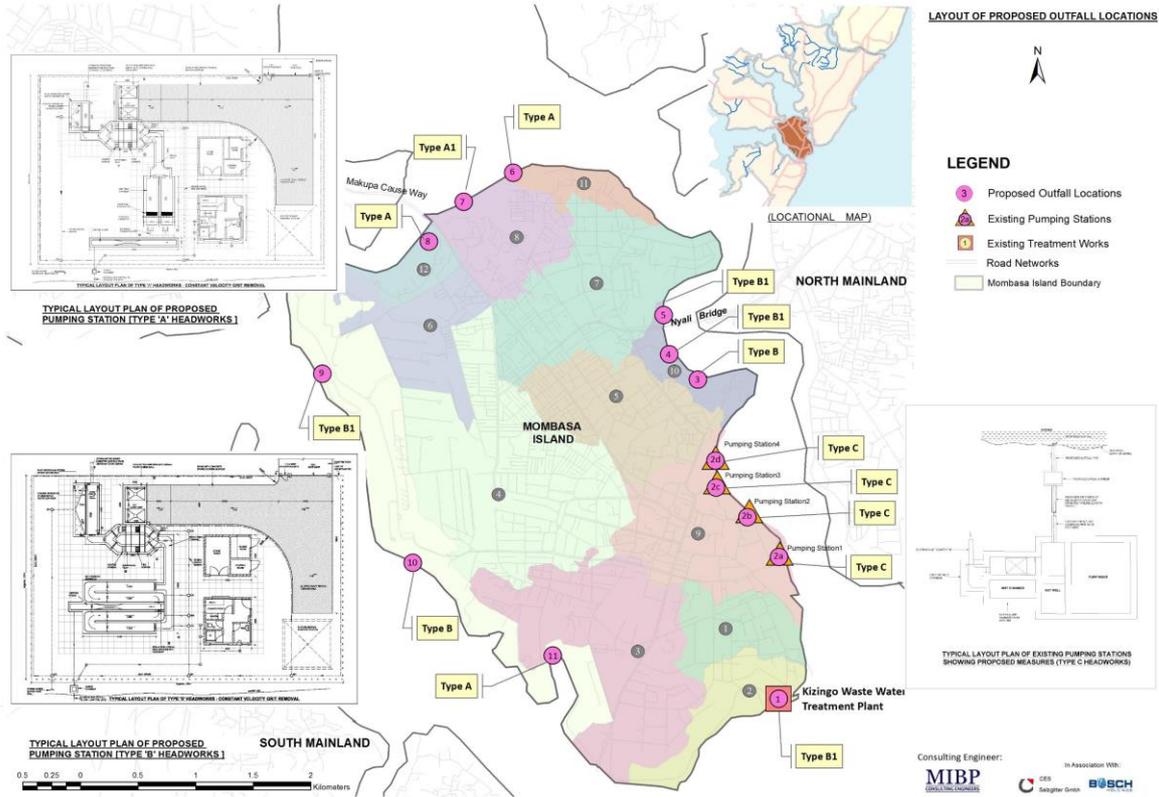


Figure 28: Grit Removal Chamber types for the outlets

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## **2.5. PROJECT COSTS**

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The proposed project is expected to cost K.Shs. 263,700,000.00 (Two Hundred and Sixty Three Million and Seven Hundred Thousand Only) for the installation of the improvements to the existing storm water outlets.

### 3. ALTERNATIVES TO THE PROJECT

#### 3.1. ALTERNATIVE SCENARIOS OF WASTE WATER FLOW INTO THE STORM WATER SYSTEM

Two other scenarios were considered in determine the percentage of waste water flow into the storm water drains. The first scenario considered was assuming 40% waste water flow into the storm water system with the flows summarized below:

**Table 31: 40% Waste Water Flow**

Contributing Drainage Area	Q <sub>dwf</sub> – 2018 (m <sup>3</sup> /day)	Q <sub>dwf</sub> – 2025 (m <sup>3</sup> /day)
1 & 2	200.4	246.8
9	1052.8	1316.8
10	861.2	1078.4
5	1687.6	2112.8
7	1530.4	1917.2
11	14	16.8
8	180	223.2
12	118.4	158
6	1342.4	1681.6
4	540.8	674
3	66	80.8

The other scenario considered was assuming 70% of the waste water flow made its way to the storm water system, with the flows summarized in the table below:

**Table 32: 70% Waste Water Flow into the System**

Contributing Drainage Area	Q <sub>dwf</sub> – 2018 (m <sup>3</sup> /day)	Q <sub>dwf</sub> – 2025 (m <sup>3</sup> /day)
1 & 2	350.7	431.9
9	1842.4	2304.4

<b>Contributing Drainage Area</b>	<b>Q<sub>dwf</sub> – 2018 (m<sup>3</sup>/day)</b>	<b>Q<sub>dwf</sub> – 2025 (m<sup>3</sup>/day)</b>
10	1507.1	1887.2
5	2953.3	3697.4
7	2678.2	3355.1
11	24.5	29.4
8	315	390.6
12	207.2	276.5
6	2349.2	2942.8
4	946.4	1179.5
3	115.5	141.4

With the non-functioning of the Kizingo Waste Water Treatment plant within Mombasa Island, many residents have made illegal connections to the existing storm water network as such raw sewage is making its way to the Indian Ocean, thus the above two scenarios were disregarded and an assumption of 100% waste water flow into the storm water system was considered for the design.

### **3.2. NO ACTION ALTERNATIVE**

The No Action Alternative is the future without the planned Project. This alternative involves not constructing the improvement on the storm water outlets as such raw sewage will continue to make its way into the Indian Ocean, thus continuing to cause pollution to the Indian Ocean and negatively affecting its ecosystem.

## 4. PHYSICAL, BIOLOGICAL AND SOCIAL BASELINE CONDITIONS OF AFFECTED ENVIRONMENT

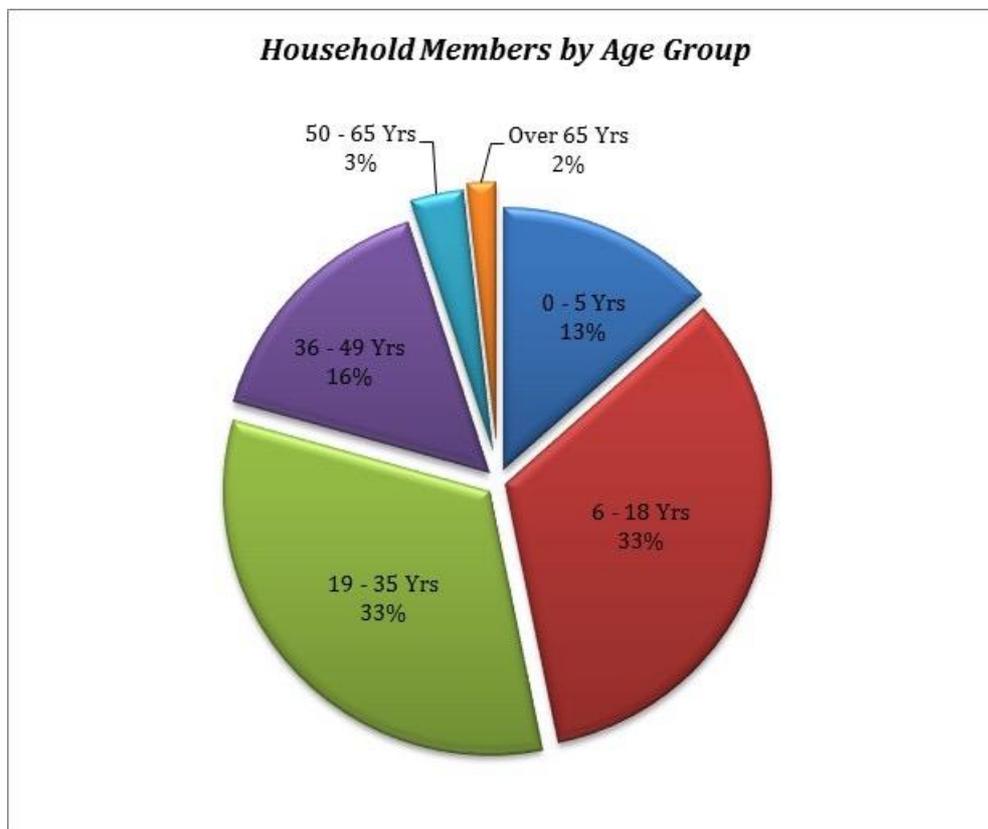
This Section discusses the baseline situation in respect of climate, topography, air quality, soils and geology, hydrology, terrestrial ecology, cultural heritage sites and socio-economic structure as well as existing infrastructure and utilities such as water, sewerage, transportation network, electricity, air transport and telephone/telecommunications and solid waste management in the region of the proposed project.

### 4.1. ENVIRONMENTAL AND SOCIO-ECONOMIC SURVEY

The socio-economic situation of the area was captured based on findings of a household survey carried out using a structured questionnaire. A sample group of 100 households, distributed within the project sites was interviewed for purposes of the analysis.

#### 4.1.1. Population dynamics and household characteristics

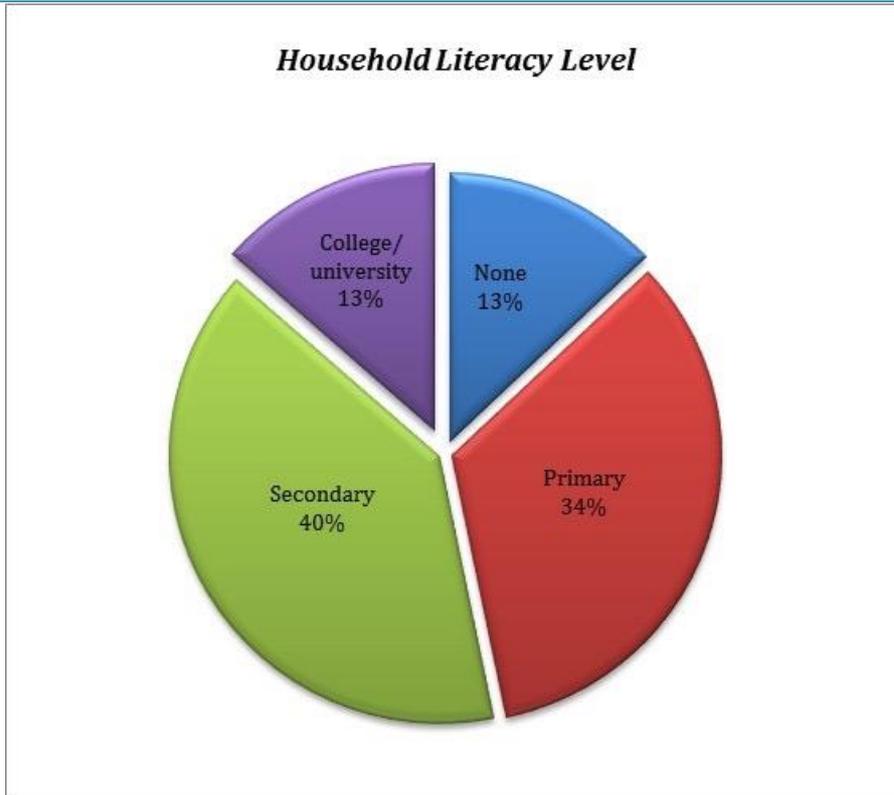
The average household size is 5 people. The general trend shows that most of the people fall in the 19-35 and 6-18 age groups. Figure 4.1 shows the population age brackets.



**Figure 41: Age Distribution of the Population**

Source: Survey data.

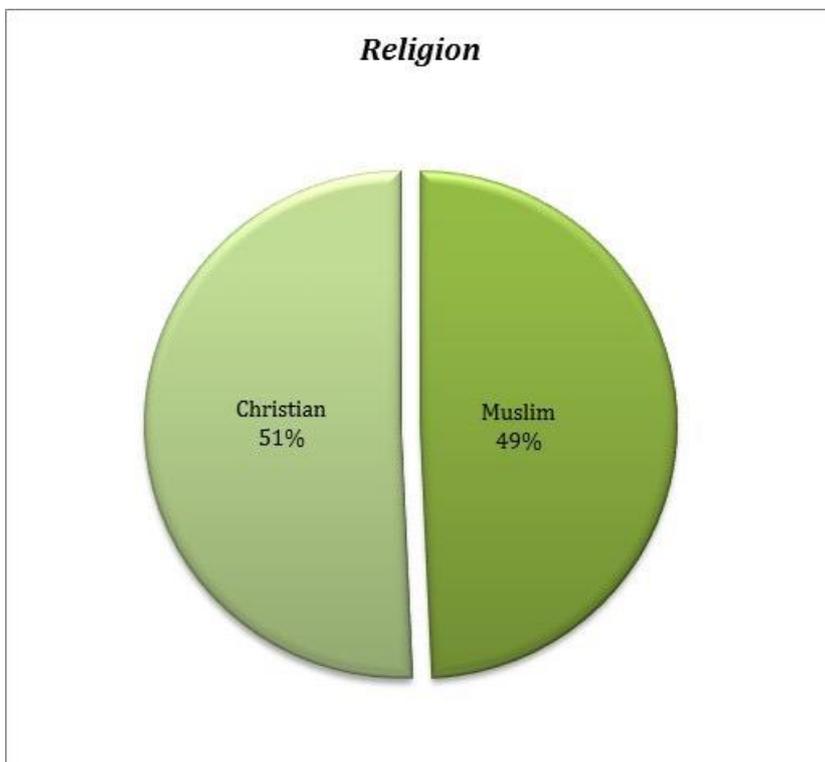
Literacy levels were as follows:- Primary level 34%, Secondary level 40%, college /university 13% and no education at all 13%. Therefore the areas have a high literacy level, which is common in urban settings.



**Figure 42: Household Literacy Level**

Source: Survey data.

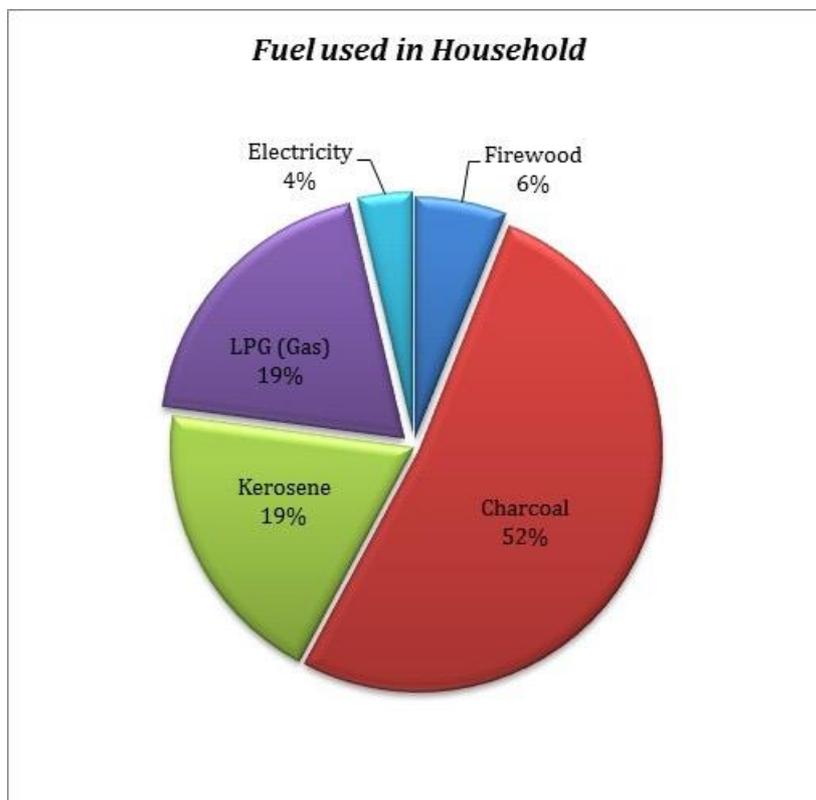
Both Christianity and Islam have a similar mass of followers with 51% and 49% of the population professing the faiths respectively.



**Figure 43: Religion of the Population**

Source: Survey data.

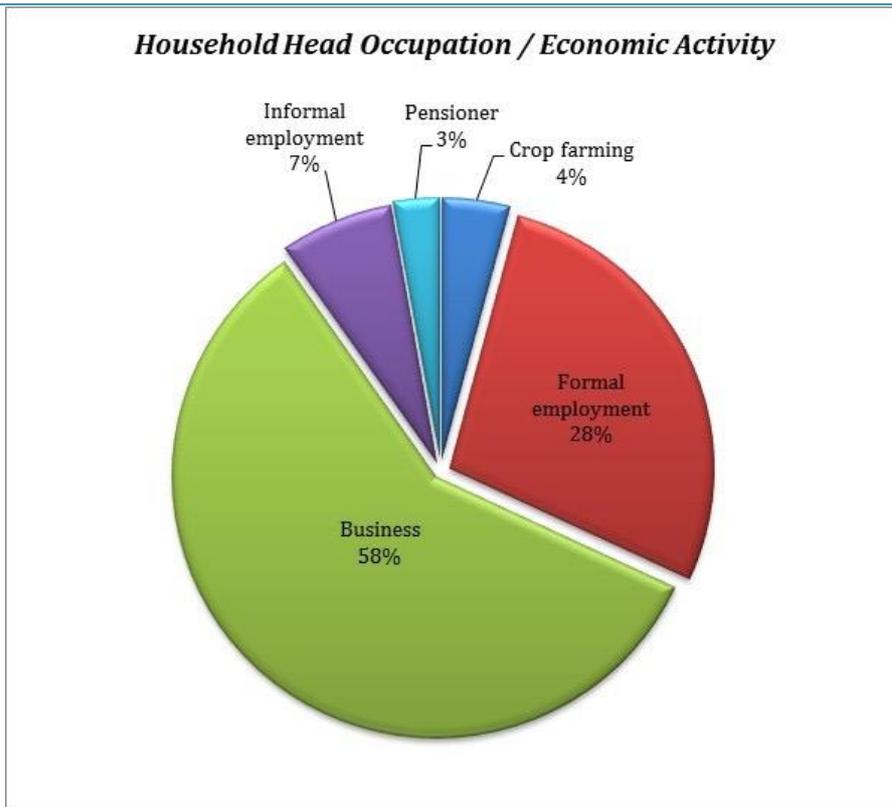
Charcoal is the main source of energy used by the community with 52% of the population depending on it. Other fuel sources are Kerosene, LPG gas, electricity and firewood.



**Figure 44: Sources of Energy**

Source: Survey data.

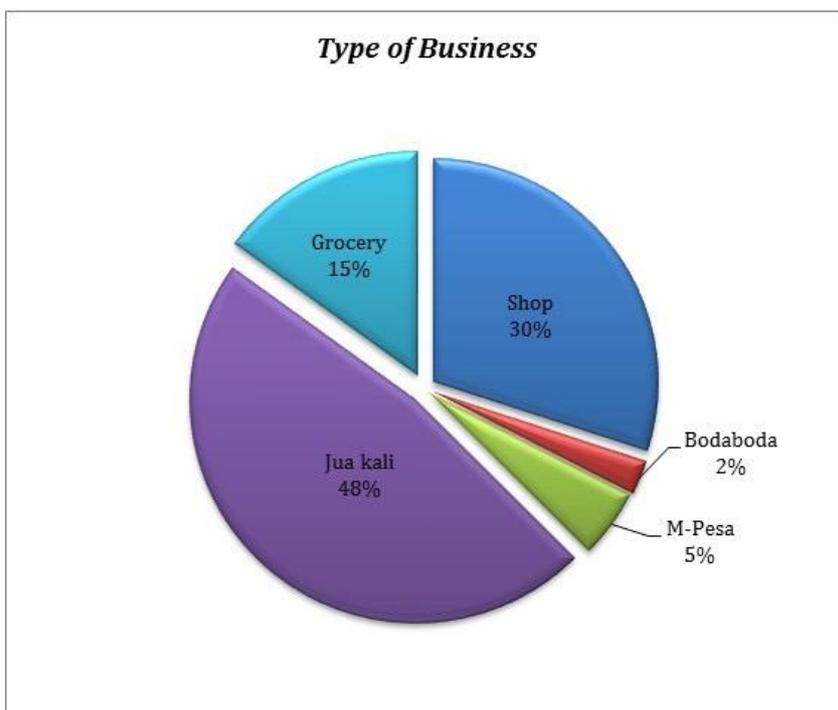
The main socio-economic activities are businesses and formal employment, common to urban settings with 58% and 28% respectively. The other socio-economic activities are shown below:



**Figure 45: Household Socio-Economic Activities**

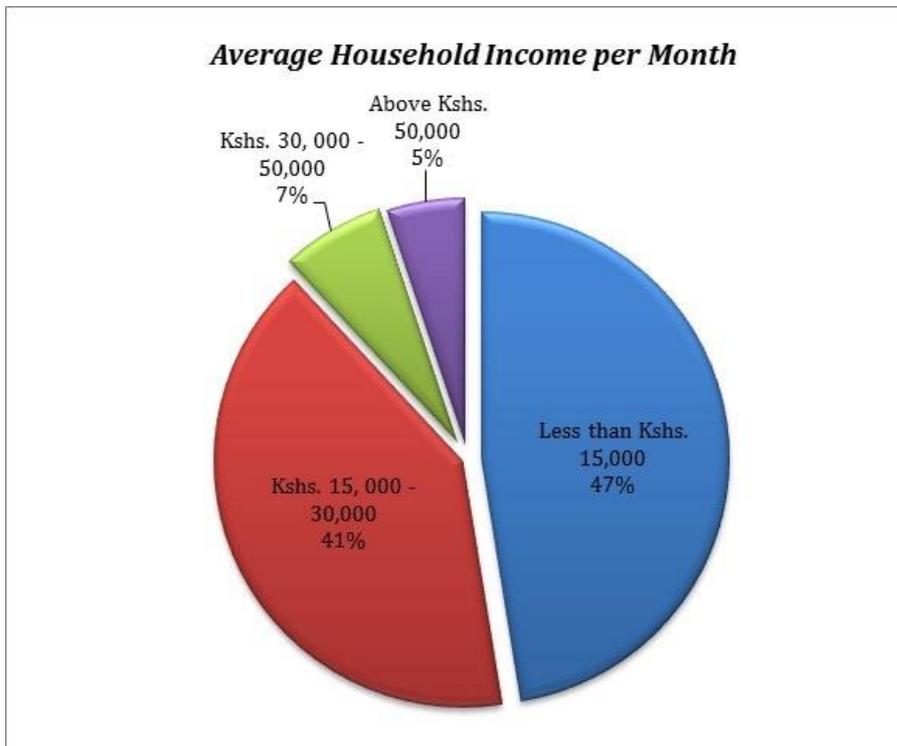
Source: Survey data.

The household conducting business constitutes 58% of the total population. The most popular business in the area is the Jua Kali industry comprising of 48 % of the entreprising population. 30% of the entreprising population have shops while 15% sell groceries. Other businesses are shown in the figure below.



**Figure 46: Business types in the project area**

Most of the populations’ income lies under 15000. Only 11% of the population receive an income of over 30,000 shillings per month.

