REPUBLIC OF KENYA

MINISTRY OF WATER & IRRIGATION

COAST WATER SERVICES BOARD (CWSB)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

FOR

LOT 1: AUGMENTATION OF BARICHO WELL FIELD

Works carried out under

Contract No.: CWSB/WaSSIP-AF/C/25/2013

Report Prepared by:

Zamconsult Consulting Engineers

JUNE 2017

ESIA EXECUTIVE SUMMARY

Background

The Coast Water Services Board (CWSB) is a Parastatal (Government Owned and Autonomous) created under Water Act, 2002 and established through a Gazette Notice No. 1328 of 27 February 2004.

CWSB (or the Board) is the agency charged with the responsibility for the effective and efficient provision of water and sanitation services within the Coast Province. The Board undertakes this by contracting Water Service Providers.

CWSB, as part of its mandate to provide bulk water to the population under its jurisdiction, intends to augment water supply to Mombasa, Malindi, Kilifi and Gongoni areas. This will be done through the drilling of three additional wells in the Baricho Treatment Works at a cost of K.Shs. 446,385,310.00 (Four Hundred and Forty Six Million, Three Hundred and Eighty Five Thousand, Three Hundred and Ten). The works will include:

i. Drilling of three (3) new boreholes in the Sabaki Well field at Baricho
ii. Laying of a new 600mm diameter, 2.4Km long water collector/ transmission pipeline
iii. Access road for the new wells and
iv. Extension of power lines to the well field

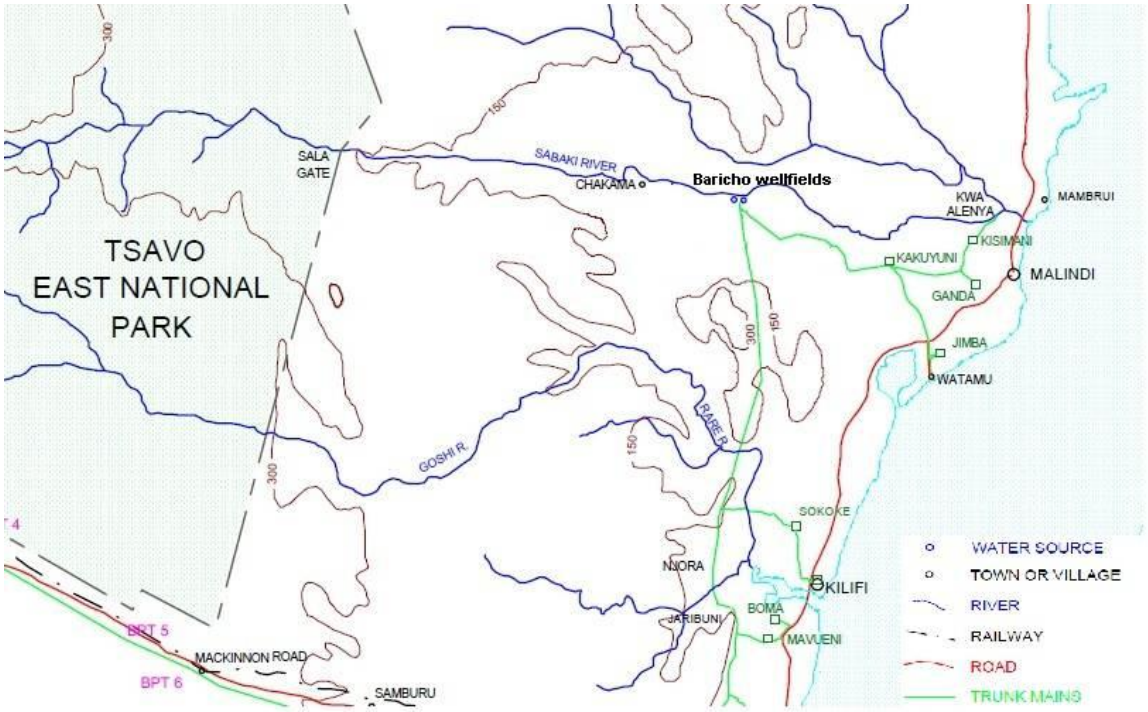

Figure 1-1: Map Showing the Location of the Project Area

The table bearing the coordinates of the proposed boreholes is shown below:

Table: Co-ordinates of proposed boreholes

Borehole	X Co-ordinates	Y Co-ordinates
Borehole 9	587879	9655786
Borehole 10	587983	9655761

Borehole 11	588095	9655732

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

Study Methods

The study approach and methodology adopted included screening and scoping 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. 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 also 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 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 namely the Environmental Impact Assessment and Audit Regulations 2003; The Environmental Management Act, Coordination (Waste Management) Regulations 2006; the Environmental Management Coordination (Water Quality) Regulations 2006; and the Environmental Management and Coordination (Noise and Excessive vibration pollution Control) Regulations2009 (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 Public Health Act (CAP. 242), and the Physical Planning Act (Cap 286) among others.

In addition to the local legislation, the Consultant identified the various World Bank operational policies relevant to the project. These are highlighted in Chapter 4 of this report.

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 socioeconomic benefits to the people and will contribute to their health and well-being. Overall, negative expected

impacts are related to the boreholes and associated infrastructure such as access roads, electrical works and laying of the transmission pipeline. 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 drilling, excavation and construction works are limited to short working sections, and that works are carried out rapidly and efficiently.

A significant Planning Phase impact will be the resettlement of land, structures, trees, crops and livelihoods in the well field. A detailed Resettlement Action Plan has been prepared and is presented as a separate report, detailing the mitigation of the resettlement impacts.

Significant Construction Phase impacts are generally significant in magnitude and socially and environmentally adverse but are also reversible, short-term largely manageable and confined to the well field. Construction camp impacts include generation and inappropriate disposal of solid and liquid wastes, haphazard exploitation of natural resources in the surrounding areas e.g. trees for firewood, increased spread of Sexually Transmitted Diseases (STD) and HIV/AIDs and change of cultural norms from migrant workers. Construction work impacts include noise, dust and loss of flora and fauna. 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 water supply. These include less water-borne disease, improved access to water, improved comfort and regional prosperity. There will be overall improved quality of life due to multiplier benefits of improved service delivery. However, significant adverse impacts from operations include solid waste disposal from the facilities, bursts and leaks from poor maintenance.

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

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.

Environmental / Social Impact	**Mitigation Action Plan**	**Responsibility**
Land Acquisition for borehole and associated works	Identification of affected land and land owners (RAP) and compensation for land at prevailing market rates in the project area	CWSB
Loss of Structures	Identification of affected structures and structure owners (RAP) and compensation for structures at full replacement cost	CWSB
Loss of trees and crops	Identification of affected trees and crops as well as the owners (RAP) and compensation for trees and crops at full replacement cost	CWSB
Loss of livelihoods	Loss of livelihoods to be valued and compensated to ensure that project affected persons (PAPs) continue with their normal lives(or better) as before the project	CWSB

Environmental / Social Impact	**Mitigation Action Plan**	**Responsibility**
Loss of cultural sites "chance find" included	The affected site to be identified by type, and method of compensation to be determined following local practices.	CWSB
Loss of flora and fauna	Site clearance should be limited to the minimum area required for the execution of the works. The records of the number and tree species cut to be kept. Replanting of indigenous trees after the project is completed. Top soil removed from the borehole should be stockpiled and spread about after completion of work to facilitate regrowth of existing vegetation so as to rehabilitate the ecosystem	Contractor Contractor Supervisor – project Engineer to consult KFS on appropriate replanting seedlings Sub-County Environmental officer
Air pollution	Vehicles and other equipment emissions would be kept to a minimum by servicing and maintaining the equipment to manufacturer's specification. In, addition the contractor to be encouraged to use unleaded and low sulphur content petrol and diesel respectively for all equipment and vehicles	Contractor Supervising Engineer
Noise and Dust	Use protective clothing like helmets and dust masks by construction crew. 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 50m of residential areas and other sensitive institutions; Good maintenance and proper operation of construction machinery to minimise noise generation; Installation of temporary sound barriers if necessary.	Contractor Supervising Engineer
Generation of solid and liquid waste	Provide adequate waste disposal facilities. Ensure collection of all solid waste from generation points, safe transportation to a central point where they are sorted out and safely disposed according to type to protect the environmental resources.	Contractor Supervising Engineer

Environmental / Social Impact	**Mitigation Action Plan**	**Responsibility**
	Put in place adequate and efficient sanitary facilities for handling liquid waste especially waste water to protect the ground water from pollution. Wastewater from residential quarters and offices to be directed to constructed septic tanks for safe handling. Pit latrines can be used in areas where the other services are not available or feasible	
Pollution of water resources	Ensure proper solid and liquid wastes disposal mainly from the construction camps and offices. Ensure proper measures are in place for collection and disposal of spilled oils and lubricants.	Contractor, Supervising Engineer Engineer in charge of Baricho
Health and safety	Provision of Personal Protective Equipment (ear muffs, gloves and helmets) for the construction crew Provide First aid kit and appropriate procedures and safety measures Provide condom dispensers at appropriate locations coupled with awareness campaigns to workers and surrounding communities on HIV/AIDS throughout the construction period	Contractor Supervising Engineer CWSB-Environmental Department

Conclusion

The ESIA concludes that the project will have substantial positive social, economic and environmental benefits. It will supply sufficient potable water to meet projected future demands of domestic and other uses in the project area.