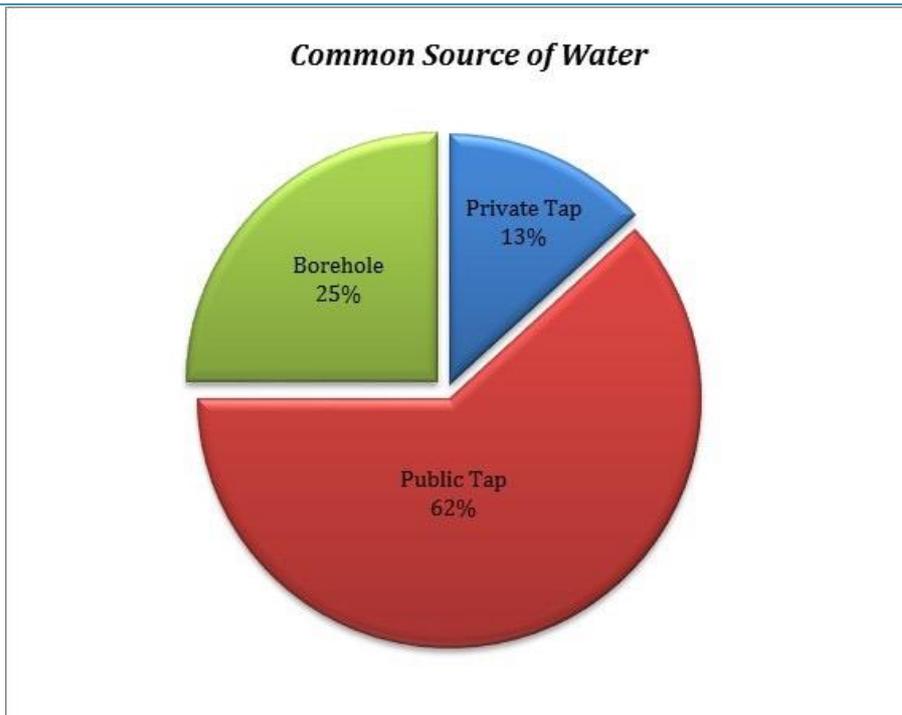


**Figure 47: Household Income per Month**

Source: Survey data.

**4.1.2. Water Supply**

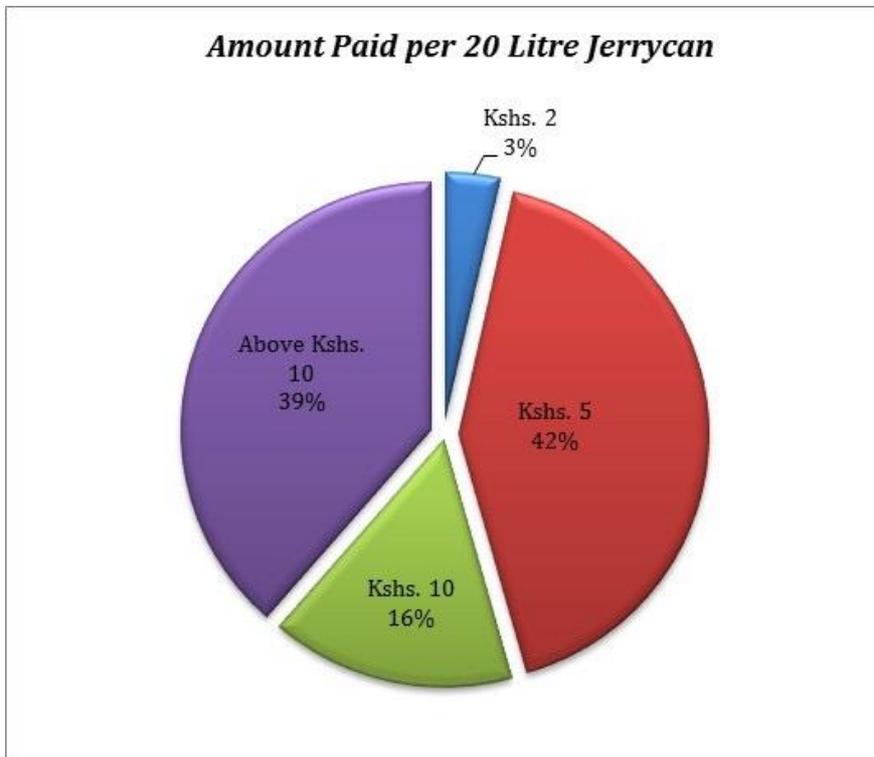
Being an urban area, the project areas receive piped water, however majority of the sites are located within low income areas, most residents rely on a public water taps, boreholes and private taps as shown below.



**Figure 48: Main Sources of Water for the Community**

Source: Survey data.

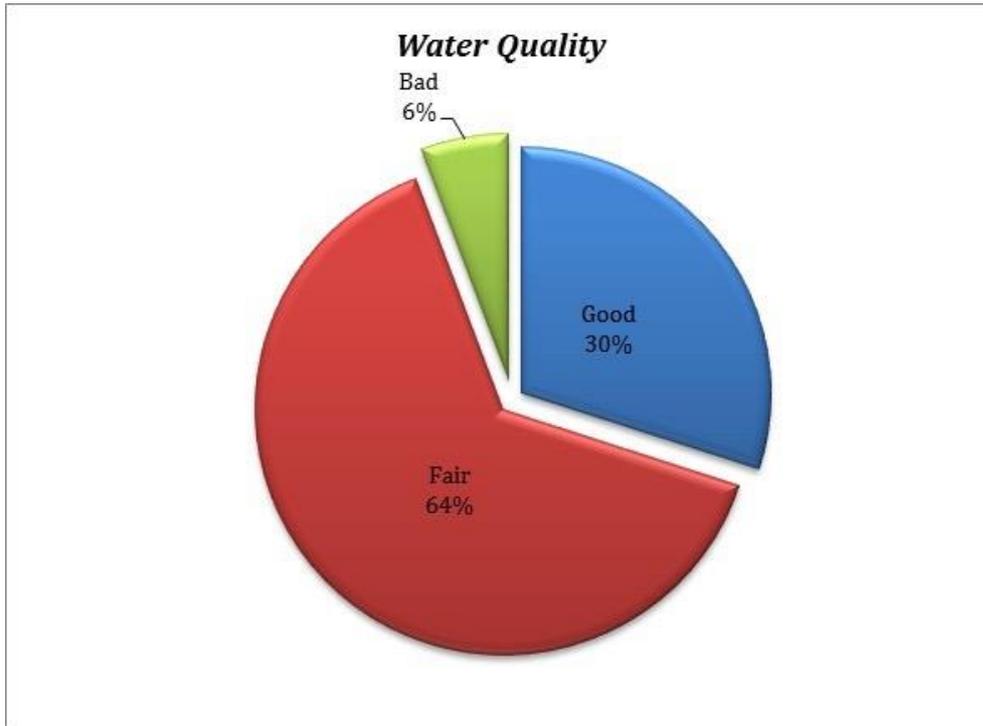
Where the population pays for water, majority of the population pays between 5 and 10 Kenya Shillings. 39% of the population pays above 10 shillings per jerrycan, as shown in the chart below:



**Figure 49: Percentage Population Paying for Water**

Source: Survey data.

The water quality is generally fair with 64% of the respondents indicating that the water quality is acceptable. 30% of the respondents find the water to be good while 6% find it to be bad.

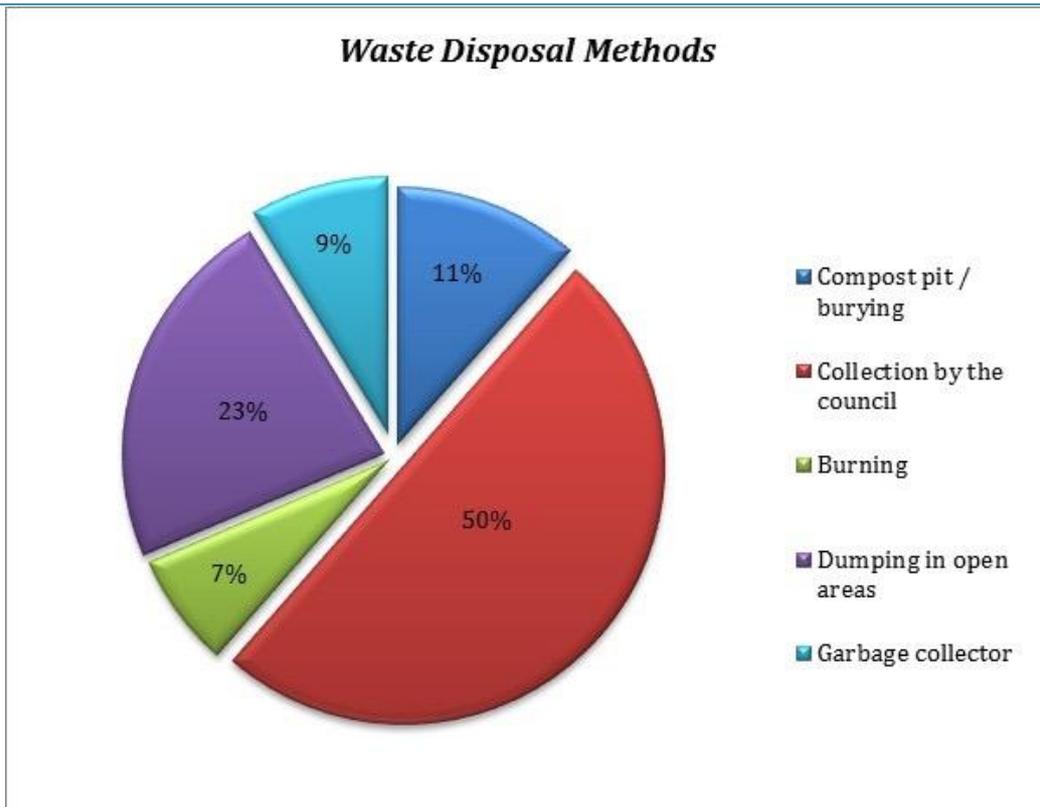


**Figure 410: General Status of the Water Quality**

Source: Survey data.

#### **4.1.3. Sanitation**

The methods used by the population to dispose refuse are distributed as follows: 50% rely on collection by the council, 23% dump household waste in open areas, 11% use compost pits/burying, 9% use local garbage collectors and 7% burn, the chart below shows the waste disposal figuratively.



**Figure 411: Common Waste Disposal Methods**

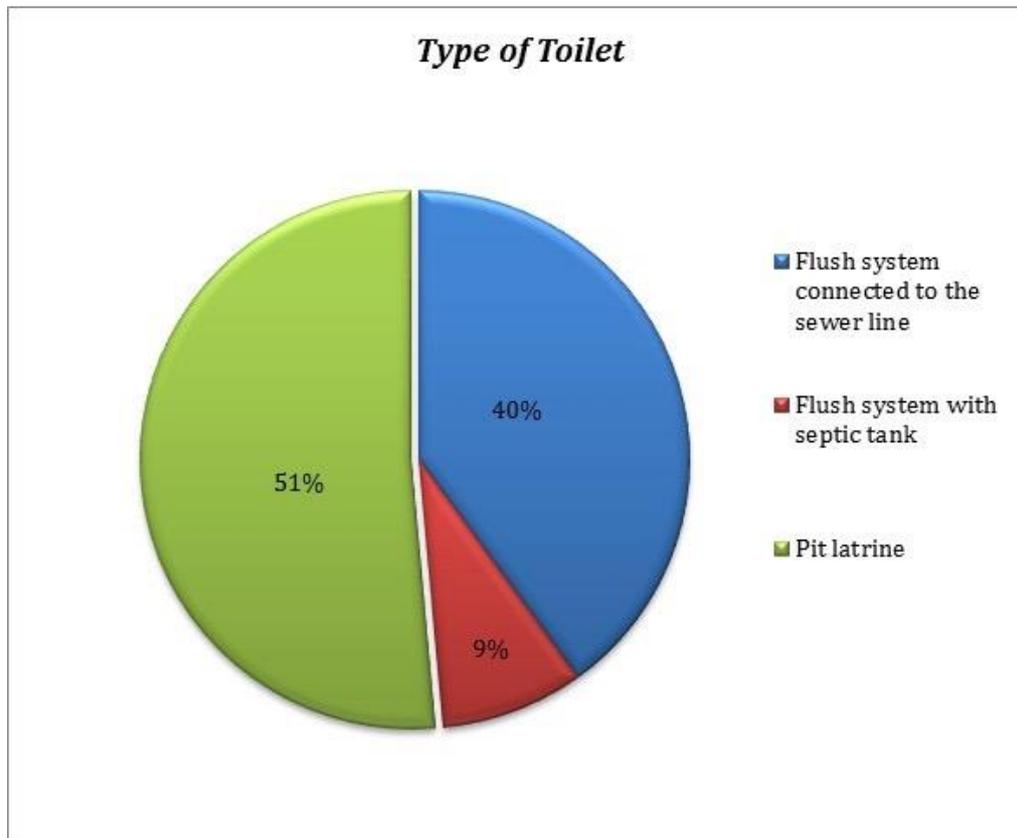
Source: Survey data.

All of the households interviewed have access to a toilet, with most of the facilities being connected to the sewer system, however majority of the toilets in the project area are squat type toilets (pit latrine) illegally connected to the storm water system which in most cases dispose household waste directly to the Indian Ocean as shown in the figures below.



**Figure 412: Respondents Who Have Toilets in Their Compound**

Source: Survey data.

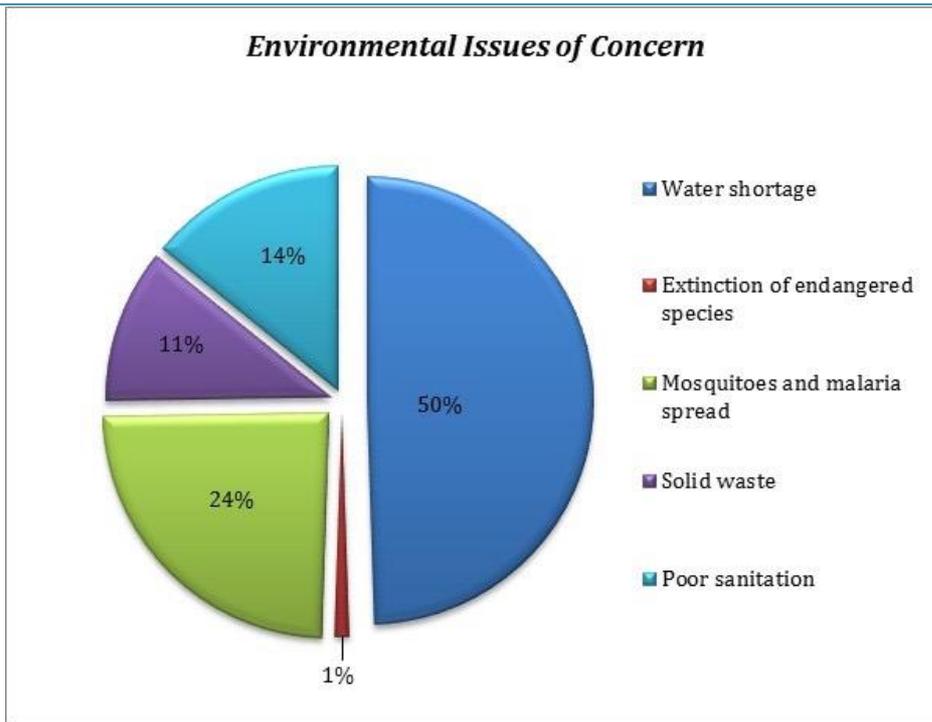


**Figure 413: Types of Toilets Respondents Have in Their Compound**

Source: Survey data.

#### **4.1.4. Environmental Situation**

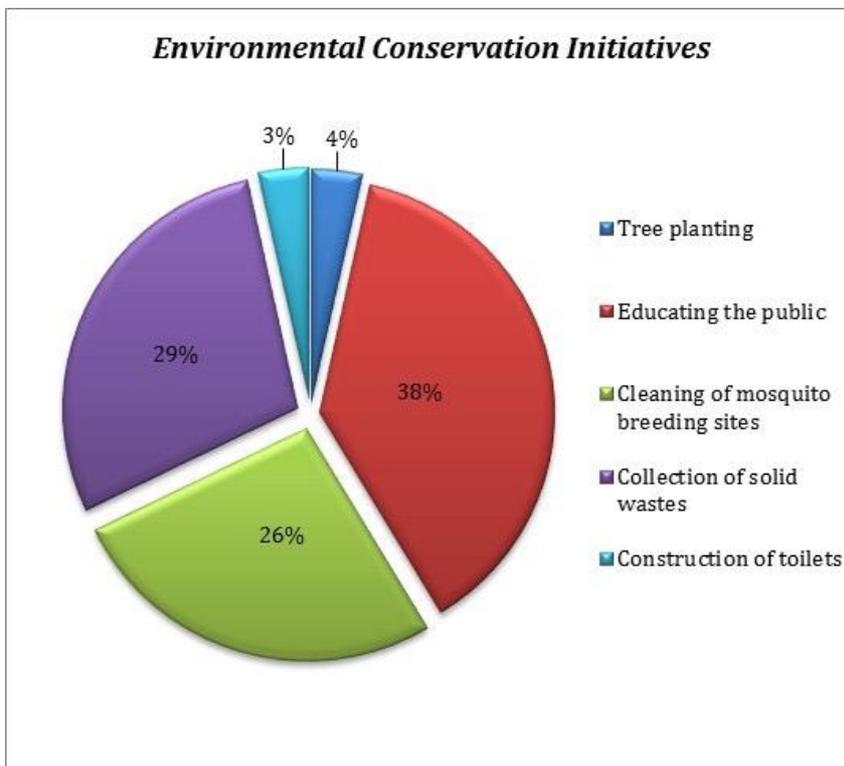
The environmental concerns in the area include water shortage, mosquitos and malaria spread, solid wastes generation, extinction of endangered species (including fish) and poor sanitation.



**Figure 414: Environmental Issues of Concern**

Source: Survey data.

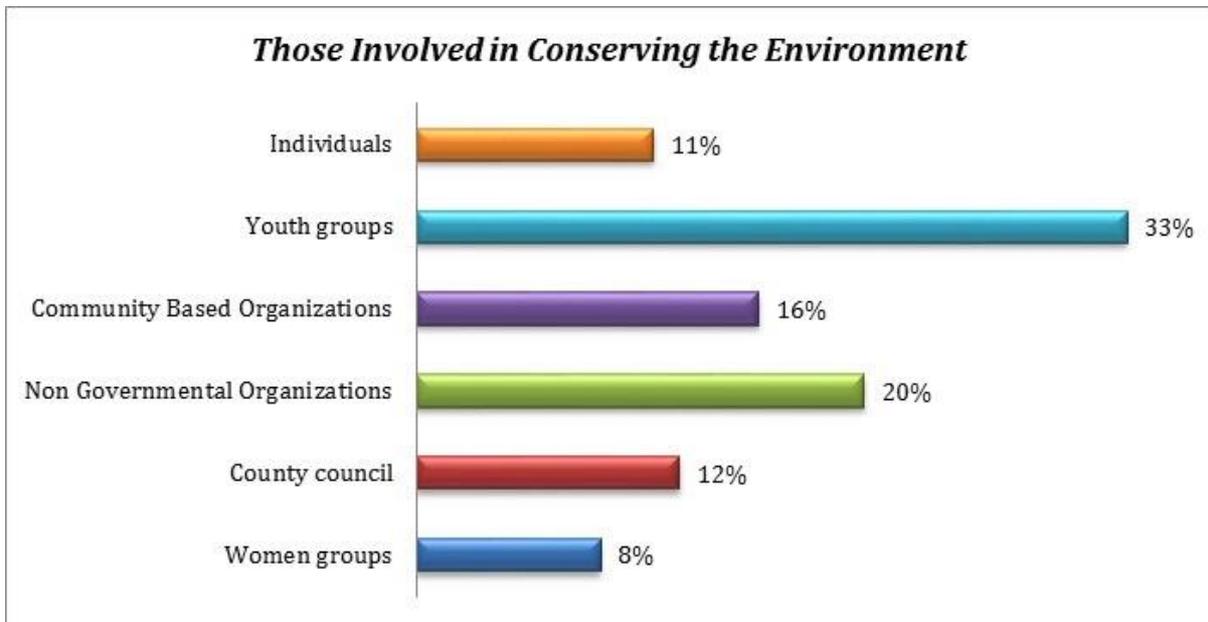
There are a number of environmental conservation initiatives in the area such as educating the public on environmental conservation and clearing of mosquito breeding sites and others such and collection of solid wastes.



**Figure 415: Environmental Conservation Initiatives**

Source: Survey data.

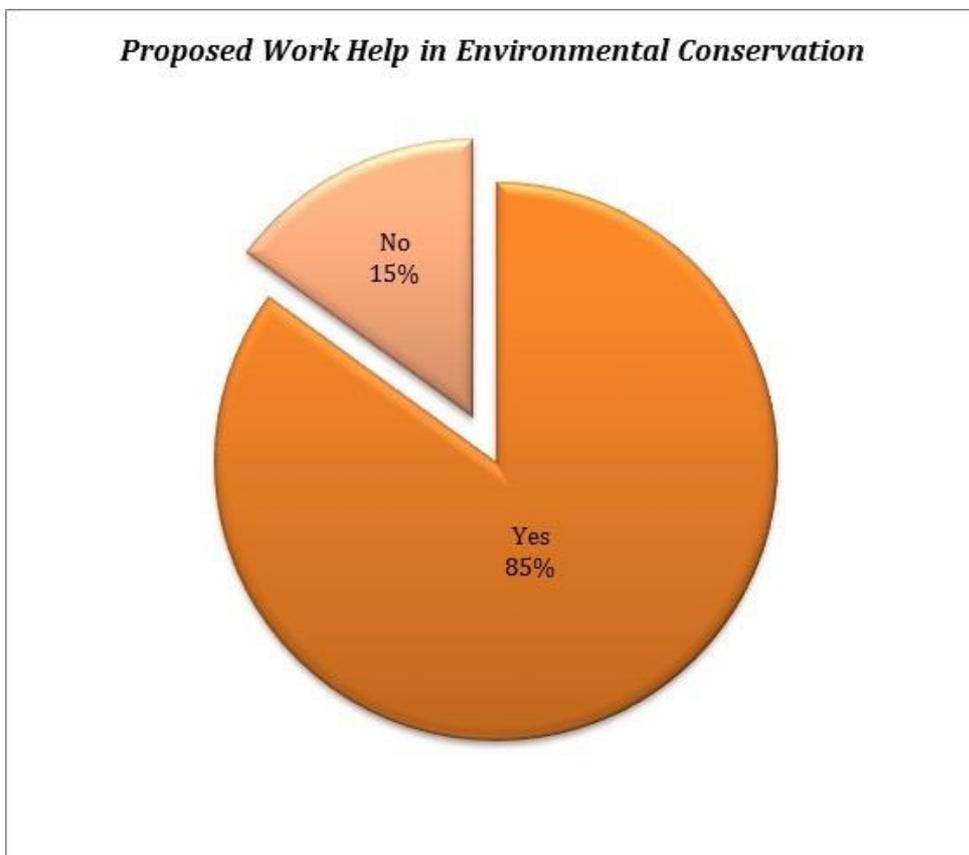
These activities are carried out by youth groups, women groups, NGOs, CBOs as indicated in the figure below.



**Figure 416: Implementers of Environmental Conservation Initiative**

Source: Survey data.

85% of the population feel that the project will help conserve the environment due to the reduced raw sewage making its way to the Indian Ocean, while only 15% feel that it will not.

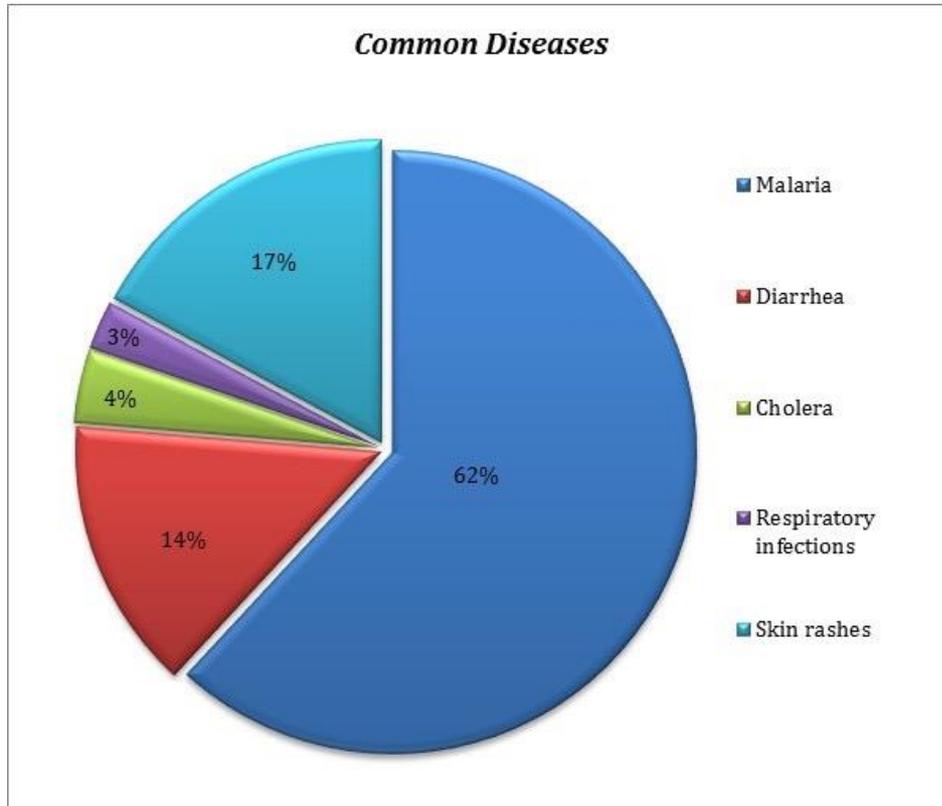


**Figure 417: Will the Water Supply Project help in conserving the Environment**

Source: Survey data.

**4.1.5. Health Status**

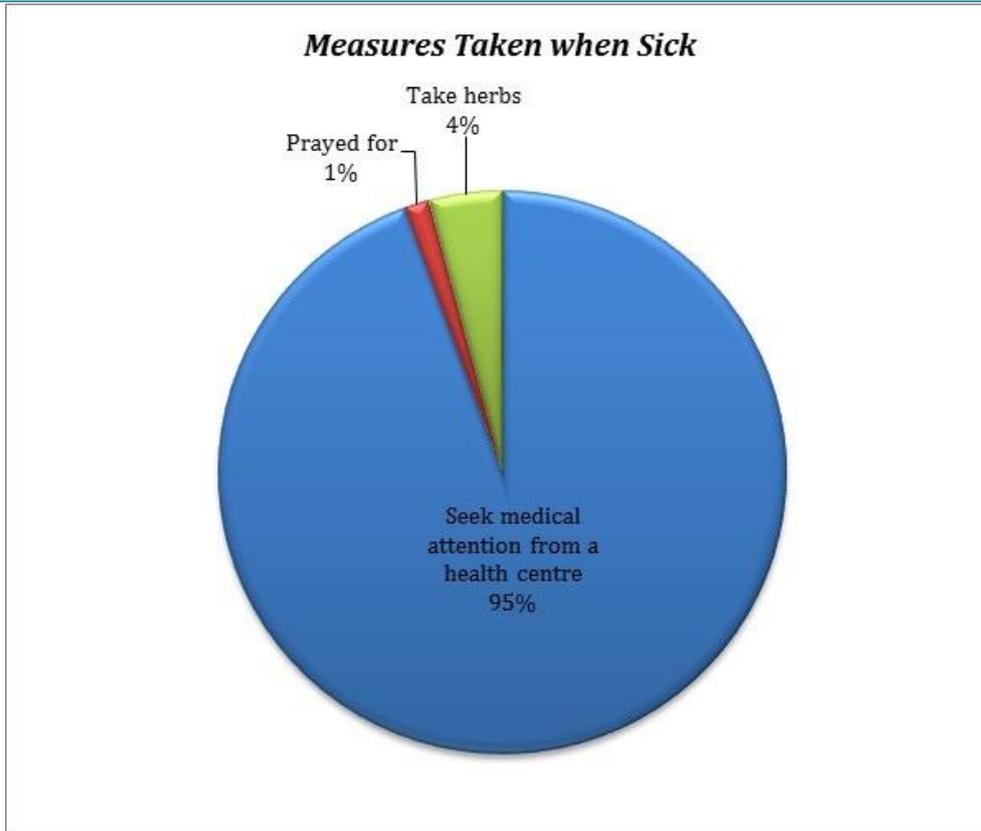
The prevalent diseases in the area are malaria, diarrhea, skin rashes cholera and respiratory infections most of which are water based.



**Figure 418: Prevalence of Diseases in the Area**

Source: Survey data.

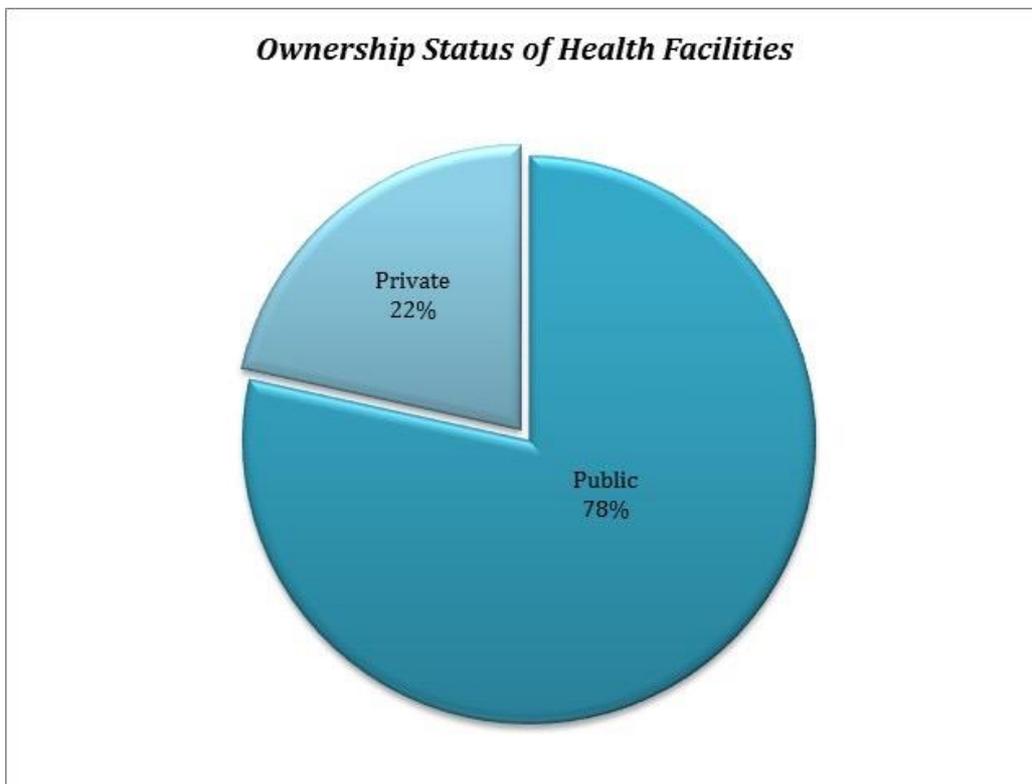
Most of the respondents when sick seek medical attention from a health centre.



**Figure 419: Type of Treatment**

Source: Survey data.

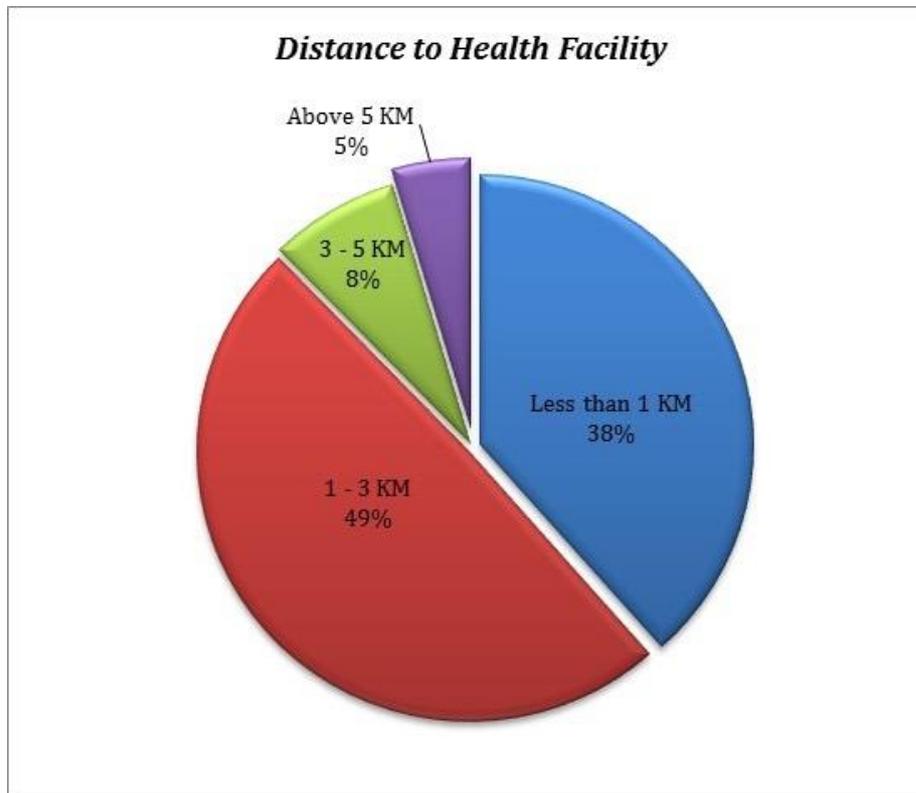
The health facilities sought by the local population are mainly government health centres.



**Figure 420: Ownership Status of the Health Facilities.**

Source: Survey data.

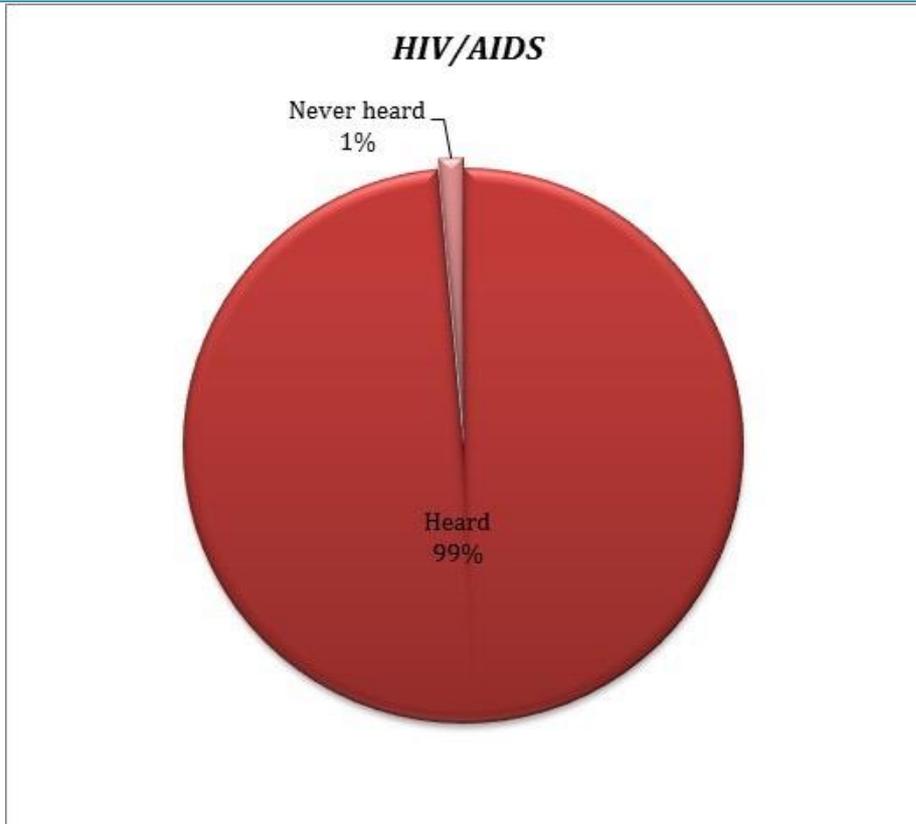
Being an urban centre, the health centres are located nearby with majority located less than 5Km away as shown in the figure below.



**Figure 421: Distance to the Health Facilities.**

Source: Survey data.

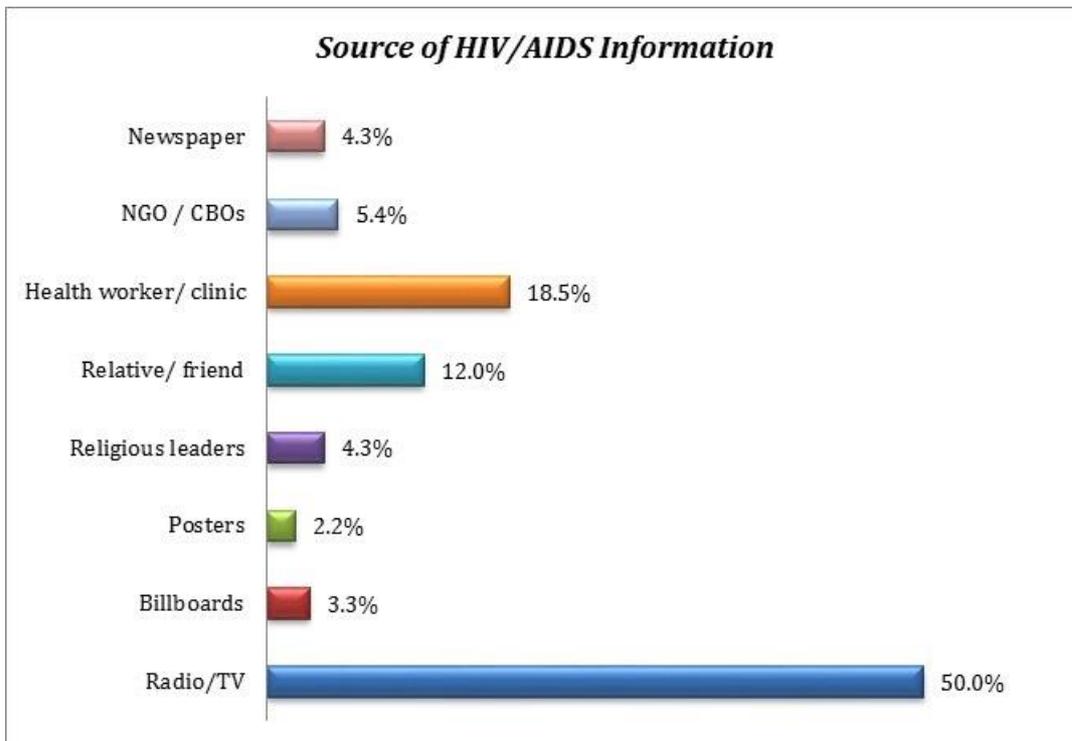
The level of HIV/AIDS awareness is high. 99% of the population is aware of HIV/AIDS.



**Figure 422: Level of Awareness on HIV/AIDS**

Source: Survey data.

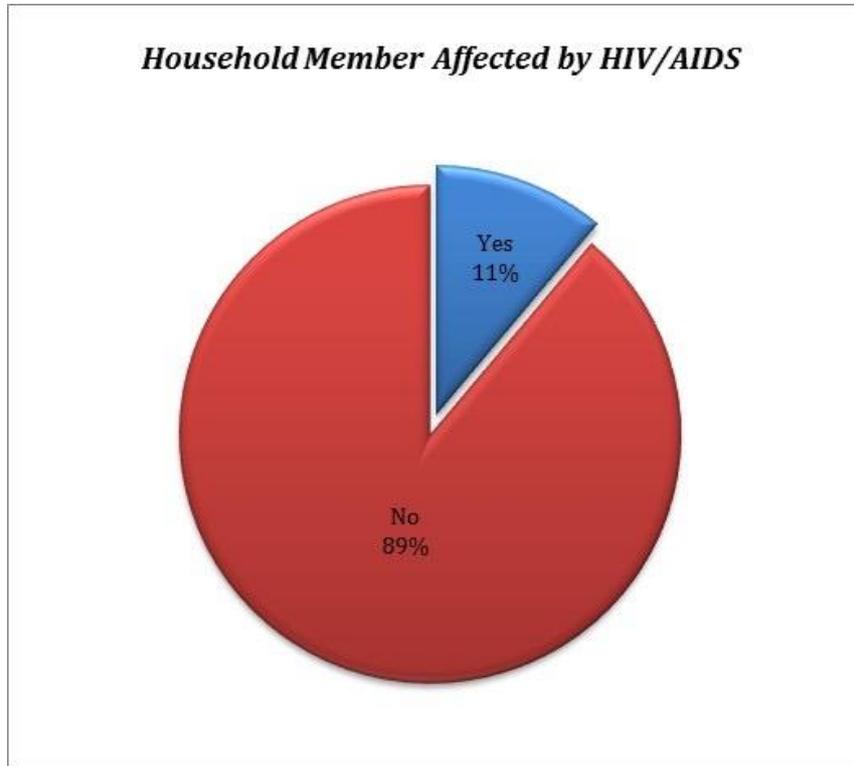
Information about HIV/AIDS is mainly got from the media, family members and friends, health workers, religious leaders, and NGOs/CBOs.



**Figure 423: Source of information on HIV/AIDS**

Source: Survey data.

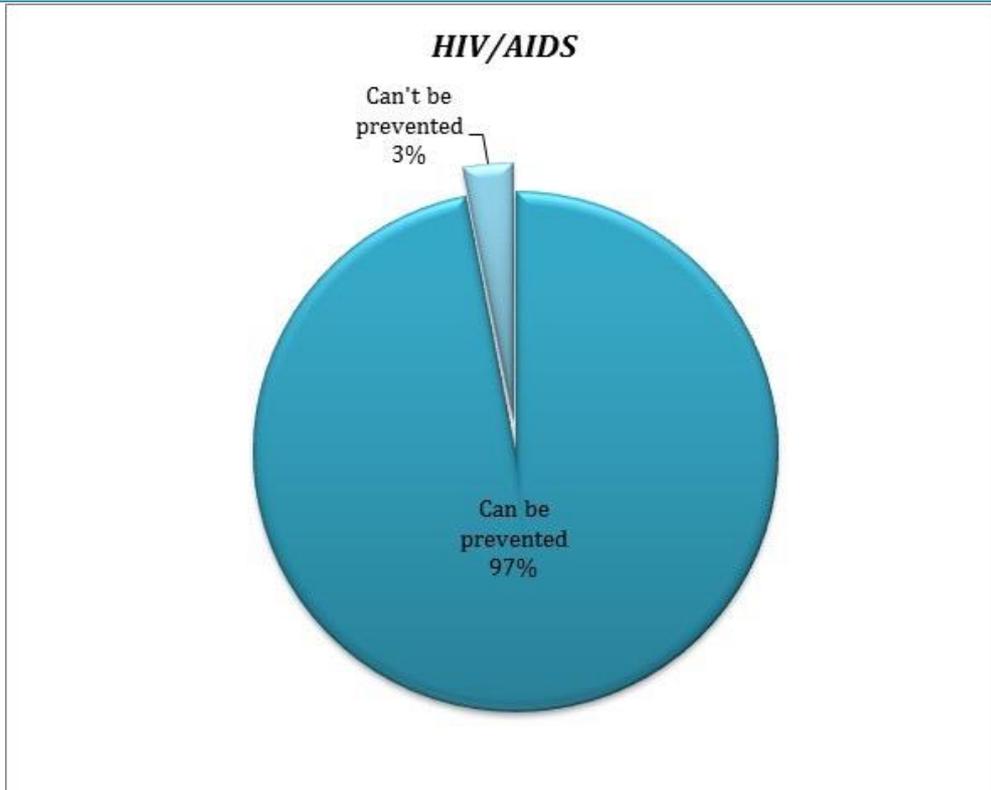
11% of the respondents have been affected by the disease, in comparison to the county level in comparison to the 3% within the county. The higher rate within the project areas may be due to the fact that majority of the storm water outlets are in low income areas, within Mombasa Island. The affected population is treated as a vulnerable group due to the stigmatization of the scourge, and can be assisted by provision of ARVs during the project duration.



**Figure 424: Household Members affected by HIV/AIDS**

Source: Survey data.

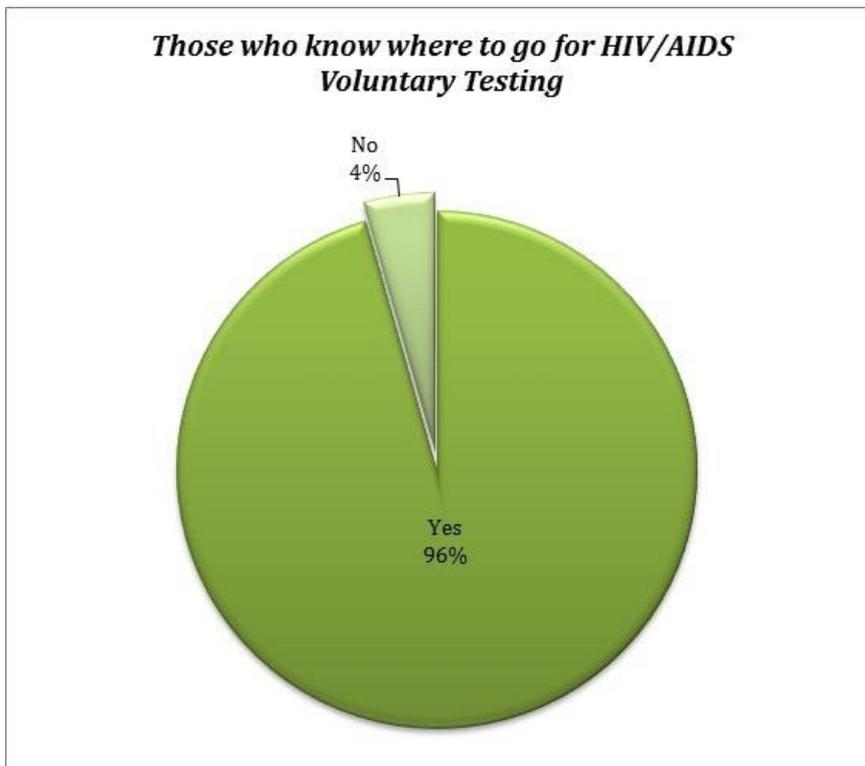
97% of the respondents feel that HIV/AIDS can be prevented while a small fraction of the population 3% says it cannot be prevented.



**Figure 425: Knowledge on whether HIV/AIDS can be prevented**

Source: Survey data.

96% of the respondents know where to go for voluntary counselling and testing for HIV/AIDS, which reflects positively on the awareness of HIV/AIDS and its repercussions.

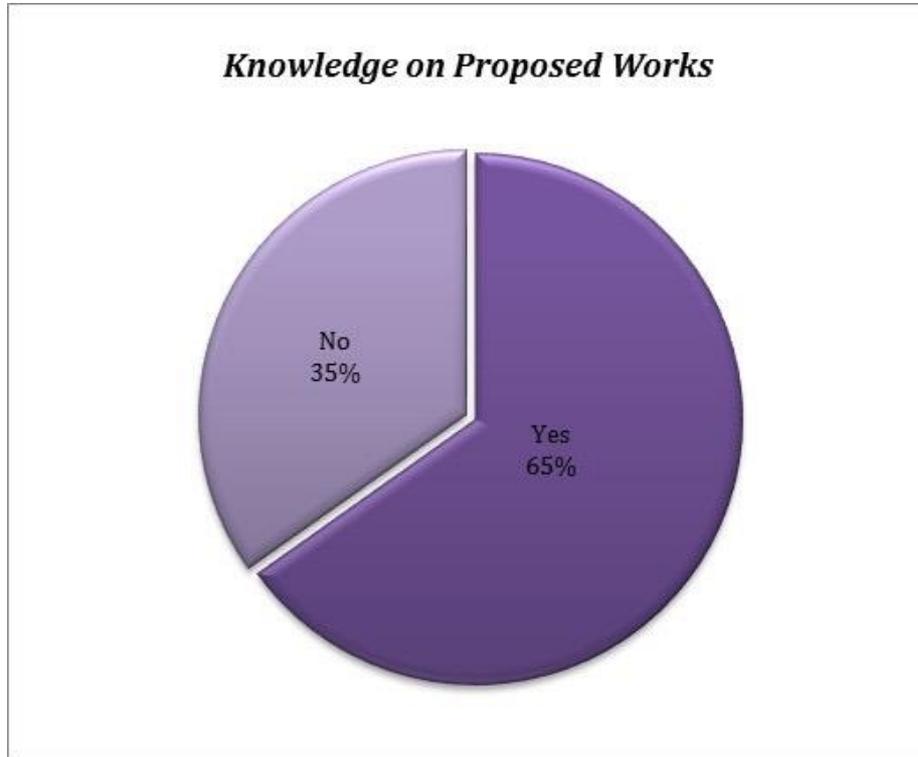


**Figure 426: Respondents who know where to go to for Voluntary HIV/AIDS Testing**

Source: Survey data.