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. 5,400,000.00**. 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.

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ACRONYMS AND ABBREVIATIONS

ACC	Assistant County Commissioner
AIDS	Acquired Immunodeficiency Syndrome
CBO	Community Based Organization
CH_4	Methane
CO_2	Carbon Dioxide
CWSB	Coast Water Services Board
EMCA	Environment Management Coordination ACT
ESMMP	Environmental and Social Mitigation and Management Plan
ESMP	Environmental and Social Monitoring Plan
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
GoK	Government of Kenya
GHG	Greenhouse Gases
HIV	Human Immunodeficiency Virus
IC	Individual Service Connection
ID No.	Identity Card Number
KAPP	Kenya Agricultural Productivity
K.Shs.	Kenya Shillings
KFS	Kenya Forestry Service
KWS	Kenya Wildlife Service
m^3	cubic metres
Mbgl	metres below ground level
MDG	Millennium Development Goals
MAWASCO	Malindi Water and Sewerage Company
MWI	Ministry of Environment Water and Irrigation
NEMA	National Environment Management Authority
NC	Communal Service Connection
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
STD	Sexually Transmitted Diseases
UFW	Unaccounted for Water
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

The Coast Water Services Board (CWSB) is a Parastatal (Government Owned and Autonomous) created under Water Act, 2002 and established through a Gazette Notice No. 1328 of 27 February 2004.

CWSB (or the Board) is the agency charged with the responsibility for the effective and efficient provision of water and sanitation services within the Coast Province. The Board undertakes this by contracting Water Service Providers.

Seven Water Services Providers (WSPs) whose areas of jurisdiction correspond with the seven initial districts of Coast Province, namely, Mombasa, Malindi, Kilifi, Kwale, Taita and Taveta, Lamu and Tana River have been appointed by the Board to provide water and sanitation services in their respective jurisdictions. The WSPs are Mombasa Water and Sanitation Company (MOWASCO), Malindi Water and Sanitation Company (MAWASCO), Kilifi Water and Sanitation Company (KIMAWASCO), Kwale Water and Sanitation Company (KWAWASCO), Taita and Taveta Water and Sanitation Company (TAVEVO), Lamu Water and Sanitation Company (LAWASCO) and Tana River respectively.

Unlike in other parts of the country, CWSB is also the water undertaker for the Coastal Bulk Water Supply System. Additionally, the Board is the asset holder of all public water and sanitation facilities within its area of jurisdiction.

The Baricho Well fields provide bulk water to Mombasa, Malindi, Watamu and Kilifi. The proposed project intends to augment supply of water to Mombasa, Malindi, Kilifi and Gongoni areas. This will be done by drilling three (3) new boreholes to increase the water supply to the aforementioned areas.

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

1.1 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, scoping, key informant & household consultations, impact assessment, mitigation, review, decision-making and monitoring. 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 study. 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

- Aesthetic Environment, and
- Archaeological 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 mobilization, site clearing and other pre-construction activities, construction, operation and maintenance and monitoring phases of the project components.

2 PROPOSED PROJECT DESCRIPTION AND ALTERNATIVES

2.1 LOCATION

The project site is located along the Sabaki River in Lango Baya in Kilifi County. A map of the project area is shown in the map below:

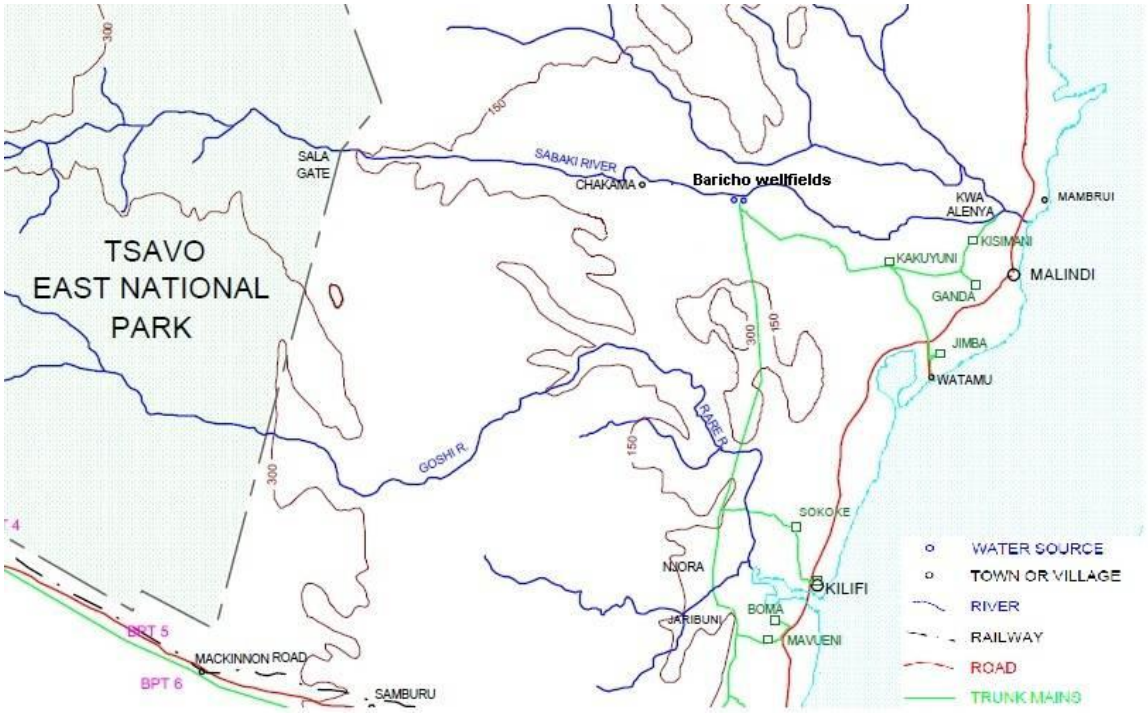

Figure 2-1: Map Showing the Location of the Project Area

The table bearing the coordinates of the proposed boreholes is shown below:

Table 2-1: Co-ordinates of proposed boreholes

Borehole	X Co-ordinates	Y Co-ordinates
Borehole 9	587879	9655786
Borehole 10	587983	9655761
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2.2 THE EXISTING WATER SUPPLY

The Baricho Well Field Currently consists of 8 wells in two well fields located in the highly permeable, sandy sediments on the southern bank of the Sabaki River. The Figure below shows the two well fields.