#### **4.1.6. The Project**

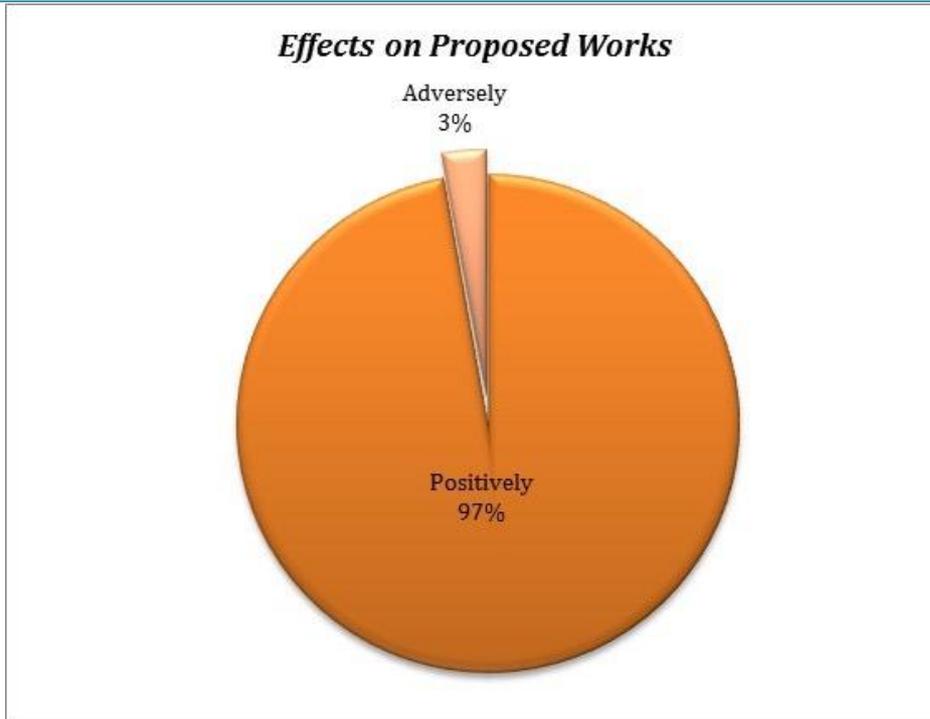
Most of the residents are aware of the intended improvements to the existing storm water facilities



**Figure 427: Public Awareness of the Intended Construction of the Pipeline**

Source: Survey data.

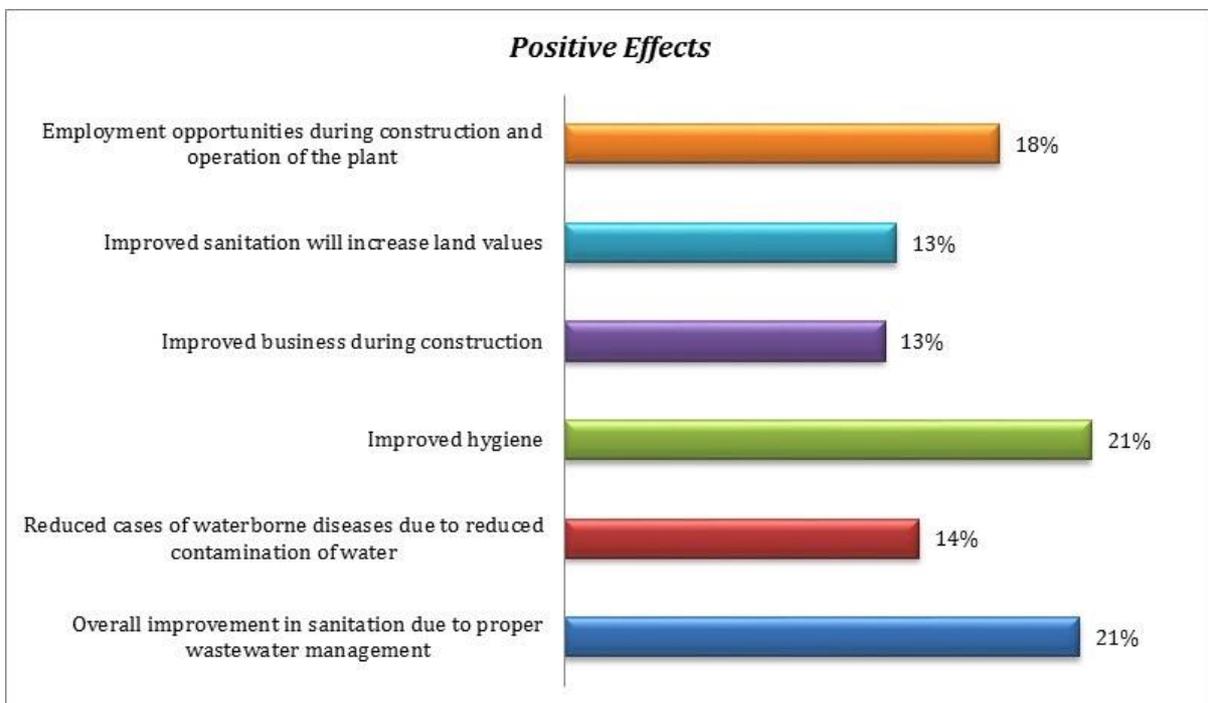
97% of the respondents perceived that the construction of the pipeline will bring positive impacts while 3% percent perceived that it will bring about adverse impacts.



**Figure 428: Perceived Impact of the Water Supply Project**

Source: Survey data.

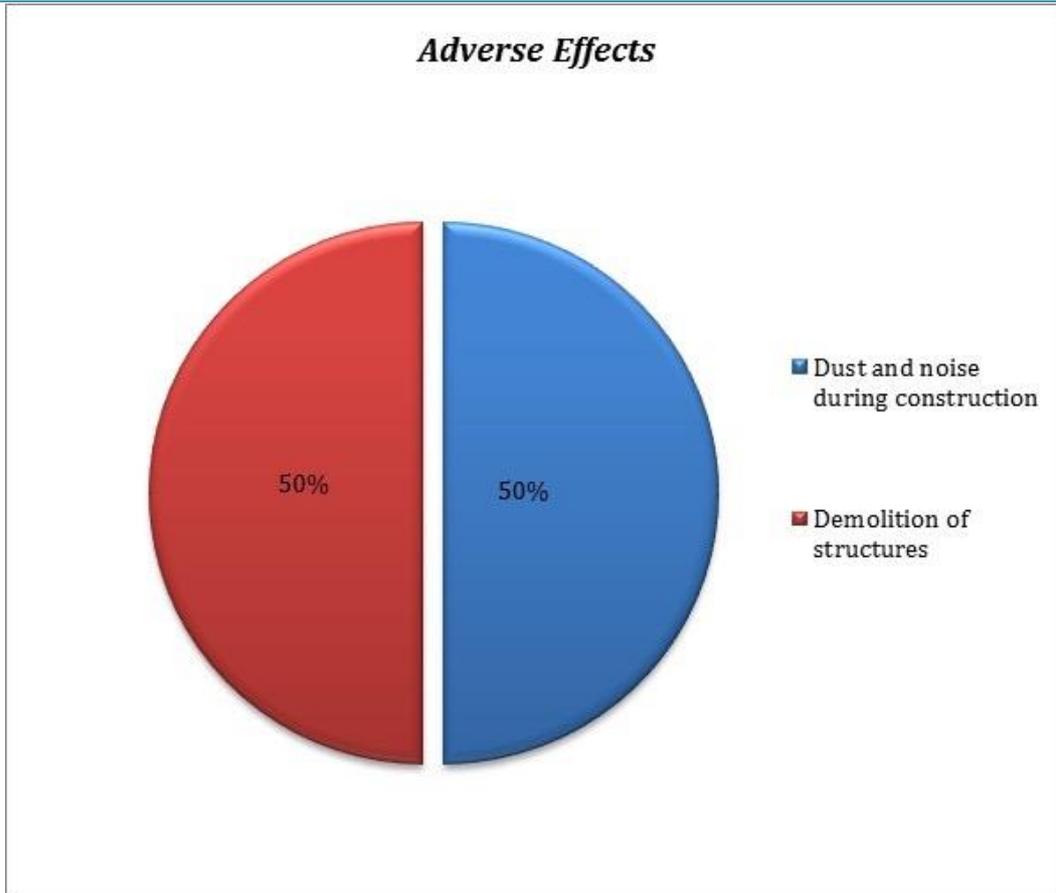
The positive impacts expected include improvements to sanitation, hygiene, business, job opportunities as well as reduced waterborne diseases.



**Figure 429: Positive Impact of the Proposed Project**

Source: Survey data.

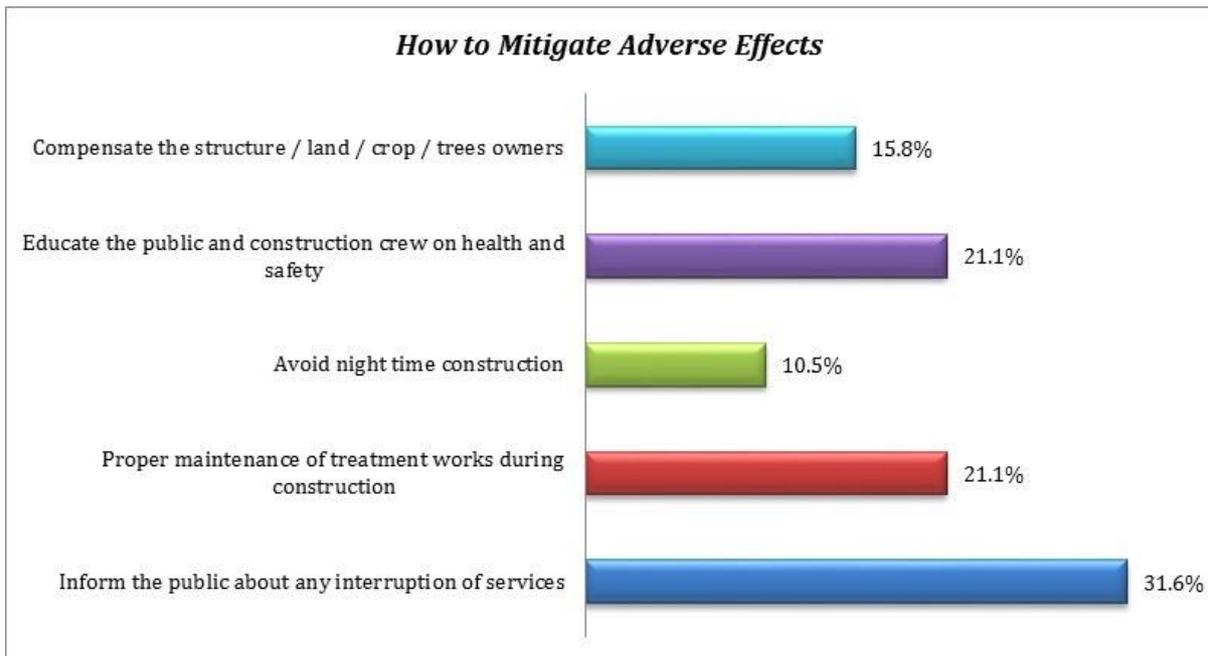
The negative impacts expected include demolition of structures and dust and noise generation during construction.



**Figure 430: Negative Impact of the Proposed Project**

Source: Survey data.

To mitigate the negative impacts the respondents feel that there is need to inform the public on any interruption of services, need to educate the public and the construction crew on health and safety, compensate the structure/land/crops/tree owners and avoid night time construction.



### Figure 431: How to Mitigate Adverse Impact of the Project

Source: Survey data.

## 4.2. PHYSIOGRAPHIC AND ENVIRONMENTAL CONDITIONS

### 4.2.1. Location

Mombasa Island is located within Mombasa County which is located in the South-Eastern part of the Coastal region of Kenya. It covers an area of 229.9 Km<sup>2</sup> excluding 65 Km<sup>2</sup> of water mass which is 200 nautical miles into the Indian Ocean. It borders Kilifi County to the North, Kwale County to the South West and the Indian Ocean to the East. The County lies between latitudes 30°56' and 40°10' South of the Equator and between longitudes 39°34' and 39°46' east of Greenwich Meridian. The County also enjoys proximity to an expansive water mass as it borders the Exclusive Economic Zone of the Indian Ocean to the East. Mombasa Island is also one of the sub-counties within Mombasa County housing the County Headquarters. Mombasa Island is shown in the figure below:

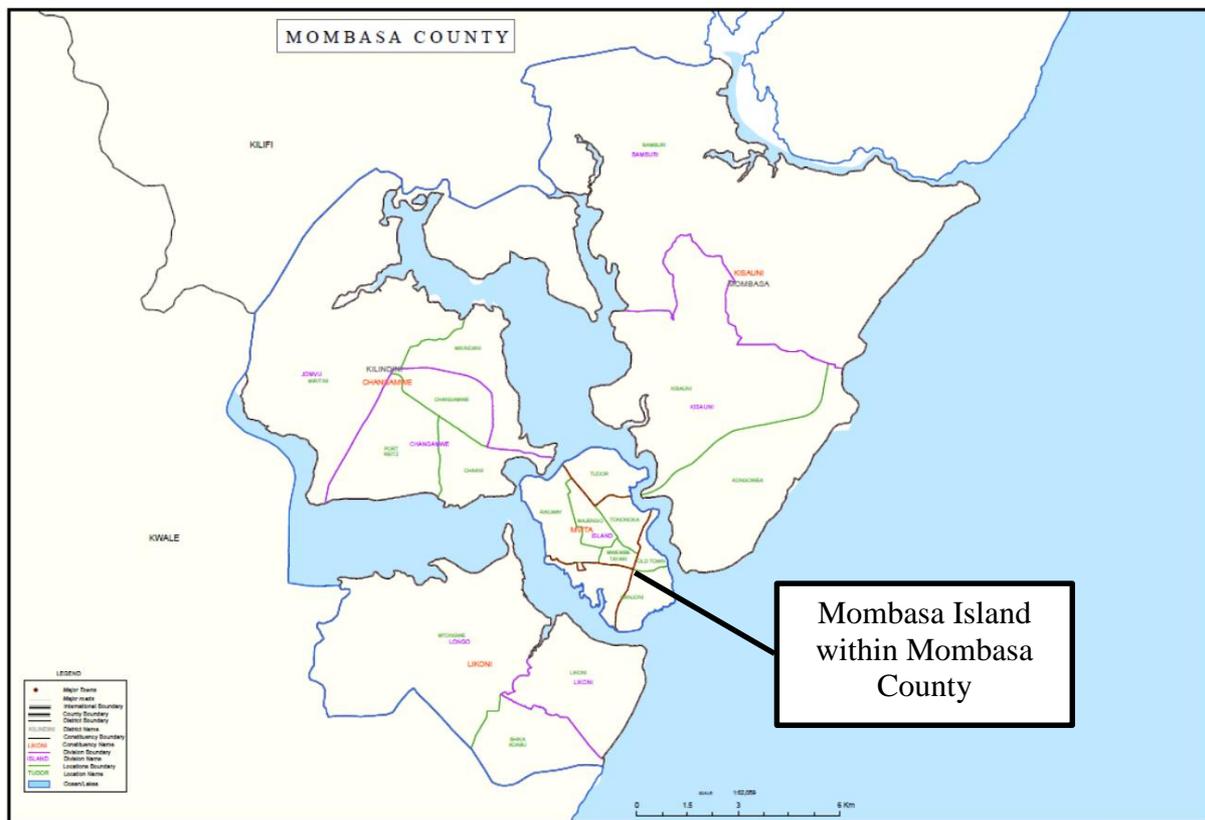


Figure 432: Location of Mombasa Island within Mombasa County

### 4.2.2. Topography

Mombasa County lies within the Coastal lowland which rises gradually from the sea level in the East to about 132m above sea level in the mainland. The terrain is characterized by three distinct physiographic features, which include the coastal plain, which is found along the shoreline, covering the project area location. The plain consists of an expansive flat land with raised beach terraces covered mainly by Coral limestone and back reef sand deposits that not only provide firm foundation for construction but also provide building materials.

The topography has evolved as a result of the lowering of the sea level over time leading to severe erosion by the storm water draining into the sea. In addition, the Subsequent rise in sea

level led to the submergence of the valleys and the creation of Mombasa Island surrounded by deep natural creeks, ports and harbors such as Kilindini, Tudor, Makupa, and Old Port creeks.

#### **4.2.3. Climate**

Mombasa County has a monsoon type of climate, with the rainfall pattern is characterized by two distinct long and short seasons corresponding to changes in the monsoon winds. The long rains occur in April – June with an average of 1,040mm and correspond to the South-Eastern Monsoon winds. The short rains start towards the end of October lasting until December and correspond to the comparatively dry North-Eastern Monsoons, averaging 240mm. The annual average rainfall for the county is 640mm.

The annual mean temperature in the county is 27.9°C with a minimum of 22.7°C and a maximum of 33.1°C. The hottest month is February with a maximum average of 33.1°C while the lowest temperature is in July with a minimum average of 22.7°C. Average humidity at noon is about 65 per cent.

#### **4.2.4. Geology**

Close to the Indian Ocean the area is underlain by coral limestone of Pleistocene age. Further inland are the Magarini sands and Mazeras sandstones of the Tertiary and Triassic ages respectively. Study sites were selected to be within the dominant lithologies of coral limestone and sandstone.

#### **4.2.5. Biodiversity**

Mombasa Island is surrounded by the Indian Ocean by means of the Kilindini, Tudor, Makupa, and Old Port creeks. The Indian Ocean is home to a wide range of flora and fauna, including plankton, seaweed, various species of fish including parrot fish and zebra fish, molluscs including squid and octopus. The various flora and fauna within the Indian Ocean are shown in the figures below



**Figure 433: Some of the fish species within the Indian Ocean**

The major vegetation located within the project areas are tree species common along the Kenyan coast, which include Indian Ashok, Palms and Coconut trees as shown in the figure below:



**Figure 434: General Vegetation in the Project Sites**

Of great importance are the few mangrove trees which are located along the Indian Ocean, particularly in Tudor and Ganjoni areas. This vegetation is currently at risk due to the high level of pollution of the Indian Ocean from the storm water facilities.

### **4.3. SOCIO ECONOMIC INFRASTRUCTURE**

#### **4.3.1. Administration**

The project area is located within Mombasa Island Sub-county of Mombasa County with the project sites being located within the following administrative units (locations)

- i. Tudor
- ii. Tononoka
- iii. Ganjoni
- iv. Old Town
- v. Railways

#### **4.3.2. Population**

The population data for the project area was taken in accordance to the 2009 census and is summarized in the table below:

Area	2009	Projection 2017
------	------	-----------------

	<b>Population</b>	<b>Density</b>	<b>Population</b>	<b>Density</b>
Mombasa Island (Mvita Constituency)	143,128	9,671	193,977	13,396

Mombasa Island is the county headquarters, in addition, it houses the port which is a major hub for the country, this among other cultural, socio-economic activities results in the high population in the area. This entire population is currently served by the water and sanitation network within Mombasa Island. However, within the informal settlements, there is no water and sanitation infrastructure.

This population stands to benefit from the proposed project.

#### **4.3.3. Health**

Mombasa Island is the headquarters of the County being home to the Coast General Hospital, which is the second largest government hospital in Kenya and serves as the tertiary referral centre for the entire coast region. In addition, the County is also home to private hospitals including Aga Khan Hospital.

Being a coastal city and a hub for tourism, the prevalence of HIV/AIDS is relatively high with the National Aids Control Council reporting that 54,670 people currently live with HIV/AIDS 6,870 of whom are women and children, however the prevalence of rate within Mombasa Island is 3% which is lower than that of the other sub-counties within Mombasa.

#### **4.3.4. Transport and Communication**

Being a major City in Kenya, the area is served by a wide network of roads. In addition, Mombasa is home to the Moi International Airport which is the second largest airport in the Country. Thus the area is well served by a transport network. The only area that has not progressed with the provision of a modern transport network is the Mombasa Old town which is still reminiscent of the Swahili town architecture characterized by narrow streets.

#### **4.3.5. Commerce and Industry**

Mombasa Island is a hub of tourism and commerce housing a large number of beach hotels and the major port at Kilindini. The area is a major tourist destination particularly during the summer and winter breaks from European Countries.

In addition to the tourism, the Indian Ocean provides a fishing ground for the local fishermen, who supply fresh fish to the beach hotels in the area.

Of additional interest in Mombasa Island is Mombasa Old Town which houses sites such as Fort Jesus which was declared a world heritage site by UNESCO in 2011. Care must be taken into account during the project implementation to ensure that the project does not adversely affect these sites.

#### **4.3.6. Local Communities**

The project area is a cosmopolitan area made up of various communities, but majority of the residents are the waswahili people.

#### **4.3.7. Water and Sanitation Services**

Mombasa County receives its water from four sources namely Baricho Wellfields, Mzima Springs, Marere and Tiwi. It is proposed to increase the water supply via the construction of Mwache Dam.

Sanitation services are not as widely spread as the water supply services. Only Mombasa West Mainland and Island are served by sewerage services, with the Kipevu treatment works serving Mombasa West Mainland and Kizingo Treatment works serving Mombasa Island. The Kipevu Treatment plant is not fully functional with some of the mechanized components being out of service. The Kizingo Treatment plant is not working all together, which has led to several illegal connections to the storm water network. These illegal connections are responsible for raw sewage being discharged into the Indian Ocean via the existing storm water outlets, which has led to pollution of the Indian Ocean and hence a negative impact on the ocean biodiversity, thus necessitating the improvements on the storm water outlets to counteract this pollution. Some of the conditions within the storm water outlets are shown in the figures below:



**Figure 435: Raw Sewage making its way into the Indian Ocean using one of the storm water outlets**



*Figure 436: Raw Sewage making its way into the Indian Ocean*



**Figure 437: Solid Waste at some of the settlements at the project area**

1) Water and Sewage Tariffs

The Mombasa Water and Sanitation Company (MOWASSCO) is mandated to manage the water and sanitation supply in Mombasa County. It currently bills residents based on the water usage via water meters connected to each development. The rates are calculated according to the water usage. The sewage rate is calculated as a factor of water usage. However due to constant water shortage the local residents buy water from local water peddlers between Kshs. 5-20, per 20 litre jerrycan.

## 5. RELEVANT LEGISLATIVE/ REGULATORY FRAMEWORK

There are many laws and regulations governing issues of environmental concern in Kenya. The principal National legislation is the Environmental Management & Coordination (Amended) Act of 2015. The Act empowers stakeholders to participate in sustainable management of the natural resources. It calls for Environmental and Social Impact assessment (ESIA) to guide the implementation of environmentally sound decisions. Other local laws and regulations looked into include but are not limited to, the Constitution, the Water Act of 2002 among others.

In addition to the local legislation, the Consultant has identified some World Bank Policies of relevance to the project.

The following is an outline of the legislative, policy and regulatory framework for which the Proponent shall observe and implement in an effort to comply with Environmental Sustainability.

### 5.1 THE ENVIRONMENTAL MANAGEMENT AND COORDINATION (AMENDED) ACT OF 2015

This Act is an amendment of the Environmental Management and Co-ordination Act of 1999. The amended Act covers virtually all diverse environmental issues which require a holistic and coordinated approach towards its protection and preservation for the present generation without compromising the interests of the future generation to enjoy the same. Consequently, the amended act provides for the legal regime to regulate, manage, protect and conserve biological diversity resources and access to genetic resources, wetlands, forests, marine and freshwater resources and the ozone layer to name a few.

The Environmental Management and Coordination (Amended) Act, 2015 harmonizes the various requirements of the other existing laws and regulations by stipulating that where the provisions of any existing law conflicts with itself, then the provisions of the Environmental Management and Coordination (Amended) Act, 2015 shall prevail. This way, the act is able to minimize any conflicts in enforcement of the various environmental laws and regulations as applied to the relevant sectors. The Environmental Management and Coordination (Amended) Act, 2015 represents the culmination of a series of initiatives and activities coordinated by Government and stakeholders. It accentuates the right of every person in Kenya to live in a clean and healthy environment and obliges each and every one to safeguard and enhance the environment. It is the master plan for the environment in Kenya and contains a National Environment Policy, Framework Environmental Legislation and Environmental Strategy.

The Act gives power to the National Environment Management Authority (NEMA) which is a semi-autonomous government agency mandated to exercise general supervision and coordination over all matters relating to the environment and to be the principal instrument of the Government of Kenya in the implementation of all policies relating to the environment. NEMA is the body in charge of ensuring developments adhere to the policies and frameworks set out by the Authority.

The amended act highlights the need for an ESIA which is presented in this report.

### 5.2 THE ENVIRONMENT MANAGEMENT AND COORDINATION AMENDED ACT 2015 AND ITS TOOLS

The Act has several regulations that aid in its implementation the relevant regulations are highlighted in the sections below:

#### 5.2.1 Environmental (Impact Assessment and Audit) Regulations 2003

These Regulations stipulate the importance of conducting an ESIA as well as the procedure necessary. The Regulations highlight the various reports and their contents to be submitted to NEMA for licensing. The regulations highlight the ESIA process which includes:

- Paying a fee of 0.1% of the project cost to facilitate licensing.
- Submission of a ESIA project report to NEMA for review or licensing
- In some cases the Authority will request for a full study report for some projects for which the applicant will be required to prepare a Terms of Reference and submit a study report.

The project and study reports will be conducted before the implementation of the development in question, the reports will be subject to approval by NEMA, which will provide a license after the payment of 0.1% of the project cost.

The regulations also calls for Environmental auditing and monitoring that will be carried out during the construction or operation of the enterprise, the regulations provide the format of the audit report which will be provided to NEMA.

### 5.2.2 Water Quality Regulations (2006)

Water Quality Regulations apply to water used for domestic, industrial, agricultural, and recreational purposes; water used for fisheries and wildlife purposes, and water used for any other purposes. Different standards apply to different modes of usage. These regulations provide for the protection of lakes, rivers, streams, springs, wells and other water sources.

These regulations provide the standards for effluent discharge into receiving water sources, which will be important for this project as a combination of waste water and storm water will be discharged into the Indian Ocean from the various discharge points within Mombasa Island. The standards are summarized in the table below:

**Table 51: Waste Water Quality that must be met by Outlets**

Parameter	Guiding Value
pH	6.5-8.5
Biological Oxygen Demand (5 days at 20°C)	30 (mg/L) max
Chemical Oxygen Demand (COD)	50 (mg/L) max
Suspended Solid	30 (mg/L) max
Ammonia –NH <sub>4</sub> + Nitrate-NO <sub>3</sub> + Nitrite –NO <sub>2</sub>	100 (mg/L) max
Total Dissolved Solids	1200 (mg/L) max
Ecoli	Nil/100 ml
Total Coliform	1000/100 ml

The effluent from the improved storm water outlets will have to meet the above regulations during its operation. The design has been carried out to meet these standards.

In addition, these regulations require the application for a license for each of the outlets to discharge the water into the ocean, for which the proponent will have to make an application.

### 5.2.3 The Environmental Management and Coordination (waste management) Regulation, 2006

The Waste Management Regulations are meant to streamline the handling, transportation and disposal of various types of waste. The aim of the Waste Management Regulations is to protect human health and the environment. The regulations place emphasis on waste minimization, cleaner production and segregation of waste at source.

These regulations will be of great importance particularly during the construction and operation phases of the project. During the Construction, the Contractor will have to meet the requirements of the regulations, by providing solid waste sorting and transportation using a licensed transporter who

will dispose of the solid waste to the designated receptacle. In addition during the operation, the Proponent will have to take the initiative to ensure that the solid waste generated from the site will be transported by a licensed transporter as well as being disposed into an acceptable receptacle.

#### **5.2.4 EMCA (Noise and Excessive Vibration Pollution Control) Regulations, 2009**

These Regulations determine the level of noise that will be permissible in particular during the construction of the improvements, the following factors will be considered:

- Time of the day;
- Proximity to residential area;
- Whether the noise is recurrent, intermittent or constant;
- The level and intensity of the noise;
- Whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and,
- Whether the noise is subject to be controlled without unreasonable effort or expense to the person making the noise.

The Contractor will have to meet the requirements of these regulations particularly during the construction process, where some of the construction activities are bound to make some level of noise. These regulations are summarised in the table below:

**Table 52: Table showing Permissible Noise Level for a Construction Site**

Facility		Local Maximum Noise Level Permitted in Decibels	
		Day	Night
1.	Health facilities, educational institutions, homes for disabled etc.	60	35
2.	Residential areas	60	35
3.	Areas other than 1 and 2 above	75	65

In addition the IFC regulations for permissible noise levels are summarized in the table below:

Facility		Maximum Noise Level Permitted in Decibels	
		Day	Night
1.	Residential; institutional; educational	55	45
2.	Industrial; commercial	70	70

Comparatively both regulations are relatively similar, as such the local regulations will be used.

### **5.2.5 Draft Environmental Management and Coordination (Air Quality) Regulations, 2009**

The objective of the Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources such as mobile sources (e.g. motor vehicles) and stationary sources such as the improvements made to the storm water outlets. The Contractor will have to ensure all his machinery do not exceed the emissions made in the regulations (presented in the first schedule of the regulations). In addition, the operation of the improvement works will not exceed the requirements set in the third schedule of the regulations. (Nitrogen Oxides  $\text{NH}_3$  – 100-400  $\text{mg}/\text{Nm}^3$ , Hydrocarbons – 400 – 2000  $\text{mg}/\text{Nm}^3$  and Hydrogen Sulphides 50 – 200  $\text{mg}/\text{Nm}^3$ ). The design of the improvements has incorporated these standards into the design.

### **5.2.6 The Environmental Management and Co-Ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009**

These regulations identify wetlands as areas permanently or seasonally flooded by water where plants and animals have become adapted and incorporates riparian and coastal zones. Its main purpose is to ensure the conservation and sustainable use of wetlands. The regulations identify the need for an EIA for any development that may cause harm to the wetland. The project will be located along the coastline, and within its riparian, thus the need to carry out the ESIA study presented in this report.

### **WATER ACT 2016**

This Act is an update of the Water Act of 2002. It makes provision for the provision of clean and safe water in adequate quantities and to reasonable standards of sanitation for all citizens.

The Act gives power to Water Works Development Agencies which are charged with:

- a) Undertaking the development, maintenance and management of the national public water works within its area of jurisdiction.
- b) Operating the waterworks and providing water services as a water service provider, until such time as responsibility for the operation and management of the waterworks are handed over to a county government, joint committee, authority of county governments or water services provider within whose area of jurisdiction or supply the waterworks is located.
- c) Providing a reserve capacity for purposes of providing water services where pursuant to section 103, the Regulatory Board orders the transfer of water services functions from a defaulting water services provider to another licensee.
- d) Providing technical services and capacity building to such county governments and water services providers within its area as may be requested; and
- e) Providing to the cabinet secretary technical support in the discharge of his/her functions under the constitution of this Act.

### **5.4. THE PUBLIC HEALTH ACT (CAP. 242)**

Part IX Section 8 & 9 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Any noxious matter or waste water flowing or discharged into a water course is deemed as a nuisance. Part XII Section 136 states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitates the breeding or multiplication of pests shall be deemed nuisances. The Act addresses matters of sanitation, hygiene and general environmental health and safety. This Act will govern the Contractor's activities on site including ensuring the health and safety of employees including providing health services when it comes to venereal diseases. In addition, this law justifies the need for the improvements needed on the storm water outlets, due to the free flowing of waste water into the Indian Ocean that is currently occurring. The improvements made to the storm water outlets will provide treatment to the waste water before being discharged into the Indian Ocean.

## **5.5. THE NEW CONSTITUTION OF AUGUST 2010 ON GENDER**

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In the New Constitution, Chapter Four—The Bill of Rights,

Section 21 (3) All State organs and all public officers have the duty to address the needs of vulnerable groups within society, including women, older members of society, persons with disabilities, children, youth, members of minority or marginalized communities, and members of particular ethnic, religious or cultural communities

Section 27 (3) Women and men have the right to equal treatment, including the right to equal opportunities in political, economic, cultural and social spheres.

Part 2 on the Composition and Membership of Parliament,

Section 97 (1) The National Assembly consists of, a) two hundred and ninety members, each elected by the registered voters of single member constituencies; (b) forty-seven women, each elected by the registered voters of the counties, each county constituting a single member constituency;

Section 98. (1) The Senate consists of— (a) forty-seven members each elected by the registered voters of the counties, each county constituting a single member constituency; (b) sixteen women members who shall be nominated by political parties according to their proportion of members of the Senate elected under clause (a) in accordance with Article 90; (c) two members, being one man and one woman, representing the youth; (d) two members, being one man and one woman, representing persons with disabilities;

Section 100 Parliament shall enact legislation to promote the representation in Parliament of—

(a) Women;

Section 127 (1) There is established the Parliamentary Service Commission.

The Commission consists of—

The Speaker of the National Assembly, as chairperson;

A vice-chairperson elected by the Commission from the members appointed under paragraph

Seven members appointed by Parliament from among its members of whom—

Four shall be nominated equally from both Houses by the party or coalition of parties forming the national government, of whom at least two shall be women;

In Chapter Thirteen, on the Public Service, Part 1—Values and Principles of Public Service

Section 232 (1) the values and principles of public service include—(i) affording adequate and equal opportunities for appointment, training and advancement, at all levels of the public service, of—

Men and women;

The members of all ethnic groups; and

Persons with disabilities.

Section 232 (2) the values and principles of public service apply to public service in—

All State organs in both levels of government; and  
All State corporations

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Parliament shall enact legislation to give full effect to this Article.

2-  
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## Review Of Environmental And Social Impact Assessment Report For Mombasa Water Supply, Expansion Of Distribution Systems, Lot 2

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In the composition, appointment and terms of office, the new constitution says that the chairperson and vice-chairperson of a commission shall not be of the same gender.

In addition clause (8) says that the State shall take legislative and other measures to implement the principle that not more than two-thirds of the members of elective or appointive bodies shall be of the same gender.

The new constitution provides for the elimination of gender discrimination in law, customs and practices related to land and property. Under Kenya's previous law, inheritance was governed by customary law, often preventing women from inheriting property from their parents or laying claim to joint assets when their husbands' died.

In summary, the New Constitution provides as follows-

The New Kenyan Constitution ensures that women will be able to pass on citizen ship to their children regardless of whether or not they are married to Kenyans. Article 14 (1)

The New Kenyan Constitution provides that parties to a marriage will be entitled to equal rights at the time of marriage, during the marriage and at its dissolution. Article 45 (3)

The New Kenyan Constitution assures that parental responsibility shall be shared between parents regardless of marital status. Article 53 (1) (e).

The New Kenyan Constitution eliminates gender discrimination in relation to land and property and gives everyone including women the right to inheritance and unbiased access to land. Article 60 (1) (f).

The New Kenyan Constitution provides for the enactment of legislation for the protection of matrimonial property with special interest on the matrimonial home during, and upon the termination of the marriage. Article 68 (c) (iii).

The New Kenyan Constitution maintains a one third requirement for either gender in elective bodies giving women of Kenya at least 1/3 minimum in elective public bodies. Article 81 (b).

The New Kenyan Constitution ensures that gender equality is maintained in political parties providing a basic requirement for political parties as amongst other to respect and promote gender equality. Article 91 (f)

The New Kenyan Constitution provides that Parliament shall formulate law to promote the representation of women, persons of disabilities, ethnic and other minorities and marginalized communities in Parliament. Article 100.

The New Kenyan Constitution ensures that women and men will have the right to equal treatment and opportunities in political, economic, cultural and social spheres without discrimination. Article 27 (3).

The New Kenyan Constitution accords the right to health including reproductive health to all. Article 43 (1) (a).

The New Kenyan Constitution affords adequate and equal opportunities for appointment, training and advancement for women and men at all levels within the Public Service Commission. Article 232 (i).

## **5.6. THE PREVENTION AND CONTROL OF MARINE POLLUTION ACT, 2014**

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This Act protects the Indian Ocean from pollution from ocean plying vessels or facilities that deposit waste into the Indian Ocean. This act mainly applies to ocean plying vessels, however chapter 5 of the Act states that all vessels must have holding tanks to prevent the flow of untreated sewage into the ocean, as such these vessels must make use of the facilities at Mombasa, thus sensitizing the importance of having a working waste water system. This project will go a long way in ensuring untreated sewage does not make its way into the Indian Ocean.

## **5.7. THE LAND ACT, 2012**

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This Act applies to all land declared as public land in Article 62 of the Constitution and all private land as declared by Article 64 of the Constitution.

The Act identifies all public land, of importance to this project will be riparian land where the improvements to the storm water outlets and their access roads in some sites will be located. The Survey Act (CAP 299) identifies this reserve as 60m from the high water mark.

The enactment of the Land Act, Sec 157(2), criminalized encroachments on public land as follows:

- i. Unlawful occupation of public land is an offence which attracts fines of up to KES 500,000 and if a continuous offence, a sum not exceeding KES 10,000 for every day the offence is continued;
- ii. Wrongful obstruction of a public right of way is an offence and attracts a fine of up to KES 10,000,000 and if a continuous offence, a sum of up to KES 100,000 for every day the offence is continued; and
- iii. In addition to these criminal sanctions, any rights over land that were obtained by virtue or on account of an offence may be cancelled or revoked.

## **5.8. CITIES AND URBAN AREAS ACT 2012**

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This act identifies Mombasa as a city due to its integrated urban area. The city is under the jurisdiction of boards which carry out the duties of the County Government. The various boards within the city are charged with:

- a) exercise executive authority as delegated by the county executive;
- b) ensure provision of services to its residents;
- c) impose such fees, levies and charges as may be authorised by the county government for delivery of services by the municipality or the city;
- d) promote constitutional values and principles;
- e) ensure the implementation and compliance with policies formulated by both the national and county government;
- f) make by-laws or make recommendations for issues to be included in bye-laws;
- g) ensure participation of the residents in decision making, its activities and programmes in accordance with the Schedule to the Act; and
- h) exercise such other powers as may be delegated by the county executive committee.

This Act identifies the importance of consulting with the county council and its departments for the proposed project in order to get opinions and recommendations for the successful implementation of the project. In addition, the County Council will be part of the operation of the proposed project, as well as being a key stakeholder in the resettlement of PAPs.

## **5.9. PHYSICAL PLANNING ACT (CAP 286)**

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The act state that while giving due considerations to the rights and obligations of landowners, there shall be compensation whenever a materials site, diversion or realignment results into relocation of settlement or any change of user whatsoever of privately owned land parcels.

Under the physical planning act, physical development activities are supposed to be carried out according to the physical plans. Accordingly the processes of physical planning involve two stages; the plan making stage and the development control stage. The former involves drawing up the actual plan to indicate the various activities and zones whereas the later involves the process of determining applications by developers to carry out specific development activities. Section 36 states “if in connection with a development application a local authority is of the opinion that proposals for the outlets or any other development activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an environment impact assessment report”. This ESIA covers the proposed outfalls.

#### **5.10. OCCUPATIONAL HEALTH AND SAFETY ACT**

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This legislation provides for protection of workers during construction and operation phases of the project. This act will provide some of the mitigation measures for any negative impacts in particular those concerning the workers within the site.

#### **5.11. THE WORK INJURY AND BENEFIT ACT 2007**

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The Act seeks to provide compensation to employees for work related injuries and diseases contracted in the course of their employment and for connected purposes. Every employer must therefore obtain and maintain an insurance policy, with an insurer approved by the Minister in respect of any liability that the employer may incur under this Act to any of its employees. The employer is required keep a register or other record of the earnings and other prescribed particulars of all employees and produce the register or record during inspection. The act also states that an employee is not entitled to compensation if an accident, not resulting in serious disablement or death, is caused by the deliberate and willful misconduct of the employee to avoid abuse of compensation.

#### **5.12 THE HIV AND AIDS PREVENTION AND CONTROL ACT**

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This is an Act of Parliament to provide measures for the prevention, management and control of HIV and AIDS, to provide for the protection and promotion of public health and for the appropriate treatment, counseling, support and care of persons infected or at risk of HIV and AIDS infection, and for connected purposes.

This Act will ensure that the Contractor makes provision for VCT services for employees and locals, as well as promotes public awareness. This will go a long way in ensuring stigmatization of HIV and AIDS is reduced as well as managed during the construction period.

#### **5.13. NATIONAL GENDER AND DEVELOPMENT POLICY**

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The National Gender and Development Policy provide a framework for advancement of women and an approach that would lead to greater efficiency in resource allocation and utilisation to ensure empowerment of women.

The National Policy on Gender and Development is consistent with the Government’s efforts of spurring economic growth and thereby reducing poverty and unemployment, by considering the needs and aspirations of all Kenyan men, women, boys and girls across economic, social and cultural lines. The policy is also consistent with the Government’s commitment to implementing the National Plan of Action based on the Beijing Platform for Action (PFA).

It mandates all employers who employ twenty or more employees to issue a policy statement on sexual harassment and prohibits the worst forms of child labor

The overall objective of the Gender and Development Policy is to facilitate the mainstreaming of the needs and concerns of men and women in all areas in the development process in the country. This law will be of relevance to the contractor in ensuring that all genders are given an equal opportunity

during recruitment during the construction phase and operation phase of the project. The employers will also provide adequate facilities for all genders within the project site.

### **5.11. THE SEXUAL OFFENCES ACT, 2006**

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This Act protects people and employees from any unwanted sexual attention or advances by staff members. It ensures the safety of women, children and men from any sexual offences which include: rape, defilement, indecent acts. This law will govern the code of conduct of the Contractor's staff and provide repercussions of any wrong doing with regards to sexual offences by staff. Section 15, 17 and 18 focuses mainly on sexual offenses on minors (children).

### **5.12. THE COUNTY GOVERNMENTS ACT, 2012**

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The promulgation of the 2010 Constitution brought about County Governments. This Act highlights the role of the County Government. The County Government will be in charge of all development activities within the County, as such will be a major stakeholder for the proposed project.

### **5.13. PEOPLE LIVING WITH DISABILITY ACT , 2012**

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An Act of Parliament to provide for the rights and rehabilitation of persons with disabilities; to achieve equalisation of opportunities for persons with disabilities; to establish the National Council for Persons with Disabilities.

Part III of the act outlines the rights and privileges of persons with disabilities

Section 12 on employment states that:

- i) No person shall deny a person with a disability access to opportunities for suitable employment.
- ii) A qualified employee with a disability shall be subject to the same terms and conditions of employment and the same compensation, privileges, benefits, fringe benefits, incentives or allowances as qualified able-bodied employees.
- iii) An employee with a disability shall be entitled to exemption from tax on all income accruing from his employment.

Section 15 on discrimination of employment states that:

(1) Subject to subsection (2), no employer shall discriminate against a person with a disability in relation to—

- . (a) the advertisement of employment
- . (b) the recruitment for employment
- . (c) the creation, classification or abolition of posts
- . (d) the determination or allocation of wages, salaries, pensions, accommodation, leave or other such benefits
- . (e) the choice of persons for posts, training, advancement, apprenticeships, transfer, promotion or retrenchment the provision of facilities related to or connected with employment; or many other matter related to employment.

(2) Notwithstanding subsection (1), an employer shall be deemed not to have discriminated against a person with a disability if—

- . (a) the act or omission alleged to constitute the discrimination was not wholly or mainly attributable to the disability of the said person;

- . (b) the disability in question was a relevant consideration in relation to the particular requirements of the type of employment concerned; or
- . (c) special facilities or modifications, whether physical, administrative or otherwise, are required at the work place to accommodate the person with a disability, which the employer cannot reasonably be expected to provide.

(3) A complaint by a person with a disability that his employer has discriminated against him in a way which is contrary to this Act may be presented to the Industrial Court through the appropriate trade union.

(4) Any contract for employment or for provision of goods, facilities or services, or any other agreement, shall be void insofar as it purports to deny any person any rights or privileges conferred under this Act or in any other way to limit the operation of this Act.

(5) An employer shall provide such facilities and effect such modifications, whether physical, administrative or otherwise, in the workplace as may reasonably be required to accommodate persons with disabilities.

(6) The minimum retirement age for persons with a disability shall be sixty years.

Section 16 provides incentives for employers who employ people living with disability , it states that:

(1) A private employer who engages a person with a disability with the required skills or qualifications either as a regular employee, apprentice or learner shall be entitled to apply for a deduction from his taxable income equivalent to twenty five per cent of the total amount paid as salary and wages to such employee:

Provided that—

(i) such an employer shall present proof certified by the Ministry responsible for labour that the persons with disabilities in respect of whom he claims the deduction are under his employ; and

(ii) the persons with disabilities so employed are accredited with the Council as to their disabilities, skills and qualifications.

(2) A private employer who improves or modifies his physical facilities or avails special services in order to provide reasonable accommodation for employees with disabilities shall be entitled to apply for additional deductions from his net taxable income equivalent to fifty per cent of the direct costs of the improvements, modifications or special services.

## **5.14. WORLD BANK SAFEGUARD POLICIES**

### ***5.14.1. Operational Policy (OP) 4.01: Environmental Assessment, 2001***

Environmental Assessment is used in the World Bank to identify, avoid, and mitigate the potential negative environmental impacts associated with Bank lending operations. The purpose of Environmental Assessment is to provide guidance for environmental assessment of the WB financed projects, improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted. The improvements on the storm water outlets are considered EA Category B, as the project impacts are anticipated to be specific to the project site and reversible with implementation of the proposed mitigation measures.

### ***5.14.2. Operational Policy 4.04: Natural Habitats, 2001***

The policy seeks to ensure that World Bank-supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society. The policy strictly limits the circumstances under which any Bank-supported project can damage natural habitats (land and water

areas where most of the native plant and animal species are still present). The Construction activities of the improvements to the outlets will have to be carried out in a way that doesn't negatively affect the surrounding biodiversity. The operation of the treatment works at the outlets, will go a long way in reducing the pollution of the Indian Ocean hence maintaining the natural habitats for trees and ocean creatures.

#### ***5.14.3. Operational Policy (OP/BP) 4.11: Physical Cultural Resources***

The objective of this policy is to assist countries in preserving physical cultural resources and avoiding their destruction or damage. PCR are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious (including graveyards and burial sites), aesthetic, or other cultural significance. PCR may be located in urban or rural settings, and may be above ground, underground, or under water. The cultural interest may be at the local, provincial or national level, or within the international community. This policy applies to all projects requiring a category A or B environmental assessment, project located in, or in the vicinity of recognized cultural heritage sites. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. For projects involving substantial civil works a set of "chance find" procedures is to be developed and included into the contracts to be used in case of accidental discovery of cultural objects during construction. Mombasa Island is home to Mombasa Old town which is a heritage recognised by UNESCO. The existing pump stations which will be improved under this project are located within the old town. Although the improvements will not affect any cultural site, the fact that the site is located within the old town, care must be taken to ensure construction methods do not affect cultural sites within the area. Most of the outlets were located near areas a few mangrove trees, which will have if possible can be avoided during the construction. In addition, the Baxton Outlet is located near a Hindu burial site however no graves will be affected by the project, there may be "chance finds" during construction for which measures will be provided in this report.

#### ***5.14.4. The Bank's Operational Policy 4.12: Involuntary Resettlement***

This is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts.