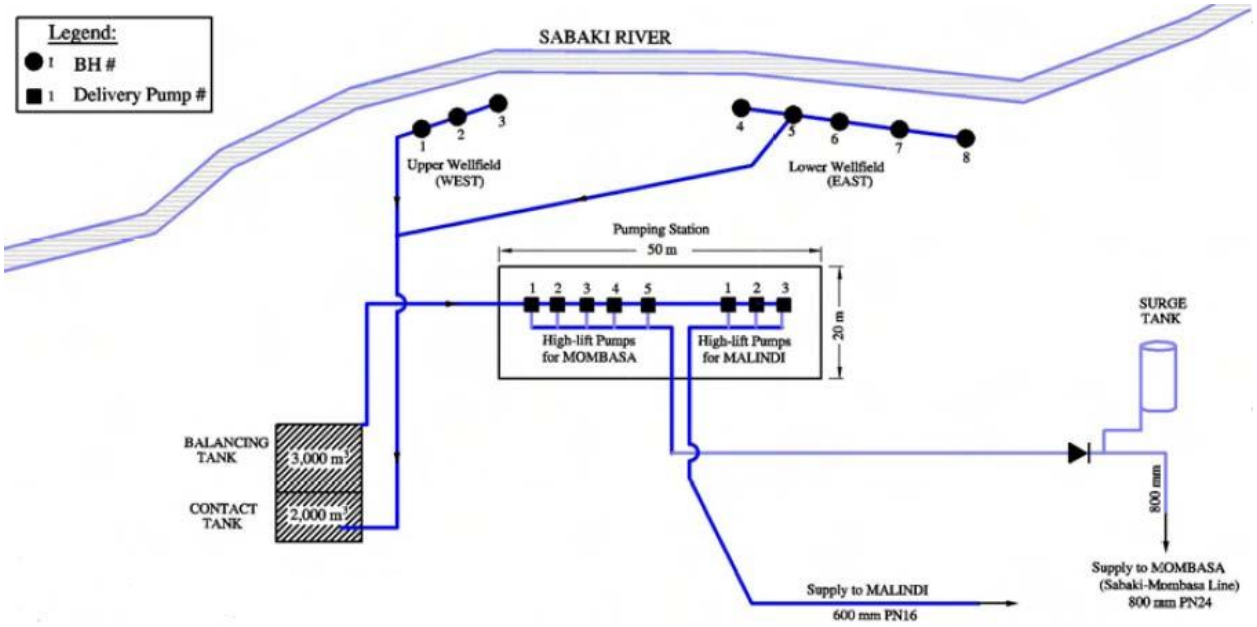


Figure 2-2: Schematic of Existing Well Fields, Treatment Works and Pump House

The upstream well field is located 0.6 km from the Water Treatment Plant while the downstream well field is located 1.3 km from the treatment plant. The wells are situated around 50m from the Sabaki River, thus a high percentage of the abstracted water is bank filtrate from the river. The wells have a spacing of 90m (upstream well field) and 120-160m in the downstream well field.

Raw water is pumped from the wells to treatment plant, where it is disinfected with Cahypochlorite via a gravity dosing system, stored, and later pumped to Mombasa, Malindi, Kilifi and other Coastal Regions.

The data on the existing wells is summarized in the table below:

Table 2-2: Summary on Wells

	BH1	**BH2**	**BH3**	**BH4**	**BH5**	**BH6**	**BH7**	**BH8**
Year of construction	1992	2014	1996	1996	1997	2014	1997	1997
Year of rehabilitation	2012		2012	2012	2011		2009	2012
Depth (m)	38.7	46	44.5	54.2	54.2	52.1	53	52.5
Borehole Ø (mm)	1000	1000	1000	1000	1000	1000	1000	1000
Casing Ø	600	600	600	600	600	600	600	600
Pump capacity (m^3/h)	470	470	470	470	470	470	470	470
Pump depth (mbgl)	10.6	24.73	8.9	19.5	19.5	25.35	19.5	18.8

	BH1	BH2	BH3	BH4	BH5	BH6	BH7	BH8
Screen from …to … (mbgl)	14.5 38.7	18.3 44.6	20.5 44.5	24.0 54.2	24.0 54.2	20.8 52.1	23.3 53.0	22.5 52.5
Screen length (m)	24.2	26.3	24	30.2	30.2	31.3	29.8	30

In 2014, 71,000 m³/day (outlet WTP) was being produced for use.

2.2.1 Water Quality of existing Wells

A water quality analysis of the water from the existing wells, including a detection of pesticides, was carried out with the following results:

Table 2-3: Water quality of upper and lower well fields

Parameter	Unit	Upper Wellfield	Lower Wellfield
pH		7.52	7.7
E. Coli	µS/cm	572	608
Total Dissolved Solids	mg/l	366	384
Alkalinity ($CaCO_3$)	mg/l	173	161
Total Hardness ($CaCO_3$)	mg/l	120	125
Calcium	mg/l	18.4	20.2
Magnesium	mg/l	18	16.8
Chloride	mg/l	82.7	82.7
Fluoride	mg/l	0.12	Not Determined
Total Iron	mg/l	0.05	0.07
Total Manganese	mg/l	<0.01	<0.01
Sulphate	mg/l	50.2	53.2
Lead	mg/l	<0.01	<0.01
Copper	mg/l	<0.01	<0.01
Aluminium	mg/l	<0.02	<0.02

2.3 OBJECTIVES OF THE PROJECT

The works under Lot 1 aim to provide an additional quantity of is 22,000 m³/day to the water supply system for the augmentation of water supply to; Mombasa, Malindi Kilifi and Gongoni Areas. This shall be achieved through the extension of the existing well field at Baricho.

In detail the works comprise:

- Drilling of three new wells in the extension of the existing downstream well field,
- New pumping main from the wells to the existing water treatment plant and connection to the existing pumping main
- Power supply for the new wells

2.4 DESIGN COMPONENTS

2.4.1 Design Criteria

The Design employed the Practice Manual for Water Supply (2005) prepared by the Ministry of Water and Irrigation of Kenya. Aspects, which are not covered by this standard, are specified in accordance with the EN Standards listed below.

- DIN EN 805: "Water supply, Requirements for systems and components outside buildings"
- DIN EN 545: "Ductile iron pipes, fittings, accessories and their joints for water pipelines "
- DIN 4924: "Sands and gravels for well construction - Requirements and testing"
- DIN 4929: "Steel wellheads"
- DVGW – GW 303:"Network calculation"
- DVGW 400-2: "Technical rules water distribution network, construction and testing"
- DVGW W122: "Closing structures for water catchment wells"
- DVGW W123: "Construction and design of vertical filter wells"
- DVGW W111:"Planning, execution and interpretation of pumping tests in water catchment"

The Design year for the different components of the project is shown in the table below:

Table 2-4: Design Horizon for Project Components

Component	**Design Year**
Wells	2016
Civil Structures	2035
Pipes	2035

2.4.2 Scope of Works

1) Drilling of New Wells

A geophysical investigation was carried out in 2014 and revealed that the paleochannel, in which the wells BH5-8 are situated, extends eastwards, but the axis of the channel slips under the Sabaki River east of BH8. Sediment thicknesses decreases slightly but seem to be still in the order of 50 metres.

The new wells will be placed as per the schematic shown in the figure below:

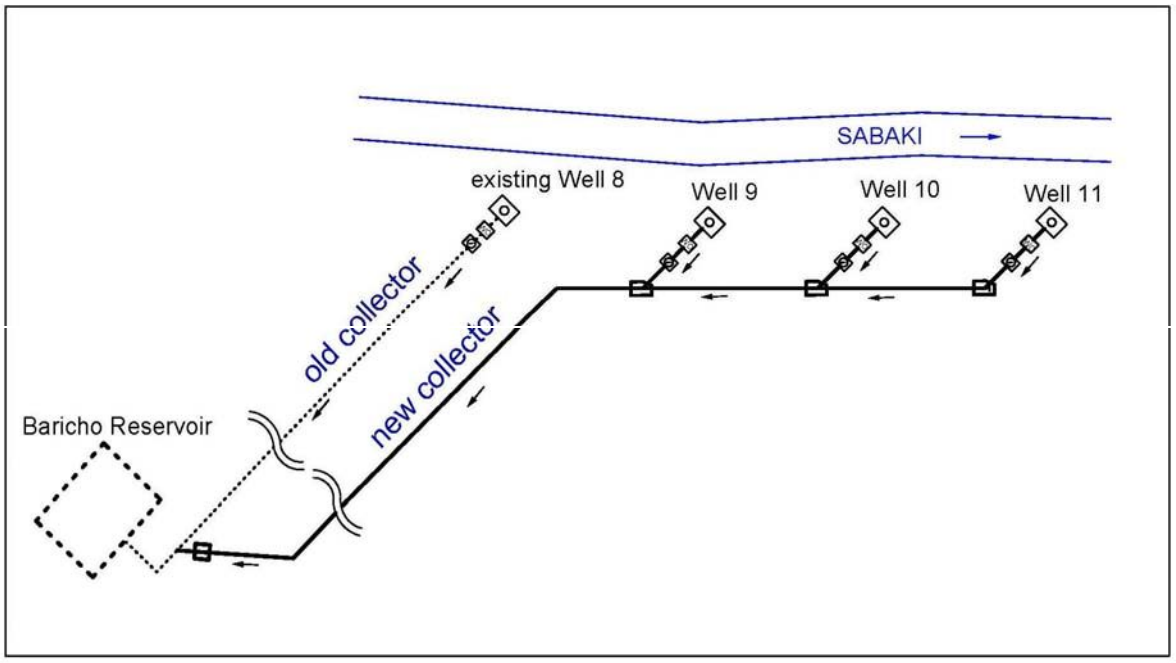


Figure 2-3: Schematic of the Proposed Wells

The expected aquifer thickness at the sites for wells BH9 and BH10 is around 50m. The yield will probably be in the same order of magnitude as in the existing boreholes (~450 m³/day).