It promotes participation of displaced people in resettlement planning and implementation, and its key economic objective is to assist displaced persons in their efforts to improve or at least restore their incomes and standards of living after displacement.

The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to Bank appraisal of proposed projects.

Some of the outlets will be located within informal settlements within the Ocean riparian, for which resettlement will have to occur.

#### ***5.14.5. World Bank Policy on Access to Information, 2010***

The World Bank policy on access to information sets out the policy of the World Bank on public access to information in its possession. This Policy supersedes the World Bank Policy on Disclosure of Information, and took effect on July 1, 2010.

This Policy is based on five principles:

- ❖ Maximizing access to information.
- ❖ Setting out a clear list of exceptions.
- ❖ Safeguarding the deliberative process.
- ❖ Providing clear procedures for making information available.

- ❖ Recognizing requesters' right to an appeals process.

In disclosing information related to member countries/borrower in the case of documents prepared or commissioned by a member country/borrower (in this instance, safeguards assessments and plans related to environment, resettlement, and indigenous peoples, OP/BP 4.01, Environmental Assessments, OP/BP 4.10, Indigenous Peoples, and OP/BP 4.12 Involuntary Resettlement); the bank takes the approach that the country/borrower provides such documents to the Bank with the understanding that the Bank will make them available to the public.

### **5.16. INTERNATIONAL FINANCE CORPORATION AND WORLD BANK ENVIRONMENTAL, HEALTH AND SAFETY (EHS) GUIDELINES**

These are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). When one or more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. These General EHS Guidelines are used in addition to the local guidelines in order to provide mitigation measures for the various environmental and social impacts that will be identified in this report.

### **5.17. World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018)**

The World Bank Group considers that no country, community, or economy can achieve its potential or meet the challenges of the 21st century without the full and equal participation of women and men, girls and boys. It is committed to closing gaps between males and females globally for lasting impact in tackling poverty and driving sustainable economic growth that benefits all (World Bank, 2018).

Major civil works can exacerbate the risk of GBV in both public and private spaces by a range of perpetrators in a number of ways, for example:

- Projects with a large influx of workers may increase the demand for sex work—even increase the risk for trafficking of women for the purposes of sex work—or the risk of forced early marriage in a community where marriage to an employed man is seen as the best livelihood strategy for an adolescent girl. Furthermore, higher wages for workers in a community can lead to an increase in transactional sex. The risk of incidents of sex between laborers and minors, even when it is not transactional, can also increase.
- Projects create changes in the communities in which they operate and can cause shifts in power dynamics between community members and within households. Male jealousy, a key driver of GBV, can be triggered by labor influx on a project when workers are believed to be interacting with community women. Hence, abusive behavior can occur not only between project-related staff and those living in and around the project site, but also within the homes of those affected by the project.
- When land redistribution occurs—for example due to resettlement for civil works—women may be extremely vulnerable to GBV. This is particularly true in countries where the legal systems preclude women from holding land titles.
- Women and girls' job opportunities are limited due to a lack of appropriate transportation options. When creating job opportunities for women within projects, teams should be aware that traveling to and from work in some settings can force women and girls to use unsafe, poorly lit commuter routes, or unsafe public transport. Increased risk of violence is experienced when women are confronted with traveling long distances to access work opportunities or forced to travel at night.

3. This Good Practice Note (GPN) was prepared to assist Task Teams in establishing an approach to identifying risks of GBV, in particular Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH), that can emerge in IPF with major civil works contracts and to advise Borrowers accordingly on how to best manage such risks. The GPN builds on World Bank experience and good international industry practices, including those of other development partners. While World Bank Task Teams are the primary audience, the GPN also aims to contribute to a growing knowledge base on the subject.

## **6. PUBLIC CONSULTATIONS**

### **6.1. LEGAL REQUIREMENTS**

#### **6.1.1. Government Policy on Public Consultation**

The overall objective of the Government is to involve communities in policy formulation and implementation at the local level. More specifically, the Community Action Planning Programme objective is to put in place a durable system of intra-community co-operation through collective action, which creates communal discussion forums for the implementation of development activities.

### **6.2. PERSONS OR AGENCIES CONSULTED**

The key issues associated with the establishment of the treatment works at the outlet sites will often relate to land-take, biodiversity, pollution, disruption of livelihoods, community safety, traffic management, communicable diseases and employment and trade opportunities.

Effort was not spared to contact all with information on the following issues:

- Assessment of the baseline environmental and social conditions
- Consideration of feasible and environmentally & socially preferable alternatives
- Requirements under Kenya country laws and regulations, applicable international treaties and agreements
- Protection of human rights and community health, safety and security (including risks, impacts and management of project's use of security personnel)
- Protection and conservation of biodiversity
- Sustainable management and use of renewable natural resources (including sustainable resource management through appropriate independent certification systems)
- Use and management of dangerous substances and major hazards assessment
- Labour issues (including the four core labour standards), and occupational health and safety
- Socio-economic impacts & fire prevention and life safety
- Land acquisition and involuntary resettlement
- Impacts on affected communities, and disadvantaged or vulnerable groups
- Cumulative impacts of existing projects, the proposed project, and anticipated future projects
- Consultation and participation of affected parties in the design, review and implementation of the project
- Efficient production, delivery and use of energy
- Pollution prevention and waste minimization, pollution controls (liquid effluents and air emissions) and solid and chemical waste management.

As such a cross-section of persons were consulted in Mombasa County as indicated by the following consultation registers in tables 5-1.

**Table 61: Persons met during the ESIA study in planning the Improvements on the Storm Water Outlets**

No.	Name	Office	Designation	Contacts
1	Mr. Francis Kombe	Mombasa County Water, Environment, and Natural Resources Office	Ag. Managing Director	+254721820335
2	Abdi Ibrahim Abdi	Mombasa County Lands, Planning and Housing Department	County Chief Officer	+2547250190
3	Mr. William Opiyo	Mombasa County NEMA offices	EIA officer	+254726537061
4	Mr. Juma Sudi	MOWASCO	Sanitation Officer	+254712287666

#### ***6.2.1. Overview from the Officer – Mombasa County Government Water, Environment and Natural resources Office.***

The Environmental officer made recommendations for consultations with key stakeholders within the County, to ensure that all stakeholders were aware and had accepted the project. He added that projects that would displace people would have to be treated following the correct procedures to ensure seamless transitions and resettlement. The Consultant noted their recommendations and would include them in the ESIA report.

#### ***6.2.2. Overview from the County Chief Officer Lands, Planning and Housing Department.***

The County Chief Officer presented copies of the County Financial Plan to the Consultant, stating that all the development projects were summarized in the plan, including improvements to the sanitation within the County.

#### ***6.2.3. Overview from the EIA Officer NEMA.***

The EIA officer stated that, the consultant could prepare a comprehensive ESIA report for all 12 sites, which could be submitted at the County level for approval and licensing, and one license was adequate for all the sites.

#### ***6.2.4. Overview from the Sanitation Officer MOWASCO.***

The officer expressed the need for the project stating that the Indian Ocean was getting extremely polluted due to illegal connections to the storm water system. He pointed out that the Kizingo Treatment works had broken down, as such raw sewage was making its way into the Indian Ocean. He took the Consultants on a tour of the existing storm water facilities showing the areas where raw sewage was making its way to the Indian Ocean. He added that the residents near the outlet locations, were suffering due to the pollution of the Indian Ocean. He concluded, stating that the project was extremely important, and expressed hope that the project would be implemented as soon as possible to improve the current conditions.

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### **6.3. PUBLIC CONSULTATION**

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The Consultant carried out public consultation in the form of a consultative meeting where, the Consultant presented the project to the local community, comprised of stakeholders, including representatives of the current residents of the project areas among others. The Consultant held a meeting on 16<sup>th</sup> December 2016 at the chief's office in Railways Location, minutes, photos and an attendance sheet of the meeting are presented in appendix 12.2.

#### **6.3.1. Findings of the meetings**

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The meetings included a presentation by the Consultant on the proposed works, the various environmental and social impacts that may arise from the project including resettlement at some of the sites. The consultant however pointed out that the Designers had tried their very best to minimize resettlement and that the proposed improvements would be located within the Ocean's riparian. She highlighted the mitigation measures for all the impacts in accordance to the RAP. She also disclosed the features of the RAP including cut off dates.

Being a public consultation meeting, feedback from the stakeholders was obtained with majority of the stakeholders approving of the project however the needs of the residents in the projects area be looked after due to the fact that most of them were low income earners and would have nowhere to move to. The meeting was successful, with the public accepting the project.

### **6.4. CONSULTATION DURING THE PROJECT DURATION**

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The Consultant also proposes that continuous consultation be carried out throughout the construction phase of the project using focus group discussions to ensure interested stakeholders are aware of construction procedures and provide a forum for feedback and recommendations for implementation in the construction. In addition there is a grievance redress procedure which is provided in chapter 9.4 of this report.

## **7. ENVIRONMENTAL AND SOCIAL EFFECTS OF THE PROPOSED PROJECT**

This chapter presents the general environmental and social impacts which may result from the proposed project. The emphasis will be initially on the specific impacts that are likely to result from the nature of works including excavation and concrete works.

The construction of the improvements at the existing storm water outlets will greatly benefit the environment, however some of the project activities will have negative effects on the environment.

In general, successful implementation of the project will have high environmental and socio economic benefits to the people and will contribute to the health and wellbeing. Overall, expected negative impacts are related to the improvements to the existing storm water outlets including construction of the inlet chamber, fine and coarse screens and grit removal chamber, as well as the general operation of the treatment works. These impacts are localized and not considered significant and long-lasting and can be mitigated through appropriate mitigation measures. The severity and duration of these impacts can be minimized by ensuring that the excavation and construction works are limited to short working sections, and that works are carried out rapidly and efficiently. Table 6.1 presents a characterization of expected impacts.

**Table 71: Characterization of Impacts**

Aspect	Predicted Impact	Characterization of Impacts								
		Nature		Effect		Time Range			Reversibility	
		Positive	Negative	Direct	Indirect	Short Term	Medium Term	Long Term	Reversible	Irreversible
Traffic	Increased traffic along the project routes		X	X		X		X		X
Ambient Air Quality	Increased local pollutant emissions and trace constituents such as VOCs Increased GHG emissions such as CH <sub>4</sub> and CO <sub>2</sub>		X	X		X			X	
	Increased levels of dust and particle emissions from construction vehicles and equipment		X	X			X		X	
soil/water pollution	Contamination of ocean from oil and chemical spills during construction		X	X			X	X		X
	Surface water pollution from construction wastes		X	X			X	X	X	

Aspect	Predicted Impact	Characterization of Impacts								
		Nature		Effect		Time Range			Reversibility	
		Positive	Negative	Direct	Indirect	Short Term	Medium Term	Long Term	Reversible	Irreversible
Noise and vibrations	Increase of noise and vibration levels due to construction activities and traffic		X	X		X			X	
Occupational Health & Safety Risks	General construction related health and safety risks for workers		X	X		X			X	X
	HIV/AIDS and increased disease risks.		X	X	X	X	X	X		X
	Sexual harassment between project workers		x	x		x			x	
	Improvement in public health and sanitation through reduced pollution of the Indian Ocean.	X		X		X	X	X		
Labour influx	Risk of social conflict as a result of increase in influx population		x	x	x		x		x	
Gender empowerment	Increased safe employment opportunities for women									

Aspect	Predicted Impact	Characterization of Impacts								
		Nature		Effect		Time Range			Reversibility	
		Positive	Negative	Direct	Indirect	Short Term	Medium Term	Long Term	Reversible	Irreversible
Socio-economics	Improvement of local and regional socio-economy	X			X			X		
	Employment and job creation during construction and operation phases	X		X		X	X	X		
	Resource and opportunity conflict as a result of labor influx		X	X			X		X	
	Sexual exploitation of workers and surrounding community		X	X		X				X
	Non inclusion of people living with disability		X	X			X		X	
solid and liquid waste	generation of both solid and liquid waste at the construction camps and at outlet sites		X	X		X	X	X	X	
direct land take	loss of livelihood demolition of structures Loss of Domicile		X	X				X		X

Aspect	Predicted Impact	Characterization of Impacts								
		Nature		Effect		Time Range			Reversibility	
		Positive	Negative	Direct	Indirect	Short Term	Medium Term	Long Term	Reversible	Irreversible
Construction	Sexual exploitation and abuse by project workers of community members									
Construction	GBV risks at the community level triggered by the project									

## **7.1. IMPACT CATEGORIES**

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First the likely significance of the potential issues of concerns has been determined and ranked according to the following:

- Potential environmental impacts which are deemed to be highly significant and need thorough investigation in the ESIA
- Potential environmental impacts that are deemed to be moderately significant, and will require reasonable investigation in the ESIA
- Potential environmental impacts that are deemed unlikely to be significant, and will need to be listed, and addressed in some way, but which will not require detailed assessment in the ESIA.

Secondly, the following characteristics have been defined for each impact:

Nature:

- Positive: applies to impacts that have a beneficial economic, environmental or social result, such as additional economic activity or enhancement of the existing environmental conditions.
- Negative: applies to impacts that have a harmful or economical aspect associated with them such as economical cost, loss or degradation of environmental resources.

Effect:

- Direct: applies to impacts which can be clearly and directly attributed to a particular impacting activity.
- Indirect: applies to impacts which may be associated with or subsequent to a particular impacting activity, but which cannot be directly attributed to it.

Time Range:

- Short Term: applies to impacts whose effects on the environment will disappear within a 1 year period, or within the construction phase.
- Medium Term: applies to impacts whose effects on the environment will disappear within a 5 year period following the construction phase.
- Long Term: applies to impacts whose effects on the environment will disappear in a period greater than 5 years following the construction phase.

Reversibility:

- Reversible: applies to impacts whose significance will be reduced and disappear over time (either naturally or artificially), once the impacting activity ceases.
- Irreversible: applies to impacts whose significance will not be reduced nor disappear over time (either naturally or artificially), once the impacting activity ceases.

## **7.2. IMPACTS EMANATING FROM THE PROPOSED PROJECT**

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The impacts are identified at three stages:-

- pre- construction/Planning Phase Impacts
- during construction and
- post-construction (operation phase)

### ***7.2.1. Planning Phase Impacts***

The impacts during this phase will be negative and will mainly be the displacement of project affected persons living in the project area. A few of the outlets are located in informal settlements where some domiciles will be negatively affected. Majority of the outfalls will be located within the ocean riparian, including the access roads that will be required for the Tudor, Buxton and Railway outfalls.

#### **Mitigation measures**

- The Outfalls will be located within the ocean riparian, as such is deemed as public land, however there is encroachment of squatters. These squatters own structures, trees, crops and fences, who will become project affected persons.
- Project affected persons to be identified by type of loss through a detailed resettlement action plan, which has been prepared and submitted to the Client alongside this report.
- The affected persons to be compensated for loss of houses and ancillary buildings, land, trees, livelihood productivity, and land improvements
- MOWASCO to agree with the local community on the form of compensation for loss of structures, trees, crops and livelihood (such as alternative and affordable housing.). Once the community is fully compensated the contractor may move to site
- The mitigation measures for social impacts are to ensure that the affected persons' livelihood is at least maintained after implementation of the project standards before the construction after implementation of the project.

### ***7.2.2. Construction Phase Impacts***

Most of the potential environmental and social impacts associated with the construction phase will be negative and temporary, and can be mitigated with the use of standard environmental management procedures. The potential social impacts or nuisance will be those typically associated with construction activities involving vehicles, equipment, and workers. The predicted impacts include the following:

#### ***1) Traffic Congestion***

Traffic congestion is anticipated from site related traffic from Contractor vehicles. The project sites are located in residential and industrial areas where there is bound to be an increased conflict between the project vehicles and residents of these areas.

#### **Mitigation measures**

The Contractor should provide temporary road signs or notices to indicate ongoing works;

The Contractor together with the Resident Engineer should Plan itineraries for site traffic on a daily basis and avoid peak traffic periods;

The Contractor should effect traffic controls and cleanliness to avoid congestion and truck accidents on roads;

The Resident Engineer has to ensure that transportation vehicles are operated during night-time and off-peak hours to avoid peak traffic. With proper vehicle operation control, adverse impacts on the environment and traffic by the transportation will be minimal;

The Resident Engineer and Contractor should choose traffic routes to reduce the impact in the neighborhood avoiding, as far as practical any sensitive areas;

For the site traffic the Contractor has to ensure that they

Only park in designated parking areas;

Don't block pedestrian routes;

Don't block traffic routes;

Obey the speed limit

The resident Engineer has to ensure that the Contractor:

Introduces segregated pedestrian walkways;

Introduces speed limits;

Reduces the need for reversing vehicles, by introducing a one way system;

Uses a qualified BANKSMAN to control deliveries and reversing vehicles;

Designates loading/unloading areas.

## 2) Site Related Oil Spills

During construction, oil spills may result from construction site equipment and storage, which can make its way into the Indian Ocean which is located nearby.

### Mitigation Measures

#### Mitigation Measures

The Contractor should ensure that the employees on site are aware of the company procedures for dealing with spills and leaks from oil storage tanks for the construction machinery through induction and safety training;

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

All vehicle works should be done in one place to avoid chances of spillage in different parts of the camp

### 3) Soil-Related Impacts

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

### Mitigation Measures

### **Mitigation Measures**

The valuable top soil containing organic material, nutrients as well as seeds and the soil fauna would be excavated separately and piled in an adequate manner for re-use.

In cases where it is identified that during construction there is a danger of increased run-off or erosion of trenches, temporary drainage channels or holding ponds can be employed

After completion of the construction works, immediate restoration spreading piled top soil and by sowing adequate grass cover and planting of trees will be followed, therefore the impact is temporary and reversible.

Plan emergency response measures in case of accidental oil spills.

#### *4) Impacts on Water Resources*

The various construction activities may have a negative impact on the Indian Ocean. Solid as well as liquid waste if not properly disposed of, will make its way into the ocean, thus affecting the ocean ecosystem.

### **Mitigation Measures**

Construction materials and other debris (lime, cement and fresh concrete, etc.) shall be prevented from entering waterways.

Ensure protection of the Ocean ecosystem by proper handling of cement during civil works. Examples of good practices while handling cement include:

Cement mixing should be done in a designated area away at a safe distance from natural water courses;

Sensitize workers and enable them to properly handle concrete spillages or waste cement.

#### *5) Socio - Economic Impacts*

During construction the project will have clear benefits with regard to local employment opportunities. The project will additionally require various skills and services which may not be available on the local level but certainly on the regional level, e.g. masonry workers, concrete workers, metal workers, etc. for which appropriate personnel will be contracted.

The increase in employment will temporarily lead to an overall increase of income directly and indirectly (through increased demand of other local services). Consequently, food vendors will have new opportunities to sell their commodities to the construction workers.

The major negative impact in will be that the in migration of people from different regions may lead to behavioural influences and this may increase the spread of diseases such as HIV/AIDS

### **Mitigation**

Unskilled construction and skilled (if available) labor to be hired from the local population as far as possible to minimize on influx of foreigners into the community.

Use of manual labor during trenching works where possible to ensure more employment of locals and hence ensure project support throughout the construction process.

Sensitize workers and the surrounding community on awareness, prevention and management of HIV / AIDS through staff training, awareness campaigns, multimedia, and workshops or during community Barazas.

### 6) Air Quality

Construction activities of materials delivery, excavation of foundations, concrete works and construction traffic will generate a lot of noise and dust especially during the dry seasons.

Vehicular traffic to the proposed sites is expected to increase especially during delivery of raw materials. Vehicular traffic emissions will bring about air pollution by increasing the fossil fuel emissions into the atmosphere. The new access routes before completion will be to earth/murram standards, which is bound to cause an increase in dust emissions to the neighbouring areas.

### **Mitigation:**

Use protective clothing like helmets and dust masks on construction crew.

Construction sites and transportation routes will be water-sprayed on regularly up to three times a day, especially if these sites are near sensitive receptors, such as residential areas or institutions.

All the vehicles and construction machinery should be operated in compliance with relevant vehicle emission standards and with proper maintenance to minimize air pollution.

Digging of trenches should be done manually so as to avoid too many trucks and machines in the area. The use of manual labor will also benefit the community socio-economically.

Use of other dust palliative measures to reduce dust emissions

### 7) Noise Pollution

Noise and vibration generated during construction by heavy construction machinery, such as excavators, bulldozers, concrete mixers, and transportation vehicles.

Generally, construction noise exceeding a noise level of 70 decibels (dB) has significant impacts on surrounding sensitive receptors within 50m of the construction site. These sensitive receptors include, the Hindu burial site at the Baxton Outlet, the Coast General Hospital at the Coast General Site.

#### **Mitigation:**

Avoid night time construction when noise is loudest. Avoid night-time construction using heavy machinery, from 22:00 to 6:00 near residential areas.

No discretionary use of noisy machinery within 50 m of residential areas and near institutions such as schools

Good maintenance and proper operation of construction machinery to minimize noise generation.

Installation of temporary sound barriers if necessary.

Selection of transport routes for large vehicles to avoid residential areas.

Where possible, ensure non mechanized construction. This includes, employing locals during the trench excavation.

### 8) Biodiversity and Conservation Impacts

Removal of vegetation as well as trees will lead to loss of plants and animal habitat. The biodiversity affected includes insects such as butterflies and worms, small mammals, reptiles and birds. Water contamination with cement will cause it to be highly alkaline and toxic to plants and animals living in watercourses.

#### **Mitigation:**

Re-plant the indigenous vegetation as much as practical once work is completed. Spare the vegetation that must not necessarily be removed such as trees.

Minimize the amount of destruction caused by machinery by promoting non-mechanized methods of construction.

Ensure protection of the Coastal ecosystem by proper handling of cement during civil works.

Cement mixing should be done in a designated area away at a safe distance from natural water courses.

Spilled cement or concrete should be collected and disposed away from natural water ways or storm water drainage;

Sensitize workers and enable them to properly handle concrete spillages or waste cement.

### 9) Occupational Health and Safety

Construction staff and the general public will be exposed to safety hazards arising from construction activities. Most of the project sites will be located within informal settlements, as such there is a risk of injuries from locals accessing the site during construction.

The project works will expose workers to occupational risks due to handling of heavy machinery, construction noise, electromechanical works etc.

Construction activities of vegetation clearing, excavation, materials delivery and concrete mixing and construction traffic will generate a lot of dust and this may affect the respiratory system.

The high temperatures in the area will expose the workers to difficult working conditions.

Construction sites may be a source of both liquid and solid wastes. If these wastes are not well disposed these sites may become a breeding ground for disease causing pests such as mosquitoes and rodents.

At the concrete mixing plant the exposure of human skin to cement may lead to damage of the skin.

Sexual harassment between project workers is another occupational health and safety risk that could occur during project implementation. Sexual harassment can occur between workers, particularly male workers against female workers, when there is insufficient sensitization of workers against prohibitions for sexual harassment, as well as the absence of reporting and

**Mitigation:**

- Ensure clear human resources policy against sexual harassment that is aligned with national law
- Integrate provisions related to sexual harassment in the employee COC
- Ensure appointed human resources personnel to manage reports of sexual harassment according to policy
- Provide sex-disaggregated latrines for male and female workers.
- Ensure that all construction machines and equipment are in good working conditions to prevent occupational hazards.
- Establish a Health and Safety Plan (HASP) for both civil and electromechanical work.
- Appoint a trained health and safety team for the duration of the construction work. Use of dust masks while working in dusty environment to avoid respiratory related sicknesses.
- Provide workers with appropriate personal protective equipment (PPE).
- Provide workers with adequate drinking water and breaks.
- Provide workers training on safety procedures and emergency response such as fire, oil and chemical spills, pipe bursts and other serious water loss risks
- Work to minimize or altogether eliminate mosquito breeding sites.

*10) HIV & AIDS Impacts*

In migration of people from different regions may lead to behavioural influences which may increase the spread of diseases such as HIV/AIDS.