The aquifer thickness is expected to decrease towards the east, so it will be 40 m or less at the proposed site for well BH11. The yield will decrease accordingly, but this has to be confirmed through test wells and pumping.

The drilling depths will not exceed 70 mbgl. The expected lithology is unconsolidated or partly cemented alluvium. Drilling in consolidated sediments or hard rock will be the exception and generally restricted to a few meters to confirm the (bedrock) stratigraphy.

The wells should preferably be drilled with the rotary drilling method. In order to avoid collapsing of the boreholes the installation of temporary casing is recommended.

The nominal final drilling diameter should not be less than 24", to allow installation of 12"screens and 20" casings with a sufficiently wide annular space for the installation of a high standard gravel pack.

Samples of the cuttings should be taken every 2m of drilling or at every change of strata. The samples will should wet-sieved with at least 5 standard sieve sizes (e.g. U.S. standard sieve sizes: 20, 30, 50, 70, 120) and a collector pan. The result of the analysis will be presented as tables and graphs showing:

- Size of sieve openings
- Cumulative weight retained
- Cumulative percentage retained.

Geophysical borehole logging should also be carried out by measuring at least the following parameters:

a) Self-Potential (SP)
b) Resistivity (RES)
- single point
- long normal
- short normal

c) Natural ɣ-radiation (GAM)

The three drilled exploratory boreholes (final depth 40-60 mbgl, final drilling diameter min. 24") will be converted into test wells and at a later stage into production wells.

Detailed well design will be prepared as soon as drilling results are available. The well design strongly depends on the encountered lithology, especially for the location and length of the screens. The detailed well design will specify the exact depths where blind casings, screens, gravel pack, clay seal(s) etc. should be installed. The figure below shows how the finished well should look.

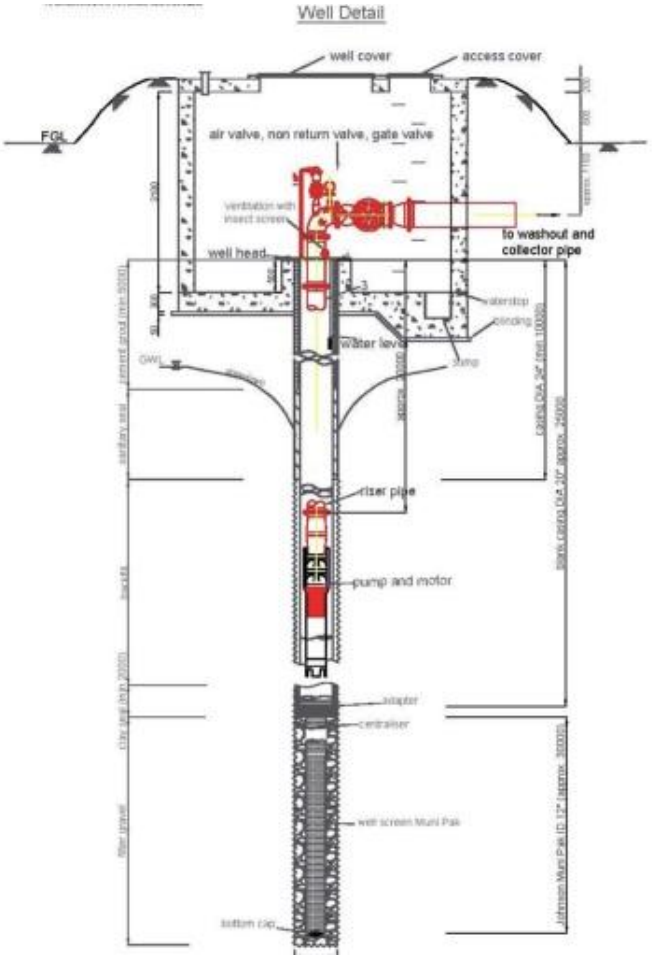


Figure 2-4: Complete Borehole

The following are details for the well design.

Casings

- *Outer casing* - A 24" nominal diameter casing of mild steel should be installed in the first 10 m of the borehole. The installation will be permanent.
- *Well casing* - A 20" diameter blank casing which will be connected to the well head will be built on the upper part of the well. It will have a length of approximately L=25 m.
- *Well Screen* - The well screen will be a Johnson Screen Muni Pak type with 12" internal diameter. The slot sizes of the screens will be 0.155" for the inner screen and 0.153" for the outer screen. The length will be approximately L=30 m. It will be connected to the well casing with an appropriate adaptor. A bottom cap will be attached to the lowest screen section. It will have a closed bottom or a tight plug secured by screws or similar.

Centralisers of a kind as recommended or provided by the manufacturer of the casing/screens will be used for proper positioning of the screen section. The centralisers should be fixed at intervals as defined in the well design plan (at least every 10 m) between the upper and the lower edge of the screen section.

Well Assembly and Lowering

During the whole lowering process the lowering string will be kept in suspension. On reaching the final depth, the string will be maintained in its hanging position and will not touch the bottom of the hole. The clamps holding the string will be removed only when the filling of the annular space is completed. Hitting the bottom of the hole or any obstacle on the way down before reaching design depth will be regarded as an accident and will result in the withdrawal of the string and removal of the obstacle.

Gravel Packing

The annular space between casing and borehole wall of the test wells will be filled with gravel around the screen sections. The level of the filter gravel filling should be checked with a plumb line.

The required volume of the filter gravel is calculated by the cylindrical section volume formula: $\mathbf{V = \pi (R^2 - r^2) \times H}$ with R = radius of the borehole, r = radius of the casing and H = height of the gravel section. An excess factor of 1.5 might be accepted in order to consider the volume of caving in the borehole wall.

Sealings

These include:

Cement grout - The annular space between the outer casing and the well casing is filled with cement grout in the upper 5 m, the rest with a sanitary seal.

Clay Seal - Where appropriate, a clay seal, made of pelleted clay of approved quality, should be installed on top of the gravel pack (preferably in a place where it faces a clay layer). The length of the clay seal will not be less than 2 m. proper positioning of the clay seal should be checked with a plumb line. Further clay seals in deeper sections of the wells might be requested when multi-layer aquifers need to be hydraulically separated.

2) Well Field Collector/Transmission Line

The main objective of the augmentation works in Baricho is to increase water abstraction by 22,000m³/d through the extension of the downstream well field. As the existing collector pipe is already working at its full capacity; an additional collector pipe will be required to transmit this flow to the WTP. The new collector will have a length of 2.4km and a nominal diameter of 600mm.

The proposed pipeline will start at the downstream well field in Baricho at the bank of Sabaki River (~55masl). From the new wells (well 9, well 10, well 11), the raw water will be conveyed to the collector through respective discharge lines with a length of approximately 35m with a diameter of DN350 (DN250 at flow meter).

3) Access Road to the Well Field

The existing access road to the existing downstream well field will be extended to access the new boreholes. The extension will be about 330m.

4) Extension of Power Lines

The pumps in Baricho are currently served by a dedicated power line in order to run the pumps in the boreholes as well as the pump station for water supply. Currently a 3.3kV cable from the main substation to a 1000 kVA, 3300 to 420V step-down transformer mounted on an elevated and ring-fenced plinth, built at the central branch of the new collector to well 10.

The power is then transmitted through a steel armoured 3 core 95 sq. mm. cross-linked polyethylene (XLPE) insulated high tension cable with a medium voltage SF6 impregnated or vacuum circuit breaker located at the mains busbar and a ring-main unit located in the MV room of the switch-house closed to the transformer. This cable runs through a waterproof cable conduit buried (DI = 100 mm) at least 0.8m below the ground level between the main substation and the location of the step-down transformer, as the standards demand.

The electrical works for the proposed additional wells which form part of this contract start at the 3.3 kV mains busbars after a step-down transformation from 3.3kV at the main incomer substation and include:

- A main medium voltage SF6 or vacuum circuit breaker with a protection and energy measurement intelligent relay suitable for transformer protection
- A High Tension cable laid from the terminals of the main medium voltage circuit breaker to the terminals of the medium voltage ring main unit installed in an enclosure near the step-down transformer close to the proposed wells (about 2.5 km away).
- The medium voltage ring main unit
- The 3300/420Volts step-down transformer
- The Incoming Low Voltage cell (cabinet) with:
    - the main low voltage circuit breaker or switch
    - -the Voltage Relay (the mains voltage condition monitor)
    - -the kWH-meter
    - -the power factor measurement and correction gear
- The Low Voltage and Auxiliary Voltage Board with the control voltage transformer, the voltage stabilizing UPS for control circuits and a 24V battery charger for supplying DC voltage
- Motor Control Centres (MCCs) one for each pump motor complete with the Motor Circuit Breakers, Contactors, Soft Starters and thermal overload relays as well as Input/output modules for motor signals
- The General Marshalling Board where all the field signals are collected and which also houses the associated input/ output ports, the communications hub and the CPU of the Programmable Logic Controller (PLC)
- The main control station with associated computers and associated peripherals
- Local Marshalling Boards at each well location with associated cable work to the local sensors and the General Marshalling Board
- The cable works to the pump motors
- Control system programming
- Earthing:
    - Medium Voltage Earthing
    - Low Voltage Earthing
- Sub Panel for switch-house installation distribution

The proposed layout for the electrical works is shown in the figure below:

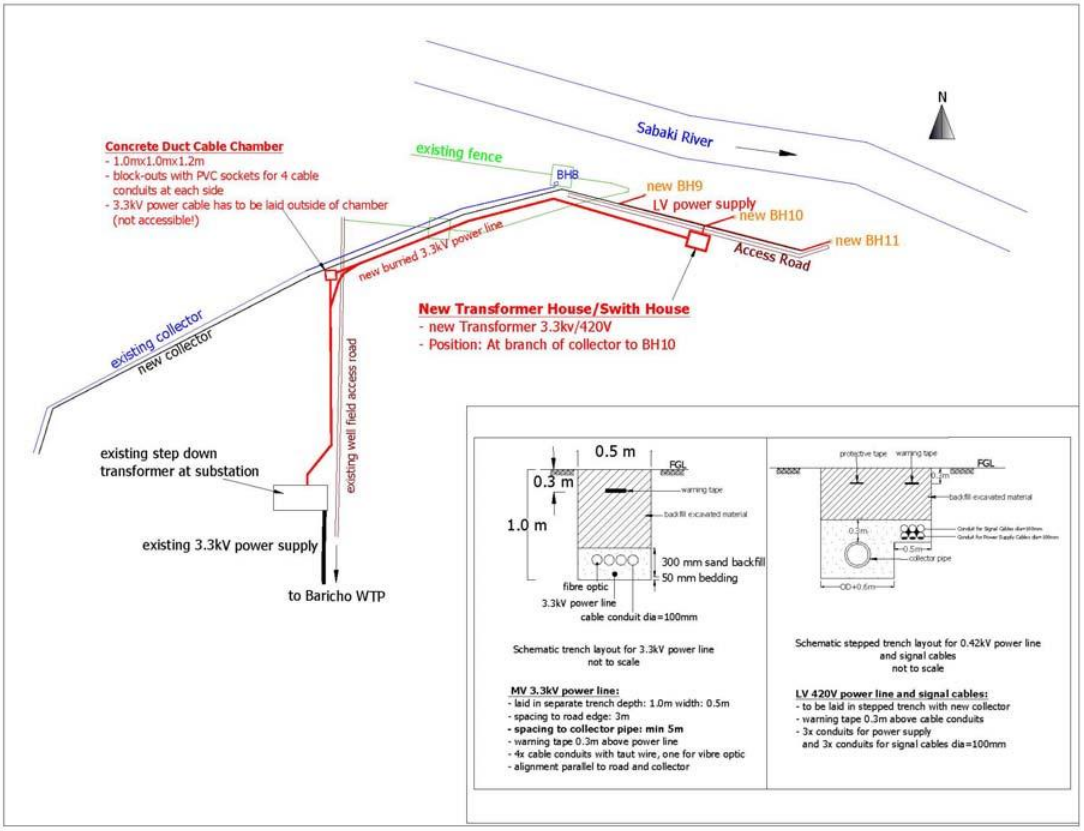


Figure 2-5: Proposed Layout for Electrical Works

2.5 PROJECT COSTS

The proposed project is estimated to cost K.Shs. 446,385,310.00 (Four Hundred and Forty Six Million, Three Hundred and Eighty Five Thousand, Three Hundred and Ten) Summarised in the table below:

Table 2-5: Breakdown of Project Costs

ITEM	**COST IN K.SHS.**
General Items	52,272,145.00
Supply of Plant, Material and Mandatory Spare Parts	222,918,219.00
Installation of Plant and Material	143,559,428.00
Day work	6,379,075.00
SUB TOTAL	**425,128,867.00**
Provisional Sums	21,254,443.00
TOTAL COST	**446,385,310.00**

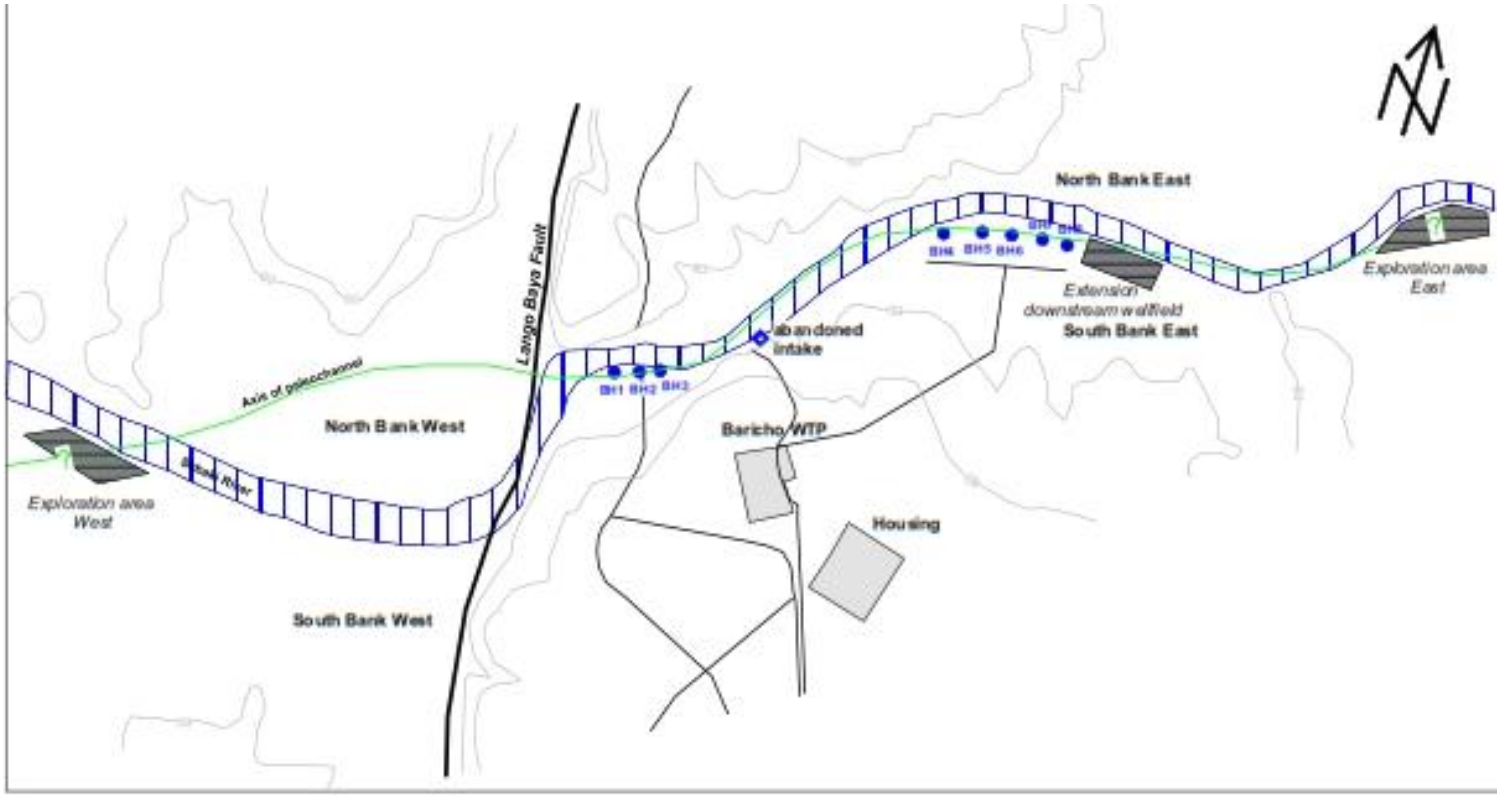
2.6 ALTERNATIVES CONSIDERED

2.6.1 Alternative sites for the Wellfields

Two alternative sites were considered for installation of a well field. These included:

1. Site 1 – downstream of the existing lower well field known as the exploration area East.
2. Site 2 – upstream of the existing upper well field known as the exploration area West.

Each of these sites are shown in the figure below:


North Bank East
Exploration area East
Extension downstream wellfield
South Bank East
abandoned intake
Lango Baya Fault
Axis of paleochannel
North Bank West
Baricho WTP
Housing
Exploration area West
South Bank West

1) *Site 1 - downstream of the existing lower well field known as the exploration area East.*

This site is located downstream of the existing lower wellfield at co-ordinates 3° 6'54.91"S and 39°48'35.54"E, approximately 3.6Km from the water treatment works. It was assumed that the paleochannel extended to this area, however the hydrogeological study carried out in the site revealed that the paleochannel does not in fact extend to this area, as such the underground conditions will not support extraction of water through wells.

2) *Site 2 - upstream of the existing upper well field known as the exploration area West.*

The second site for consideration is located upstream of the upper wellfield approximately 3.4Km from the treatment works at co-ordinates 0582835, 9654740 and 0582660, 9654786. The hydrogeological survey established that it is indeed possible to obtain adequate water from this area, however in addition to the expected construction works including extension of the access road, collector pipe and power lines (which require longer lengths for each) as compared to the proposed works; the proposed works will also include flood protection facilities which in essence will increase the overall cost of the project as such this alternative was not considered further

2.6.2 Do Nothing Alternative

This alternative involves not constructing the three additional boreholes, as such the proposed project area will remain under crop farming. In addition to that the Gongoni area will not receive water and Kilifi, Malindi and Mombasa will not receive improved water supply as such the water will continue to be inadequate.

3 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.

3.1 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 total of 570 questionnaires were administered of within the proposed supply areas in Kilifi, Gongoni, Malindi, Mombasa and Baricho.

3.1.1 Population dynamics and household characteristics

The general trend shows that most of the people fall in the 5-18 and 19-35 age groups. Figure 3-1 shows the population age brackets.

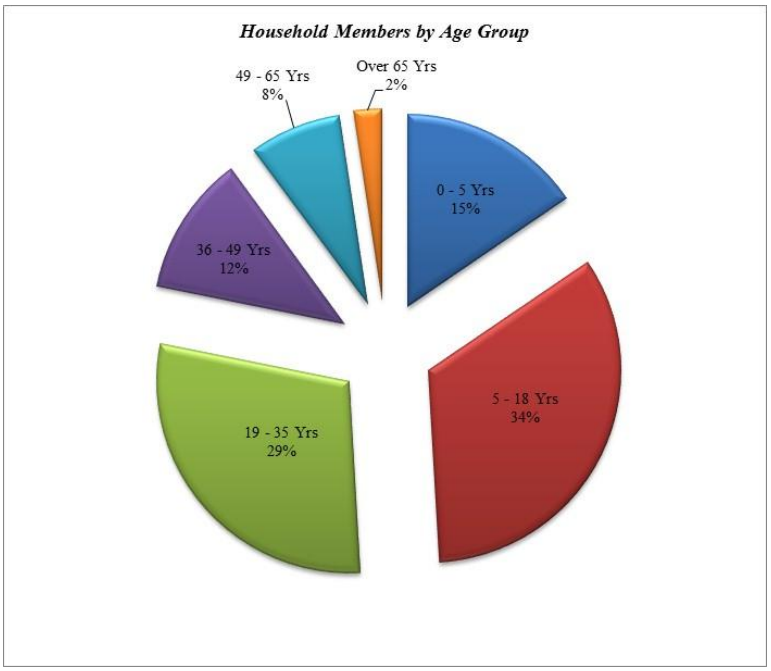


Figure 3-1: Age Distribution of the Population

Source: Survey data.

The Literacy level in the area is high with 76% of the population being able to read and write. The literacy levels were as follows; No education at all 24%, primary level 54%, secondary level 17%, and college/university 5%. Thus the Consultant foresees an understanding of the project and its impacts to majority of the population.

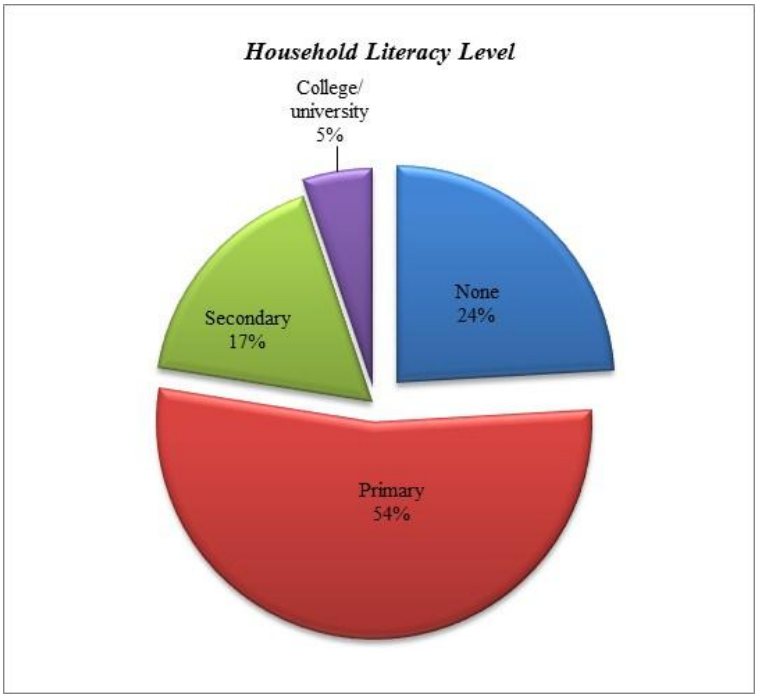


Figure 3-2: Household Literacy Level

Source: Survey data.

The dominant religion is Christianity with 77% of the population professing the faith, the other religions are Islam and Traditionalism.

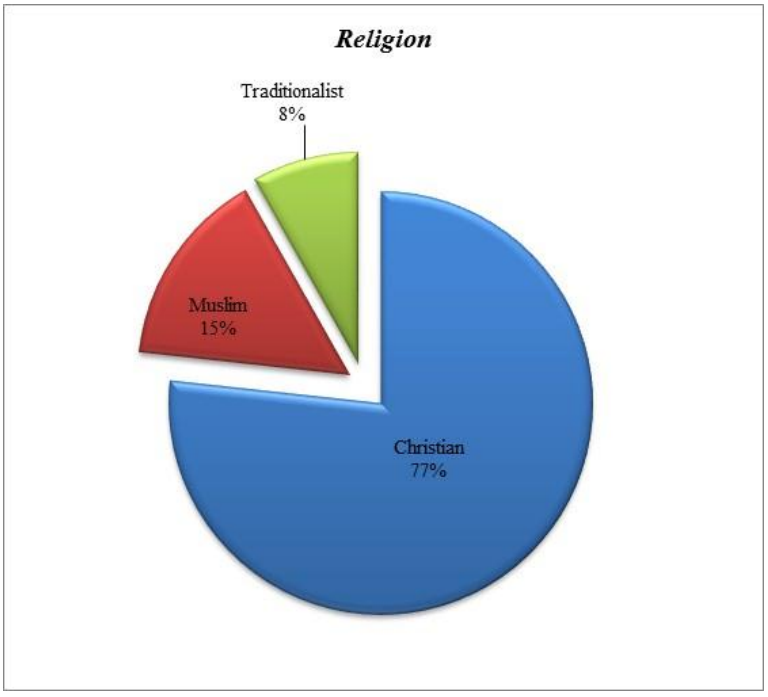


Figure 3-3: Religion of the Population

Source: Survey data.