**Mitigation:**

- Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS through staff training, awareness campaigns, multimedia and workshops or during community Barazas.
- Use of existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members
- Sensitize the community and surrounding communities on labor influx and associated social impacts as well as mitigation measures

### 11) Gender Empowerment Impacts

There is need to promote gender equality in all aspects of economic development and more so in construction. The Contractor should uphold principles of gender equality through compliance with the following:

#### **Mitigation:**

- Ensure equitable distribution of employment opportunities between men and women
- Mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 gender rule and National Gender and Equality Commission Act 2011
- Ensure safe employment for women, including training for all staff on SH COC, regular consultation with female employees and other measure to ensure physical safety and dignity of female employees

### 12) Impacts on Cultural Heritage

Some of the project sites are located within Mombasa Old town which is home to several cultural sites, in addition, the Baxton site is located near a Hindu burial site. Although none of these cultural sites will be affected, provisions must be made for a “chance find” cultural site.

#### **Mitigation:**

- Use of “chance find” procedures provided in the appendices.

### 13) Security within the Project Site

Some of the project sites are located within slums which are prone to a few incidences of crime.

#### **Mitigation:**

- Fencing around project area.
- Working with local committees (e.g. “nyumba kumi) to provide security within the site in addition to the Contractor’s own security.

### 7.2.3. Impacts during Operation & Maintenance

During the operation of the improved storm water outlets, the positive impacts greatly outweigh the negative impacts, and with proper maintenance, potential negative impacts can be mitigated.

### 1) Positive Environmental and Socio-Economic Impacts

The several positive impacts are summarized below:

- ❖ Reduced pollution of the Indian Ocean due to the treatment of combined storm and waste water.
- ❖ The improved conditions of the Indian Ocean will lead to habitable conditions for ocean flora and fauna.
- ❖ The increased flora and fauna will have socio-economic benefits, in that fishermen will have access to fish.
- ❖ Tourism will increase due to reduced pollution within the Indian Ocean.

Other potential impacts typically associated with operation and maintenance activities are such as:

### 2) Generation of solid waste

The coarse and fine screens as well as the grit removal chambers will generate solid waste which will have to be disposed of in an environmentally friendly way.

The coarse and fine screens will have a collection skip from where all debris will be collected and loaded to lorries for transport to the existing approved landfills. The sludge collected from the grit removal chambers will also be collected periodically and transported to the existing sludge management facilities.

#### **Mitigation measures:**

- Sorting of all debris collected by the screens before transport to the relevant facilities.
- Sludge from the grit removal chamber should be transported by a licensed exhauster to the existing sludge management facilities.
- Continuous removal of solid waste to prevent overloading of the system to ensure efficiency in the cleaning of the combined storm and waste water.
- All transporters used should have a license from NEMA.

### 3) Noise Pollution

Noise Pollution may occur due to the various hauling trucks that will be used to transport the solid waste, particularly at the sites that are close to residential areas, and sensitive areas eg. Coast General Hospital.

#### **Mitigation measures:**

- All transportation vehicles should be kept in good working order, serviced regularly in accordance to the manufacturers specifications.
- All transportation vehicles should be licensed by NEMA

#### 4) Air Quality

There is bound to be some smell at the inlet chamber for the improvement works.

Mitigation measures:
<ul style="list-style-type: none"><li>□ Continuous removal of debris from the screening will improve the overall efficiency of the system thus reducing any foul odours. Foul odours will be a system that is not efficiently functioning.</li></ul>



#### 7.2.4. Impacts during De-commissioning

De-commissioning of the Project is not envisaged. Project components however will be rehabilitated over time having served their useful life.

## 8. ENVIRONMENTAL MITIGATION COST ESTIMATES

The cost of some of the proposed mitigation measures will have been included in the main engineering Bills of Quantities and therefore need not be included in the Environmental mitigation costs. These costs will also include cost of supervision for implementation of mitigation measures. These costs will be added to the Bill of Quantities as the Environmental Mitigation Costs.

Table 7 1 shows cost estimates for environmental mitigation. The brief description of the items is for identification purposes and does not supersede or modify the detailed descriptions of works in other sections of this report.

**Table 81: Cost Estimates for Environmental Mitigation**

S/No	Item description	Unit	Quantity	Unit Price (K.Shs.)	Item Cost per Site (K.Shs.)	Item Cost For all 12 sites (K.Shs.)
1	Emergency measures in case of accidental oil spill	LS	1	50,000.00	50,000.00	600,000.00
2	Emergency measures in case of accidental water contamination	LS	1	50,000.00	50,000.00	600,000.00
3	On completion of construction works, reinstatement of ground for vegetation regeneration	Ha	0.012	250,000.00	00.00	6,000,000.00
4	Provide waste collection bins at strategic points and ensure that all solid wastes e.g. disposable water bottles, empty cement bags, etc are transported to a place of safe disposal	No.	5	2,000.00	10,000.00	1,500,000.00

S/No	Item description	Unit	Quantity	Unit Price (K.Shs.)	Item Cost per Site (K.Shs.)	Item Cost For all 12 sites (K.Shs.)
5	Provide Personal Protective Equipment (PPE) to the construction crew – helmets, overalls, gum boots, earplugs and dust masks.	set	10	3,000.00	30,000.00	2,000,000.00
6	Sensitize workers and the surrounding community on awareness, prevention and management of HIV/AIDS and other STDs through staff training, awareness campaign, media, and sign boards in local languages, workshops and during public Barazas.	Item	1	200,000.00	200,000.00	2,400,000.00
7	In collaboration with the Ministry of Health provide VCT that carry out site visits and testing regularly	No.	1	150,000.00	150,000.00	1,800,000.00
8	Provide condom dispensers at appropriate locations	LS	1	50,000.00	50,000.00	600,000.00

S/No	Item description	Unit	Quantity	Unit Price (K.Shs.)	Item Cost per Site (K.Shs.)	Item Cost For all 12 sites (K.Shs.)
9	Provide both male and female toilets at strategic points within the site	No.	2	50,000.00	100,000.00	1,200,000.00
10	Spraying Mosquito/rodent breeding sites	LS	1	30,000.00	30,000.00	500,000.00
11	Provide signage at construction sites to control traffic to avoid accidents	LS	1	50,000.00	50,000.00	600,000.00
12	Formulate a Healthy and Safety Management Plan, train workers on health and safety procedures and emergency response in case of a fire outbreak, and other risks	LS	1	40,000.00	40,000.00	2,500,000.00
13	Environmental supervision, monitoring, and evaluation over a period of 4 calendar months	Months	4	150,000.00	600,000.00	7,200,000.00
14	Provisional sum to be spent as directed by the Engineer on miscellaneous environmental issues like sampling and testing	LS	1	75,000.00	75,000.00	1,500,000.00

<b>S/No</b>	<b>Item description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Price (K.Shs.)</b>	<b>Item Cost per Site (K.Shs.)</b>	<b>Item Cost For all 12 sites (K.Shs.)</b>
15	Funds set aside in case of interference with cultural sites "chance find"	LS	1	25,000	25,000	5,000,000
<b>TOTAL</b>					<b>2,035,600.00</b>	<b>31,750,000.00</b>

## **9. ENVIRONMENTAL AND SOCIAL MITIGATION AND MANAGEMENT PLAN (ESMMP)**

By design, the potential positive impacts of the project can readily be optimised while the potential majority of the negative environmental and social impacts are mostly restricted to the planning and construction period, with the negative impacts experienced during the operation phase of the project mitigated by continuous maintenance of the system. These are assessed and considered as minor to medium, being reversible and short-term and can be managed through well-defined mitigation and monitoring measures.

### **9.1. POSSIBLE ENHANCEMENT MEASURES**

Possible enhancement measures of beneficial impacts would include the following:

- ❖ Construction should adhere to recommended best construction practices that make effective and economical use of locally available resources including materials, expertise and labour.
- ❖ Operation of the project should adhere to the operations and maintenance specifications prepared with the design
- ❖ Ensure that the poor and other vulnerable in the project area will be catered for by the project under the RAP.
- ❖ Ensure that social services provide education on appropriate hygienic conditions and taking into consideration gender particular roles and responsibilities.

### **9.2. MITIGATION MEASURES**

Mitigation measures for negative environmental impacts include the following:

- ❖ Construction site environmental and social management plans, prepared by the contractor, will be required for all works. This plan will include a waste management plan for all activities during the construction period.
- ❖ Water bowing at regular intervals to minimize dust.
- ❖ Avoid pollution of the Indian Ocean during Construction.
- ❖ Construction activities should be scheduled appropriately to reduce high noise levels particularly at night from noisy activities.
- ❖ Avoid areas sensitive to erosion.
- ❖ At the end of construction works, allow for vegetation restoration where possible.
- ❖ Prevention of work place injuries during construction is taken care of by the contractors, e.g. by means of signs, signals, fencing, etc.
- ❖ Employ occupational Safety and Health measures as required by law. This health and safety management plan will be prepared by the contractor and approved by the supervising engineer to set out how they will deliver a safe and healthy working environment, and protect the local community from any harm.

- ❖ A code of conduct is required for the Contractor and his staff members and a complaints registry and redress in order to address any breach of the code.

Mitigation measures have already been discussed in Chapter 6. However, a brief summary is included in the Environmental and Social Mitigation and Management Plan (ESMMP) in Table 8.1. Also considered in this management and monitoring plan are the persons responsible for implementation.

**Table 91: The Proposed Environmental and Social Mitigation Plan (ESMP)**

<b>Project Phase</b>	<b>Environmental / Social Impact</b>	<b>Mitigation Measure</b>	<b>Responsibility</b>
Pre-construction	Land acquisition for construction of the works	The project sites will be located within the Ocean Riparian which is public land as such there will be no land compensation.	CWSB/MOWASCO/County government/National Land Commission
Pre-construction	Loss of structures	As a first step, the owners, type of structures are identified. The compensation will be done in accordance to the RAP.	CWSB/MOWASCO/County government/National Land Commission
Pre-construction	Loss of livelihoods	Loss of livelihoods to be valued and compensated to in accordance to the RAP	CWSB/MOWASCO/County government/National Land Commission
Pre-construction	Loss of housing	Facilitation to move in accordance to RAP	CWSB/MOWASCO/County government/National Land Commission

<b>Project Phase</b>	<b>Environmental / Social Impact</b>	<b>Mitigation Measure</b>	<b>Responsibility</b>
Construction	Loss of flora and fauna	<p>Re-plant the indigenous vegetation as much as possible once work is completed.</p> <p>Spare the vegetation that must not necessarily be removed such as trees.</p> <p>Minimize the amount of destruction caused by machinery by promoting non-mechanized methods of construction.</p> <p>Ensure protection of the ocean ecosystem by proper handling of cement during civil works.</p> <p>The Contractor should ensure that the employees on site are aware of the company procedures for dealing with spills and leaks from oil storage tanks e.g. using dispersants or adding biological agents to speed up the oil breakdown for the construction machinery through induction and safety training (the contractor will propose a method of cleanup which will be subject to approval);</p> <p>If the oil spill makes its way to the ocean, the Contractor can make use of a boom and skimmer to contain the oil spill</p>	<p>Contractor</p> <p>Supervising Engineer</p> <p>County Officer- Water Energy and Natural Resources</p>

<b>Project Phase</b>	<b>Environmental / Social Impact</b>	<b>Mitigation Measure</b>	<b>Responsibility</b>
Construction	Air quality	<p>Use protective clothing like dust masks on construction crew.</p> <p>Construction sites and transportation routes (those that are murrum and earth standards) will be water-sprayed on regularly up to three times a day, especially if these sites are near sensitive receptors, such as residential areas or institutions (schools, hospitals, etc.).</p> <p>All the vehicles and construction machinery should be operated in compliance with relevant vehicle emission standards and manufacturer's specification to minimize air pollution.</p>	Contractor Supervising Engineer
Construction	Noise pollution	<p>Avoid night time construction when noise is loudest. Avoid night-time construction using heavy machinery, from 22:00 to 6:00 near residential areas.</p> <p>No discretionary use of noisy machinery within 50 m of residential areas and near institutions such as schools</p> <p>Good maintenance and proper operation of construction machinery to minimize noise generation.</p> <p>Where possible, ensure non mechanized construction to reduce the use of machinery</p>	Contractor Supervising Engineer

Constructi on	Site Related Oil Spills	<p>The Contractor should ensure that the employees on site are aware of the company procedures for dealing with spills and leaks from oil storage tanks e.g. using dispersants or adding biological agents to speed up the oil breakdown for the construction machinery though induction and safety training (the contractor will propose a method of cleanup which will be subject to approval);</p> <p>If the oil spill makes its way to the ocean, the Contractor can make use of a boom and skimmer to contain the oil spill</p> <p>In case of spillage the Contractor should isolate the source of oil spill and contain the spillage to the source of leakage before it makes its way into the ocean, using sandbags, sawdust, absorbent material and/or other materials approved by the Resident Engineer;</p> <p>The Resident Engineer and the Contractor should ensure that there is always a supply of absorbent material such as saw dust on site during construction, readily available to absorb/breakdown spill from machinery or oil storage, this can be incinerated after use;</p> <p>All vehicles and equipment should be kept in good working order, serviced regularly in accordance to the manufacturers specifications and stored in an area approved by the Resident Engineer;</p> <p>The Contractor should assemble and clearly list the relevant emergency telephone contact numbers for staff, and brief staff on the required procedures.</p>	Contractor Supervising Engineer
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<b>Project Phase</b>	<b>Environmental / Social Impact</b>	<b>Mitigation Measure</b>	<b>Responsibility</b>
Construction	Soil Related Impacts	<p>In cases where it is identified that during construction there is a danger of increased run-off or at the project site, temporary drainage channels or holding ponds can be employed</p> <p>After completion of the construction works, restoration of the ground by sowing adequate grass cover and planting of trees will be followed, therefore the impact is temporary and reversible.</p> <p>In areas prone to erosion, provision of soil stabilization in form of a retaining wall or planting of trees, subject to approval by the Resident Engineer</p> <p>Plan emergency response measures in case of accidental oil spills.</p>	Contractor Supervising Engineers
	Impacts on Water resources	<p>Ensure proper solid and liquid wastes disposal mainly from the construction camps, sites and offices.</p> <p>Ensure proper measures are in place for collection and disposal of spilled oils and lubricants.</p>	Contractor, Supervising Engineer County Water Officer
Construction	Public Health & Safety	<p>Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS through staff training, awareness campaigns, multimedia and workshops or during community Barazas. Provide information, education and communication about safe uses of drinking water.</p>	Contractor Supervising Engineer CWSB

<b>Project Phase</b>	<b>Environmental / Social Impact</b>	<b>Mitigation Measure</b>	<b>Responsibility</b>
Construction	HIV & AIDS Impacts	<p>Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS through staff training, awareness campaigns, multimedia and workshops or during community Barazas. Provide information, education and communication.</p> <p>Use of existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members</p>	Contractor Supervising Engineer CWSB
Construction	Socio-economic impacts	<p>Unskilled construction and skilled (if available) labor to be hired from the local population as far as possible to minimize on influx of foreigners into the community.</p> <p>Use of manual labor during excavation and construction works where possible to ensure more employment of locals and hence ensure project support throughout the construction process.</p> <p>Sensitize workers and the surrounding community on awareness, prevention and management of HIV / AIDS through staff training, awareness campaigns, multimedia, and workshops or during community Barazas.</p> <p>Use of existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members</p> <p>The Contractor should enforce and maintain a code of conduct for his employees</p>	Contractor Supervising Engineer

<p>Constructi on</p>	<p>Traffic Congestion</p>	<p>The Contractor should provide temporary road signs or notices to indicate ongoing works;</p> <p>The Contractor should effect traffic controls and cleanliness to avoid congestion and accidents on roads;</p> <p>The Resident Engineer has to ensure that a traffic management plan is in place, eg, one way entry and one way exit to prevent congestion;</p> <p>The Resident Engineer and Contractor should choose traffic routes to reduce the impact in the neighborhood avoiding, as far as practical any sensitive areas;</p> <p>For the site traffic the Contractor has to ensure that they</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Only park in designated parking areas;</li> <li><input type="checkbox"/> Don't block pedestrian routes;</li> <li><input type="checkbox"/> Don't block traffic routes;</li> <li><input type="checkbox"/> Obey the speed limit</li> <li><input type="checkbox"/> The resident Engineer has to ensure that the Contractor:             <ul style="list-style-type: none"> <li>i. Introduces segregated pedestrian walkways;</li> <li>ii. Introduces speed limits;</li> <li>iii. Reduces the need for reversing vehicles, by introducing a one way system;</li> <li>iv. Uses a qualified BANKSMAN to control deliveries and reversing vehicles;</li> <li>v. Designates loading/unloading areas.</li> </ul> </li> </ul>	<p>The Contractor Supervising Engineer</p>
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<b>Project Phase</b>	<b>Environmental / Social Impact</b>	<b>Mitigation Measure</b>	<b>Responsibility</b>
Construction	Gender empowerment	Ensure equitable distribution of employment opportunities between men and women  Provide toilets and bathrooms for both male and female workers on site	The contractor The Supervising Engineer
Construction	Impacts on Cultural Heritage	Use of local customs to move the site.	Contractor and Local Administration
Construction	Security within the Project Site	Fencing around project area.  Working with local committees (e.g. "nyumba kumi) to provide security within the site in addition to the Contractor's own security.	Contractor
Operation	Generation of solid waste	Sorting of all debris collected by the screens before transport to the relevant facilities.  Sludge from the grit removal chamber should be transported by a licensed exhauster to the existing sludge management facilities.  Continuous removal of solid waste to prevent overloading of the system to ensure efficiency in the cleaning of the combined storm and waste water.  All transporters used should have a license from NEMA.	MOWASCO
Operation	Noise Pollution	All transportation vehicles should be kept in good working order, serviced regularly in accordance to the manufacturers specifications.  All transportation vehicles should be licensed by NEMA	MOWASSCO

<b>Project Phase</b>	<b>Environmental / Social Impact</b>	<b>Mitigation Measure</b>	<b>Responsibility</b>
Operation	Air Quality	Continuous removal of debris from the screening will improve the overall efficiency of the system thus reducing any foul odours. Foul odours will be a system that is not efficiently functioning.	MOWASSCO

### **9.3. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN**

The purpose of the Environmental and Social Monitoring Plan (ESMP) for the proposed project is to initiate a mechanism for implementing mitigation measures for the potential negative environmental impacts and monitor the efficiency of these mitigation measures based on relevant environmental indicators. The Environmental and Social Mitigation and Management Plan in Chapter 8 identified certain roles and responsibilities for different stakeholders for implementation, supervision and monitoring. The objectives of the ESMP therefore are:

- ❖ To ensure that the recommendations in the approved ESIA report are adhered to by the various institutions
- ❖ To ensure that the environmental and social mitigation and their enhancement actions are well understood and communicated to all involved stakeholders.
- ❖ To ensure that the proposed environmental and social remedial measures are implemented during the project execution stage
- ❖ To evaluate the effectiveness of environmental and social remedial measures
- ❖ To evaluate the effectiveness of various evaluation techniques and procedures
- ❖ To provide the Proponent and the relevant Lead Agencies with a framework to confirm compliance with relevant laws and regulations.

Conversely, environmental monitoring provides feedback about the actual environmental impacts of the project. Monitoring results help judge the success of mitigation measures in protecting the environment.

They are also used to ensure compliance with environmental standards, and to facilitate any needed project design or operational changes. A monitoring program, backed up by powers to ensure corrective action when the monitoring results show it necessary, is a proven way to ensure effective implementation of mitigation measures. By tracking the project's actual impacts, monitoring reduces the environmental risks associated with the project, and allows for project modifications to be made where required.

Table 9-1 presents the indicators that will be used to monitor the implementation of the improvement project. The indicators are selected based on the project and major anticipated impacts.

**Table 92: Proposed Environmental Monitoring Plan**

<b>Area</b>	<b>Environmental Component</b>	<b>Performance Indicators</b>	<b>Monitoring Requirements</b>	<b>Frequency of monitoring</b>
Construction Camp	Public health and safety	<input type="checkbox"/> Prevalence rates of common diseases. <input type="checkbox"/> Provision of condoms, contraceptives and mosquito nets. <input type="checkbox"/> Conduction of campaign meetings on transmission of diseases like HIV/AIDS and other STDs. <input type="checkbox"/> Availability of adequate solid waste bins. <input type="checkbox"/> System of safe disposal of both solid and liquid waste in place. <input type="checkbox"/> Availability of first aid facilities. <input type="checkbox"/> Outpatient attendance registers. <input type="checkbox"/> Compliance with the Health and Safety Act.	<input type="checkbox"/> Physical inspection <input type="checkbox"/> Documentation Number of complaints <input type="checkbox"/> Interview with residents	Monthly
	Solid and liquid wastes	<input type="checkbox"/> Presence of scattered litter. <input type="checkbox"/> Signs of obstruction of water courses.	<input type="checkbox"/> Physical inspection <input type="checkbox"/> Number of complaints.	Monthly

Area	Environmental Component	Performance Indicators	Monitoring Requirements	Frequency of monitoring
Project Site	Solid and liquid wastes	<input type="checkbox"/> Scattered litter <input type="checkbox"/> Signs of obstruction of water ways. <input type="checkbox"/> Flow of wastewater on the ground surface. <input type="checkbox"/> Provision of sanitary facilities to the construction crews. <input type="checkbox"/> Pollution of the Indian Ocean	<input type="checkbox"/> Physical inspection <input type="checkbox"/> Number of complaints	Monthly
	Noise	<input type="checkbox"/> Level of noise generated. <input type="checkbox"/> Provision of PPE. <input type="checkbox"/> Compliance with existing noise standard issued by NEMA.	<input type="checkbox"/> Liaise with other stakeholders. <input type="checkbox"/> Documentation on complaints about noise	Monthly
	Air pollution	<input type="checkbox"/> Level of dust generated. <input type="checkbox"/> Provision of PPE.	<input type="checkbox"/> Physical inspection <input type="checkbox"/> Interview residents including workers <input type="checkbox"/> Liaise with other stakeholders	Monthly

#### **9.4. GRIEVANCE REDRESS MECHANISMS**

The table above, shows the performance indicators as part of the monitoring plan. Some of these indicators will be as a result of grievances raised by stakeholders. This section identifies the procedures in which stakeholders can present their grievances for redress.

The Consultant proposes that the Supervising Engineer's office be in charge of collecting and forwarding the grievances to the relevant authority of redress.

The filing of grievances for accurate record keeping is important. If the complainant is not able to express his/her complaint in writing, he/she can be assisted by a local leader (Area Chief) to file the complaint at the complaints desk in the project office. To ease follow-up, each complaint will be registered and assigned a unique reference number. The office will then evaluate the application and determine what implementing agency will resolve the issue. The figure below shows a sample of a complaint form:

**Figure 91: Table Showing a Sample Grievance Form**

<b>Grievance Form</b>					
<b>Ref. No.</b>	<b>PAP Name</b>	<b>Date</b>	<b>Description of Grievance</b>	<b>Proposed Redress Measure</b>	<b>Issue Resolved (Y/N)</b>

These records will be reviewed by the environmental supervisor who will ensure grievances have been redressed.

## **10. CONCLUSIONS AND RECOMMENDATIONS**

As has been alluded in this report, the following can be said in summary.

The implementation of the proposed improvements to the storm water outlets will have the following benefits:

- i) Reduced Pollution of the Indian Ocean.
- ii) Improved hygiene within the project area
- iii) Improved socio-economic benefits via improved tourism opportunities and fishing grounds

The recommendations of the public consultation and participation was incorporated into the findings of this report.

The ESIA concludes that the project will have substantial positive environmental benefits. It will supply will improve the environment within the ocean ecosystem.

The adverse impacts on the physical and natural environment will be “in sum total,” not significant, and can be handled through the recommended mitigation measures. There are incremental costs required to achieve these. Compensation for direct land take, demolition of structures and livelihood will be done through a detailed Resettlement Action Plan which is provided under a separate report.

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## **11. REFERENCES**

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Republic of Kenya, Environmental Management and Coordination Act (EMCA, Cap 387), Government Printer, Nairobi

Republic of Kenya, Water Act (2002), Government Printer, Nairobi

Republic of Kenya, Public Health Act, Cap 242, Government Printer, Nairobi.

Republic of Kenya, Environmental Impact Assessment/Audit Regulations 2003, (Legal Notice No.101) Government Printer, Nairobi

The Constitution of Kenya 2010

The Land Act, No. 6 of 2012

International Finance Corporation and World Bank Environmental, Health and Safety (EHS) Guidelines

World Bank Operational Policies

## 12. APPENDICES

### 12.1. APPENDIX A SURVEY QUESTIONNAIRE

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#### **PROPOSED WORKS CONTRACTS UNDER COAST WATER SERVICES BOARD**

#### **ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT SURVEY QUESTIONNAIRE**

An Environmental and Social Impact Assessment Survey is being carried out for the proposed **Improving the Existing Storm Water Outlets in Mombasa Island** on behalf of the Coast Water Services Board (CWSB). The aim of this survey is to form a realistic and up to date picture of the Environmental and Social situation in the area. We need your honest and accurate information during this discussion. Your inputs will assist in the understanding of your needs for improvement. The answers you provide will be kept confidential.

#### **SECTION 1 DETAILS**

- 1.1 Name of the Enumerator: .....
- 1.2 Signature of the Enumerator: .....
- 1.3 Name of the Respondent.....
- 1.4 Telephone number of the respondent..... ID Number of the respondent.....
- 1.5 Date: ..... Time of Interview: .....
- 1.4 Respondent place of resident: (1) Village..... (2) Location .....
- (3)Sub-County ..... (4) County .....

#### **SECTION 2 BASIC HOUSEHOLD SETUP**

- 2.1 Name of the household head? .....
- 2.2 ID Number of the household Head..... Telephone Number of the Household Head.....
- 2.3 How many members do you have in this household.....
- 2.4 How many members of your household fall under each of the following age groups?
- (1) 0 – 5yrs..... (2) 6 – 18yrs..... (3) 19-35yrs..... (4) 36-49yrs.....
- (5) 50-65yrs..... (6) Over 66yrs .....
- 2.5 How many of your household members have attained each of the following education levels?
- (1) None ..... (2) Primary ..... (3) Secondary ..... (4) College/university .....
- 2.6 What is the occupation /economic activity of the household head
- (1) Crop farming ..... (2) Livestock farming ..... (3) Formal employment .....
- (4)Business ..... (5) Fishing ..... (6) Mining ..... (7) Others (specify) .....
- 2.7 If crop farming what type of crops? (1) Maize..... (2) Cashew nuts ..... (3) Cassava.....
- (4) Mangoes ..... (5) Beans..... (6) Coconut..... (7) Others.....
- 2.8 If livestock farming what animals?
- (1) Cow..... (2)Sheep ..... (3)Goats..... (4) Donkeys ..... (5) Others .....

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- 2.9 If business what kind of business? (tick) (1) Shop ..... (2) Bodaboda (bicycle /motorbike).....  
 (3) M-Pesa..... (4) Jua kali ..... (5) Grocery ..... (6) Others (specify) .....
- 2.10 What is the average combined household income per month? (tick) (1) Less than 15,000.....  
 (2) 15,000-30,000..... (3) 30,000-50,000..... (4) Above 50,000 .....
- 2.11 What's the religion of the Household Head? (tick) (1) Christian..... (2) Muslim.....  
 (3) Hindu..... (4) Traditionalist ..... (5) Others Specify .....
- 2.12 Type of fuel mostly used for cooking: (tick)  
 (1) Firewood ..... (2) Charcoal ..... (3) Kerosene ..... (4) LPG (Gas) .....  
 (5) Electricity ..... (6) Others (specify) .....

### SECTION 3 WATER AND SANITATION

- 3.1 What is the common source of water in this area?  
 (1) Private tap ..... (2) Public Tap ..... (3) Bore hole ..... (4) Shallow well .....  
 (5) Protected spring /river ..... (6) Water pan ..... (7) Others (specify) .....
- 3.3 What is the general quality of the water? (Tick)  
 (1) Good ..... (2) Fair ..... (3) Bad .....
- 3.4 How often do you Fetch water?  
 (1) Every day ..... (2) Every alternate day of the week ..... (3) Once a week .....
- 3.5 Do you pay for water (1) Yes..... (2) No.....
- 3.6 If yes how much per 20 litre jerrican in Ksh.  
 (1) Ksh. 2..... (2) Ksh. 5 ..... (3) Ksh. 10..... (4) Above Ksh. 10 .....
- 3.7 What is the common mode of transporting water in this area?  
 (1) Carrying on the head ..... (2) Hand driven carts/wheelbarrow.....  
 (3) Bodaboda (bicycle/motorbike)..... (4) Pack animals (Donkeys/Camels) .....  
 (5) Animal drawn carts ..... (6) Trucks ..... (7) Others (specify) .....
- 3.8 How do you dispose of your household waste? (Tick)  
 (1) Compost pit/burying ..... (2) Collection by the council ..... (3) Recycling .....  
 (4) Burning ..... (5) Dumping in open areas ..... (6) Others (specify) .....
- 3.9 Does the household have a toilet?  
 (1) Yes ..... (2) No .....
- 3.10 If yes, type of toilet: (tick)  
 (1) Flush system connected to the sewer line ..... (2) Flush system with Septic tank .....  
 (3) Pit latrine ..... (4) Mobile toilet ..... (5) Any other (Specify) .....
- 3.11 Are you aware of the proposed Works under Coast Water Services Board?  
 (1) YES ..... (2) NO .....

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- 3.12 How will proposed Works under Coast Water Services Board affect the community here? (Tick)  
 (1) Positively ..... (2) Adversely (negatively).....
- 3.13 If positively, in what way? (Tick)  
 (1) Overall improvement in sanitation due to proper wastewater management .....  
 (2) Reduced cases of waterborne diseases due to reduced contamination of water.....  
 (3) Improved hygiene..... (4) Improved business during construction..... (5)  
 Improved sanitation will increase land values ..... (6) Employment opportunities  
 during construction and operation of the plant ..... (9) Others (please specify)  
 .....
- 3.14 If negatively, in what ways? (Tick)  
 (1) Dust and noise during construction..... (2) Demolition of structures ..... (3)  
 Loss of farm land/trees/crops ..... (4) odours during operation of the plant .....  
 (5) Proliferation of scavenger species, e.g. birds during operation ..... (6) Spread of  
 diseases (STD, HIV/AIDS)..... (7) Interruption of services (road access, electricity, etc.)  
 during construction (8) Others (specify) .....
- 3.15 What do you think should be done to minimize or mitigate these negative impacts?  
 (1) Inform the public about any interruption of services .....  
 (2) Proper maintenance of treatment works during construction ..... (3) Avoid night time  
 construction ..... (4) Educate the public and the construction crew on health and safety.....  
 (5) Compensate the structure/Land /crop/trees owners..... (6)Others (specify).....

#### **SECTION 4 HEALTH**

- 4.1 Which diseases have members of your household suffered from in the past six months? (Tick)  
 (1)Malaria ..... (2)Malnutrition ..... (3)Measles ..... (4)HIV/AIDS .....  
 (5)Eye problems ..... (6)Diarrhea ..... (7) Cholera ..... (8) Intestinal worms .....  
 (9)Respiratory infections ..... (10)Skin rashes ..... (11)Others (specify) .....
- 4.2 What do you do when you are sick?  
 (1)Seek medical attention from a health centre..... (2)Prayed for ..... (3)Take herbs.....  
 (4) Visit a traditional doctor..... (5)Others (specify) .....
- 4.3 What is the ownership status of the health facilities attended by your household members? (Tick)  
 (1)Public ..... (2) Private ..... (3) Faith based ..... (4) NGO ..... (5) Traditional .....
- 4.4 How far is the health facility visited by your household members in km?  
 (1) Less than 1km ..... (2) 1 -3km..... (3) 3 – 5km ..... (4) Above 5km.....

#### **SECTION 5 KNOWLEDGE AND ATTITUDE ON HIV/AIDS**

- 5.1 Have you ever heard of HIV/AIDS? (1) Yes ..... (2) No .....

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5.2 If yes, what source did you hear it from? (Tick)

- (1) Radio/TV ..... (2) Billboards ..... (3) Posters ..... (4) Religious leaders .....  
 (5) Relative/friend ..... (6) Health worker/Clinic..... (7) NGO/CBOs .....  
 (8) Newspaper ..... (9) Other (Specify) .....

5.3 Has any of your household members been affected by HIV/AIDS? (1)Yes..... (2)No .....

5.4 Do you think HIV (AIDS) can be prevented? (1)Yes ..... (2) No ..... (3) Do Not Know .....

5.5 Do you know where to go for voluntary counseling and testing for HIV/AIDS?

- (1)Yes ..... (2) No .....

## **SECTION 6 ENVIRONMENTAL**

6.1 What environmental issues are of concern to the people of this area?

- (1) Water shortage ..... (2) Invasive species ..... (3) Overgrazing ..... (4) Extinction of  
 endangered species ..... (5) Mosquitoes and malaria spread ..... (6) Solid waste .....  
 (7) Deforestation ..... (8) Drought ..... (9) Poor Sanitation (10) others (please  
 specify).....

6.2 What are the environmental conservation initiatives in the area?

- (1) Tree planting ..... (2) Educating the public ..... (3) Cleaning of mosquito breeding sites .....  
 (4) Collection of solid wastes..... (5) Construction of toilets (6) others (please  
 specify) .....

6.3 Who are carrying out these activities?

- (1) Women groups ..... (2) County council..... (3) Non-governmental organization .....  
 (4) Community based organizations..... (5) Youth groups..... (6) Others (please specify) .....

6.4 Will the completion of the proposed Works under Coast Water Services Board help in the conservation of the environment in the area? (1) Yes ..... (2) No .....

6.5 If yes in what ways? .....

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## **12.2. SUMMARY OF PUBLIC CONSULTATION**

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### ***12.2.1. Minutes of the Public Consultation meeting Held at Chief's Office Railway Location on 16<sup>th</sup> Dec 2016 at 2.45 pm***

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1) Present

- Marion Orina - Zamconsult Consulting Engineers (Consultant)
- Francis Moturi - Zamconsult Consulting Engineers (Consultant)
- Joyce Mutinda - CWSB representative
- Shaban N. Noor - Chief of Ganjoni Location
- Stephen K. Nyamu - Assistant Chief Tudor Location
- General Public

2) Introductions

The meeting started at 2.45pm and was chaired by the area chief, who introduced the Consultant to the attendees. He then invited the Consultant to give her presentation.

3) Presentation on Project by the Consultant

The Consultant gave a presentation of the proposed project, its scope, and the laws governing the Environmental and Social Process as well as the need to conduct public consultation meetings.

The consultant stated that the presentation would cover two projects being carried out, these were. the Mombasa Lot 2B pipelines and the improvements to the existing storm water outlets. She stated that CWSB intended to put up new pipelines as well as to replace some of the old lines within the Island as a way to rehabilitate and improve the existing water supply system. She further outlined the 12 outlets that are within the scope of the storm water outlets project to be at Mbaraki; Railways; Makupa; Tudor; Buxton; Nyali, Coast General, at the four existing pump stations and at the Kizingo treatment works.

The Consultant explained the various impacts associated with the project, throughout the project duration (planning, construction, operation and decommissioning, including possible resettlement of Project Affected Persons (PAPs). The Consultant explained that a Resettlement Action Plan had been carried out in order to identify all the PAPs. For the outlets project, the consultant stated the two critical storm water outlets would be have resettlement of households. These were Makupa and Tudor. It is within these regions that are made up of informal settlements that several households had been identified as PAPs. Fortunately, the pipelines project intended to stick within the road reserve hence very few people had been identified as PAPs since there was minimal encroachment within the road reserve area. She outlined that the cut-off date for the RAP exercise was 19<sup>th</sup> of December 2016. As such, any further developments within the project sites would not be considered for compensation.

The Consultant also explained that an ESIA activity had been carried out in the area to sensitize the public about the two proposed projects and now the meeting was being conducted so as to disseminate information on the findings of the ESIA. She further explained all the mitigation measures put in place in view of the anticipated disturbances and assured the public that in case the contractor failed to adhere with the regulations put in place, they could address their complaints to the resident engineer on the ground for relevant action to be taken.

#### 4) Questions, Answers and Feedback

The Consultant then invited the attendees to raise whatever issues they had, in order to have full knowledge on the project.

1. Douglas Kitema from Ganjoni pointed out that there were several open manholes along the roads of the main line. He inquired what could be done to correct the situation.

***The consultant reiterated that she would relay the concerns to the relevant authorities and added that the storm water outlets aimed at improving the overall water and sanitation situation within Mombasa.***

2. Antomatte Ambuga from Tudor pointed out that the storm water outlets were located within informal settlements and the residents there were low income earners, she recommended that the project should look into their wellbeing.

***The consultant agreed with the recommendation adding that the reason for carrying out the RAP was to ensure that the wellbeing of the residents was ensured, via compensation and resettlement.***

3. Rogers Mwatate from Shimanzi stated that Shimanzi area had no water pipes and should be included in the project.

***The consultant outlined that this particular project was part of the broad Kenya Water and Sanitation Development Projects (KWSDP) and that CWSB had secured funds for a section of the project and that it was in the process of seeking funds for the rest of the pipelines included in the design. She however acknowledged the proposal and stated that it would be recommended in the final report.***

4. Ahmed Athman from Tononoka asked when the pipeline project was scheduled to begin.

***The consultant stated that the project was still in the planning phase and that the World Bank was awaiting a successful completion of the Resettlement Action Plan before releasing the funds for the construction phase of the project.***

5. Martin Mabinda from Tudor inquired if the water pipes intended to be installed were main pipes or distribution lines. He further stated that Tudor had been left out in the pipeline project and also inquired where the source of the water for the pipeline project would be.

***The consultant pointed out that the mandate of CWSB is bulk water supply (main pipes) hence the distribution is not part of the project. She furthered that MOWASSCO was the organisation in charge of the distribution. However, the consultant has acknowledged the opinion and will forward it to the relevant authorities (MOWASSCO).***

***With regards to the intake of the pipelines, the consultant stated that the source at the moment would remain the same (Baricho wells, Mzima springs, Marere springs and Tiwi boreholes). However, she stated that there are on-going improvement works on Baricho wells (3 more boreholes to be drilled) and the rehabilitation of Pemba Dam that would increase the overall supply of water into Mombasa County.***

6. Simon Bett from Shimanzi inquired if the intended pipelines would positively impact Railways location

***The consultant responded that the rehabilitation of the pipes that are in poor condition and the placement of new lines would bring the water supply nearer to the affected Railways location hence making it easier for the public to access it.***

7. James Oduor from Tononoka inquired if the installation of the new line would lead to those connected in the old line being disconnected.

***The consultant responded by stating that in all replacements, all initial connections that were legal would be reinstated at no additional cost. She furthered that all new lines to be constructed parallel to existing lines would not affect the old lines.***

8. Johnstone Omedi from Tudor inquired if those affected in the on-going water projects within the area were compensated accordingly. He further pointed out some water and sanitation issues of concern within the area such as the open trenches within the MOWASSCO projects and some storm water holes within Burukenge at Buxtan posed great health danger to the public, asking how they could be dealt with. Also, he pointed out that the road in Tudor was flooded with storm water. He asked what could be done to correct the situation.

***The CWSB representative responded by stating that the on-going projects were under a different entity, MOWASSCO, and were being implemented by a contractor called Toddy. She stated that MOWASSCO and CWSB operated differently since CWSB is a government parastatal while MOWASSCO is under the county government.***

***The consultant added that any complaints regarding the on-going construction project can be addressed through the Chief, the resident engineer, the contractor's offices or MOWASSCO in case the other channels do not bear fruit. In addition, she stated that she would include the grievances in the report and recommend that the issues be addressed by MOWASSCO. Regarding the storm water issues in the area, the consultant stated that she would forward the recommendations to the relevant authorities.***

9. Thomas Weke from Shimanzi inquired whether the project was based in the Coastal region or in the country as a whole. He further requested for the objectives of the project.

***The consultant responded by stating that the project is part of the broad Kenya Water and Sanitation Development Projects (KWSDP) and that CWSB had secured funds for a section of the project which is based in the Coast region. She furthered that the government was in the process of improving the water supply in various regions within the country through addition of water sources, rehabilitation of de-commissioned pipelines and the installation of new pipelines.***

10. Japhet Kubende from Railways inquired for the extent of the pipeline project.

***The consultant reiterated what she had outlined in her presentation by stating all the regions that the pipeline would cover including areas that would acquire new lines and others that would need replacements.***

11. Martin Mabinda inquired if the water sector was devolved. He further asked if the water from the ocean could be purified to meet domestic standards.

***The consultant responded by outlining that the water act from the national government has all the guidelines of CWSB, the Ministry of Water and Irrigation and MOWASSCO with various mandates. For instance, CWSB is for bulk water supply; MOWASSCO is for distribution of water. MOWASSCO further operates in conjunction with the county in implementing its duties.***

***With regards to the purification of ocean water, the consultant stated that there are various methods that can be used to desalinate ocean water such as reverse osmosis. However, they are capital intensive and were not within the scope of the project. She however acknowledged the recommendation and stated that she would include it in the final report.***

5) Conclusion

The Consultant asked if the people were in support of the project. The locals, by a show of hands approved of the project, stating that their recommendations given in the meeting should be taken into account. The meeting ended at 4.20 pm with a word of prayer.

**12.2.2. List of Attendance**

<b>Public participation Attendance list</b>			
<b>Mombasa County ;Railways Location on 16 december 2016</b>			
<b>Name</b>	<b>Designation</b>	<b>Contact</b>	<b>Vilage</b>
Ahamed Athman	Youth Leader	72649600	Tononoka
James Oduor	Youth Leader	72544559	Tononoka
Antomatte Ambuga	Village Elder	728372904	Manyimbo Tudor
Eddah Charles	youth	720935378	Shimanzi
Munupi Japeth	Nyumba Kumi	737499115	Shimanzi
Thomas Weke	G.H.V	716328467	Shimanzi
Kifi Chisenga	Village Elder	723719470	Tononoka
Maunwa Garbell	Village Elder	725132302	Shimanzi
Otieno Walter	Youth	791007515	Shimanzi
Yvonne Otieno	Youth	791213748	Shimanzi
Benjamin Muringe	Village Elder	725897434	Shimanzi
Jonathan	Village Elder	728473410	Kiziwi
Douglas M Kitomoi	Village Elder	716265333	Tudor
Stephen Mwangi Manwa	Village Elder	721760996	Shimanzi
Simeon Magwaro	Village Elder	717226673	Shimanzi

Rodgers Mwatate	Village Elder	781215195	Shimanzi
Simon K Bett	Village Elder	723222156	Shimanzi
Scholastica Kadenge	youth	720935378	Shimanzi
Johnstone Omedi	Village Elder	71563535	Tudor
Martin Mwabinda	Village Elder	723267471	Tudor
Robert N Mwathi	Village Elder	703640265	Shimanzi
Brenda A Awiti	Youth	703962766	Shimanzi
Rashid Suleiman Bakari	Village Elder	727103416	Ganjoni
Shaban N Ngoro	Chief	721527702	Ganjoni
James Henry Omindo	Chief	722318729	Ganjoni
Christoper Wagila	Chief	721320168	Ganjoni
Silas Wamalwa	Chief	712069813	Ganjoni
Joseph Musyoki	Chief		Ganjoni
Matilda Akinyi	Village Elder	723215318	Shimanzi
Stephen K Nyamu	Assistant Chief	725403375	Tudor

### 12.2.3.

CHIEF'S OFFICE  
 MOMBASA COUNTY  
SUB COUNTY  
 MVITA CONSTITUENCY  
 ISLAND WARD  
 RAILWAY LOCATION

## MEETING ATTENDANCE LIST

NO.	NAME	VILLAGE	DESIGNATION	CONTACT	SI
1	AMNEZ ATHMAN	TENONOKA	YOUTH LEADER	0726496022	
2	JAMES OTHUA	TENONOKA	YOUTH LEADER	0725447559	
3	Antemette Ambiga	Marumba Tude	V. Elder	0728372904	
4	SCHOENSTING Kadenge	SHIMANZI	YOUTH	0720935378	
5	EDDIE CHARLES	SHIMANZI	YOUTH	0704456169	
6	MUNUPI JAPHET	SHIMANZI	MEMBER KIM	0737499115	
7	THOMAS WEKE	SHIMANZI	C.H.V	0716398467	
8	RIFI CHISHENGA	TENONOKA	YELDER	0725719470	
9	MALWA GABRIEL	ZHIMANZI	V. ELDER	0725132203	
10	MILIND WINTER	SHIMANZI	YOUTH	0991009515	
11	YVONNE ATIENO	SHIMANZI	YOUTH	0701213748	
12	MARTIN MABINDA	TUDOR (KIZWI)	BALOZI	0723267471	
13	JOHNSIONE OMEJI	TUDOR	V. ELDER	0715563535	
14	BENJAMIN MURDGE	SHIMANZI	BALOZI	0725897434	
15	JOHN MITTE	TUDOR	BACSI	0726472410	
16	Bugler M. Kitema	CRAYON	V. ELDER	0716265533	
17	Stephen Mwangi Madi	SHIMANZI KRU	BALOZI	0721760946	
18	SIMEON MUGWISO	V. Elder	V. Elder	0717226673	
19	RODRIGES MURIA TIC	SHIMANZI	BALOZI	0781215195	
20	IMON R. BOIT	SHIMANZI	BALOZI	0722-222150	

BE PUNCTUAL ALWAYS.

CHIEF'S OFFICE  
 MOMBASA COUNTY  
 MVITA CONSTITUENCY  
 ISLAND WARD  
 RAILWAY LOCATION

MEETING ATTENDANCE LIST

NO.	NAME	VILLAGE	DESIGNATION	CONTACT	SIGNATURE
1	ROBERT M. MURANTH	SHIMANZI	LIMAN BAZU SHE	0703690 265	
2	BRENDA A. DWITI	ISHIMANZI	YOUTH	0703962766	
3	RASHID SUKUMANI BAKALI	BANJONI	V/ELDER	0727103416	
4	SHARAH N. NINGO	GANJON	CHIEF	0721827702	
5	JAMES HENRY OMIWIDE	"	"	0722318729	
6	CHRISTOPHER WONG'KO	"	"	0721320082	
7	SHAS. WAMALISA	"	"	0714069812	
8	JOSEPH MUSHOKI	"	"	"	
9	MATILDA AKINYI	SHIMANZI KPA	V/ELDER	072325518	
10	STEPHEN K. NYAMU	TUDOR LDC	ASST CHIEF	0725403375	
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

BE PUNCTUAL ALWAYS.

Figure 121: Public Consultation Meeting List of Attendance

### ***12.2.3. Public Consultation Meeting Photos***



***Figure 122: Consultant giving a presentation on the various projects***



*Figure 123: Feedback from one of the participants*



*Figure 124: Feedback from one of the Participants*

### **12.3. “CHANCE FIND” PROCEDURES**

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Due to the fact that some of the outlets will be located near cultural site, there may be the possibility of discovering some cultural sites that may be affected. These cultural sites include graves, structures that are earmarked as heritage sites. The following procedures will be followed in case a cultural site is discovered during construction:

1. After discovery, all activities within the vicinity of the identified site will be stopped and cordoned off.
2. The Contractor will notify the Resident Engineer on the finding.
3. Records of the finding will be made, including location, photographs, a description of the find whether it's a structure, grave, etc.
4. The Resident Engineer will then inform the Client, local administration and relevant government official's e.g. National museums of Kenya officials if it's a cultural structure on the finding, public health officer, etc. to discuss a way forward, including a change in design to avoid the cultural site.
5. If a grave is discovered (near the burial site), the authorities within the Hindu community on the religious procedures involved in moving the remains to a new grave site.
6. The corrective measures will be carried out by the Contractor and supervised by the Resident Engineer. Records of the corrective measures will be made and given to all parties involved.