Firewood is the main source of energy for the community (74%). 19% of the population use charcoal, 4% of the population use kerosene, 3% use LPG gas. The high rate of wood and

charcoal as a fuel may lead to the depletion of the mangrove and coastal forests in the project area.

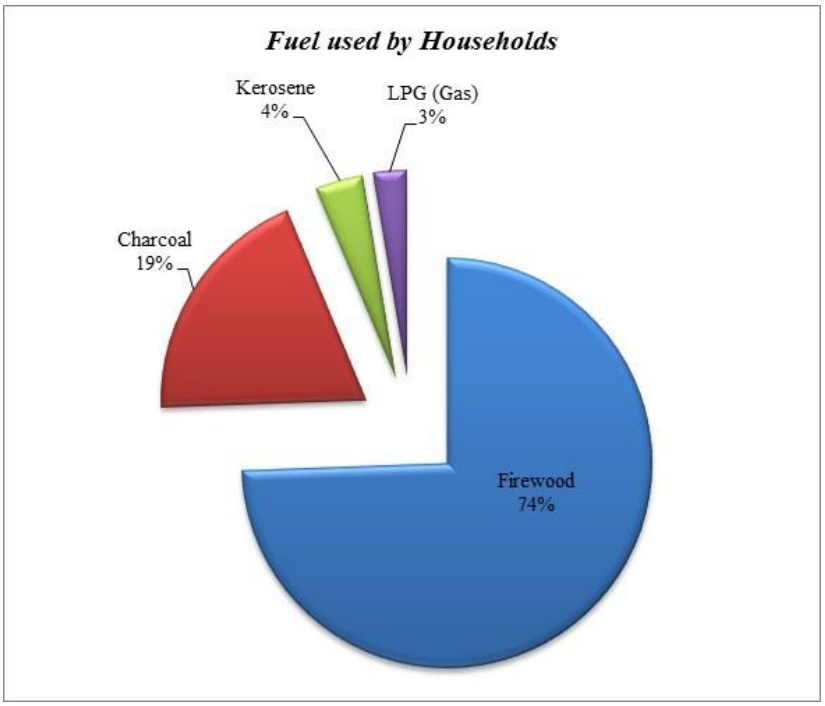


Figure 3-4: Sources of Energy

Source: Survey data.

The main socio-economic activities are crop farming for which 45% of the population are engaged in. Other activities include, livestock farming, business formal employment and fishing. A summary of the economic activities is highlighted in the chart below:

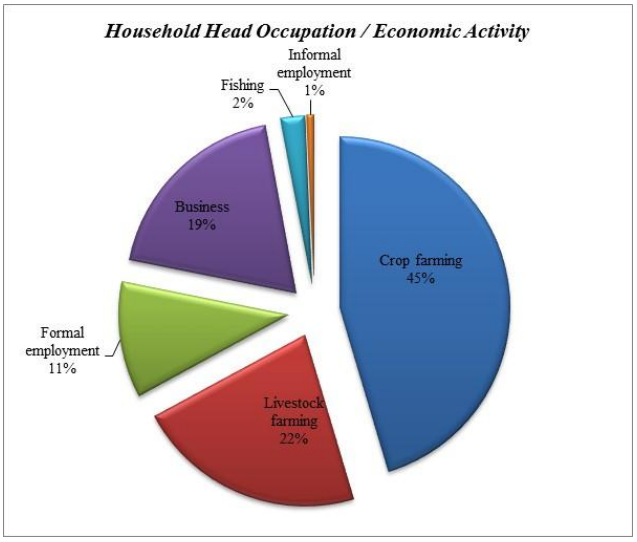


Figure 3-5: Household Socio-Economic Activities

Source: Survey data.

Households that carry out business as the economic activites constitute 19% of the sample population. The major businesses carried out in the project areas include: shops, bodabodas, and the jua kali sector as shown in the chart below:

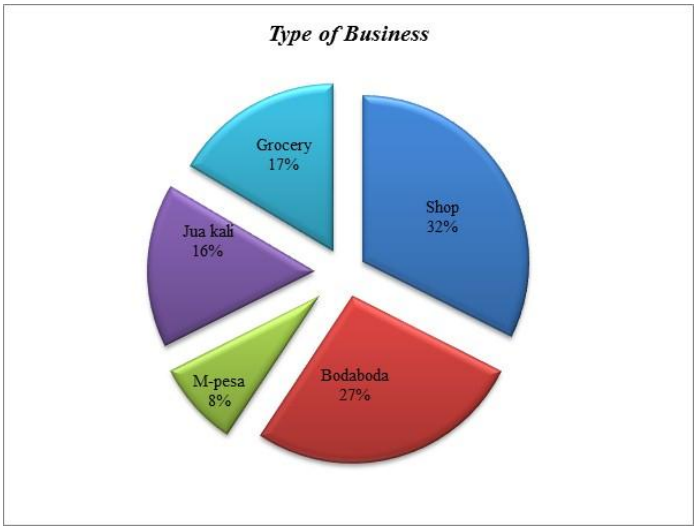


Figure 3-6: Type of Business

Source: Survey data.

22% of the households own livestock. The main livestock reared are goats with 67% of the households own goats, cattle, sheep and poultry are also reared as shown in the figure below.

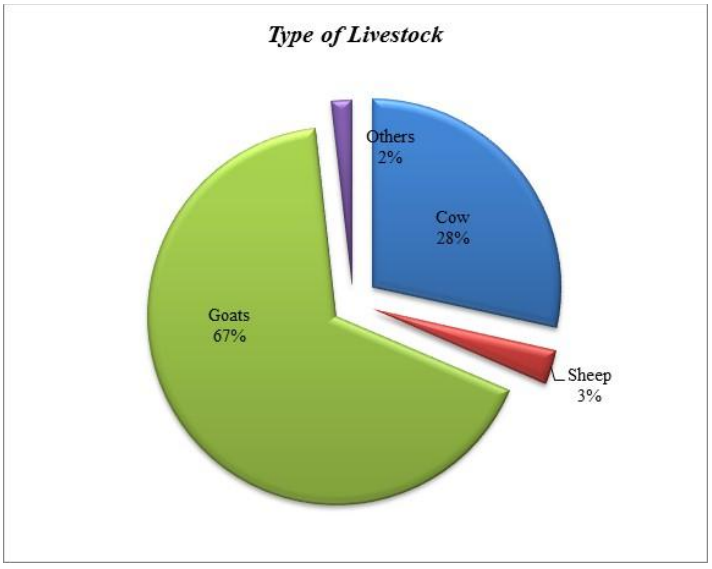


Figure 3-7: Type of Livestock

Source: Survey data.

The project area is mainly agricultural, with majority of the population growing corps. The crops grown in the area are shown in the chart below:

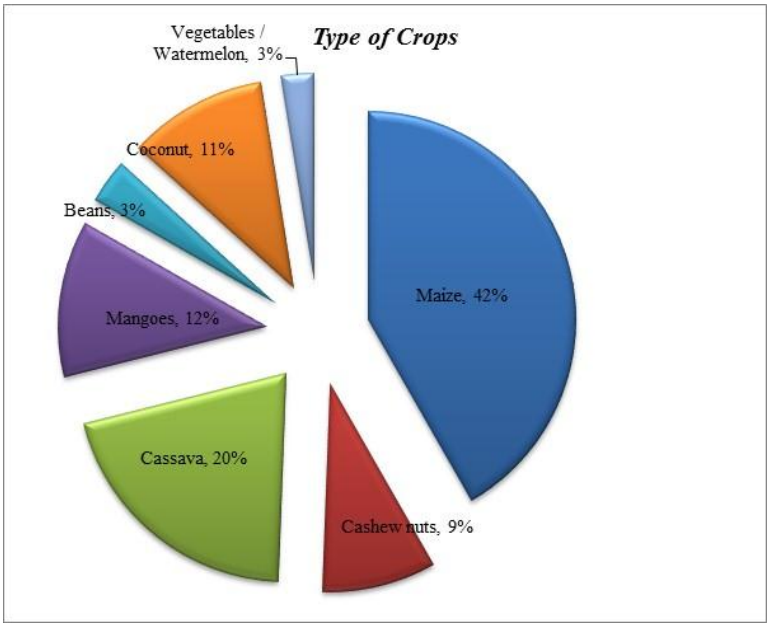


Figure 3-8: Crops grown in the area

Source: Survey data.

55% of the population earns less than K.Shs. 15,000, 30% earn K.Shs. 15,000-30,000, 10% earn K.Shs. 30,000-50,000, while just 5% earns above K.Shs. 50,000.

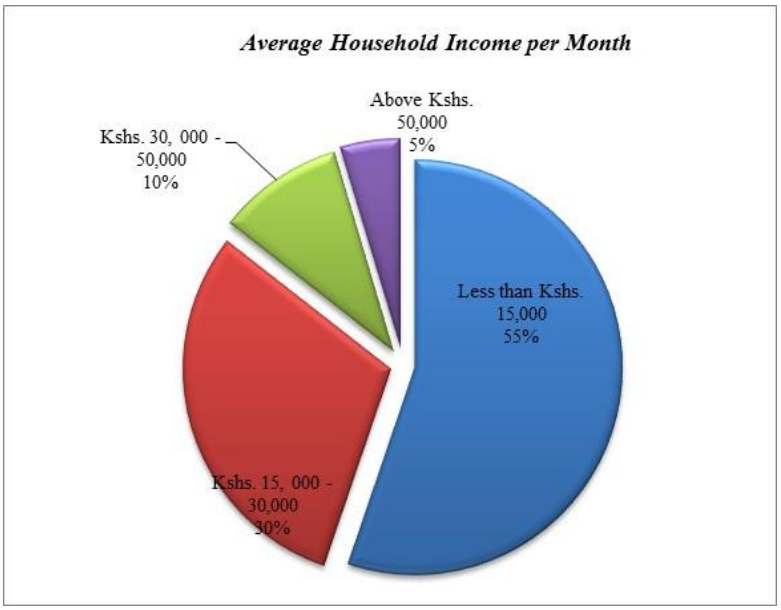


Figure 3-9: Household Income per Month

Source: Survey data.

3.1.2 Water Supply

Majority of the population, particularly in Kilifi, Malindi and Mombasa rely on piped water either in public or private taps. However the population particularly towards Gongoni use shallow wells and boreholes as a source of their water. In addition to that the towns receive water from the existing Baricho wells. The major sources of water are highlighted in the chart below:

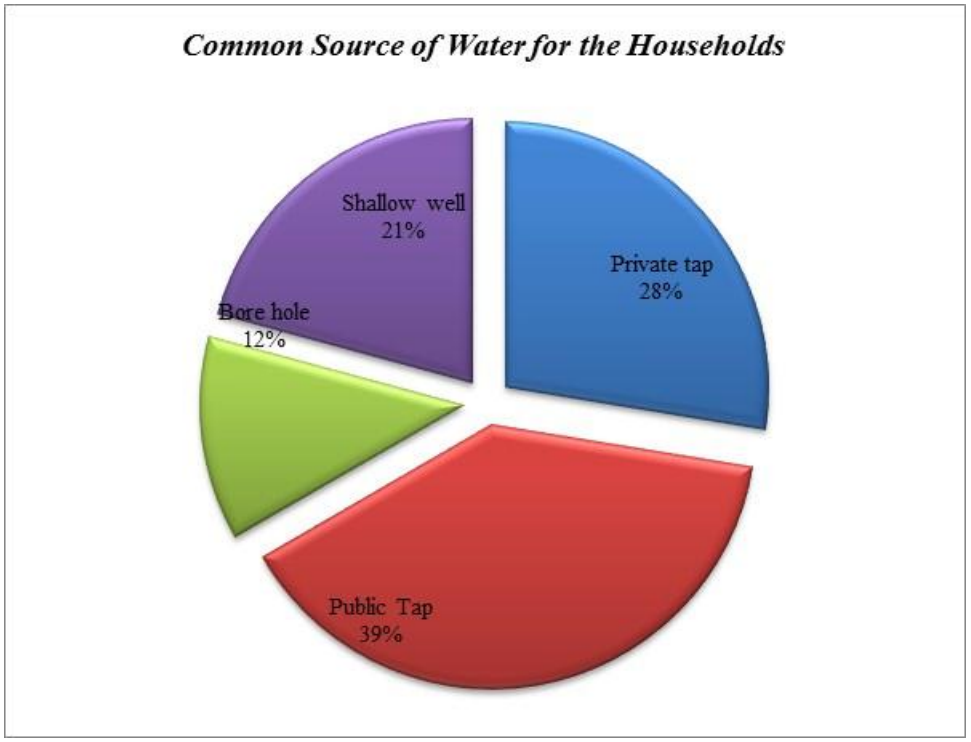


Figure 3-10: Main Sources of Water for the Community

Source: Survey data.

Most of the water sources are either publically or privately owned, with 56% of the water sources owned by public institutions, 34% owned by private, 5% by NGOS, and 5% by faith based institutions.

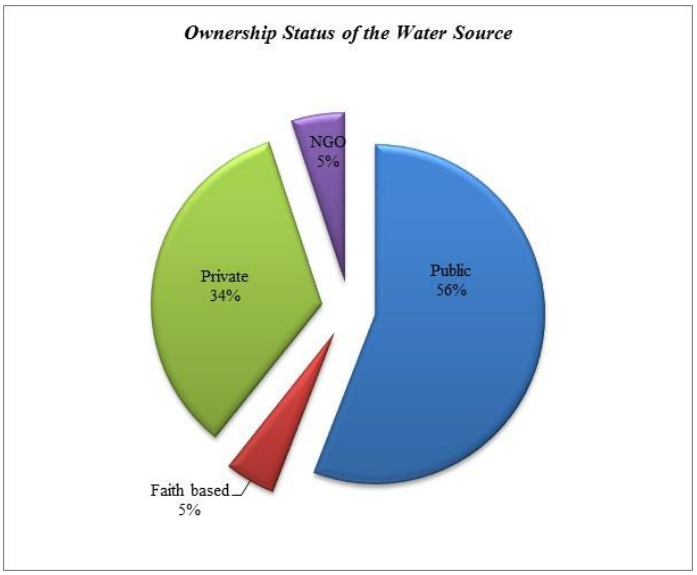


Figure 3-11: Ownership Status of Water Sources

Source: Survey data.

74% of the population pay for water while 26% don't pay for water.

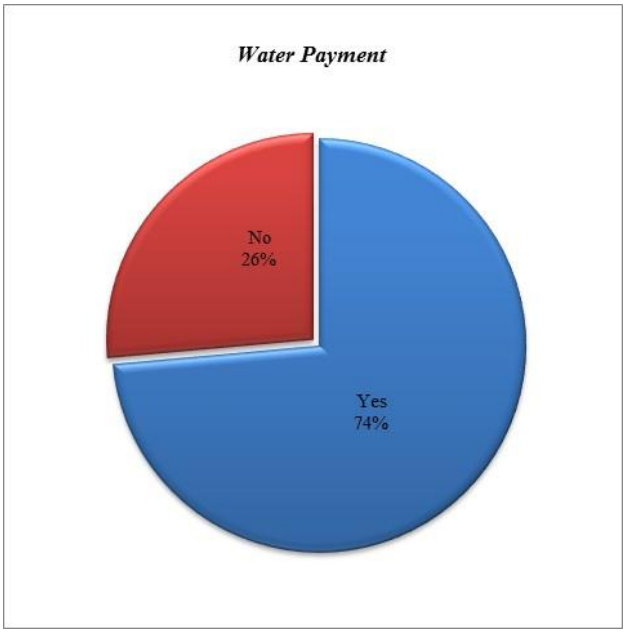


Figure 3-12: Percentage Population Paying for Water

Source: Survey data.

The cost of water varies from K.Shs. 10 and above to K.Shs. 2 depending on the ownership status of the water source. Majority of the population pays between K.Shs. 2 and K.Shs. 5 for a 20 litre jerry can of water. Only 12% and 9% pay K.Shs. 10 and above respectively as shown in the figure below:

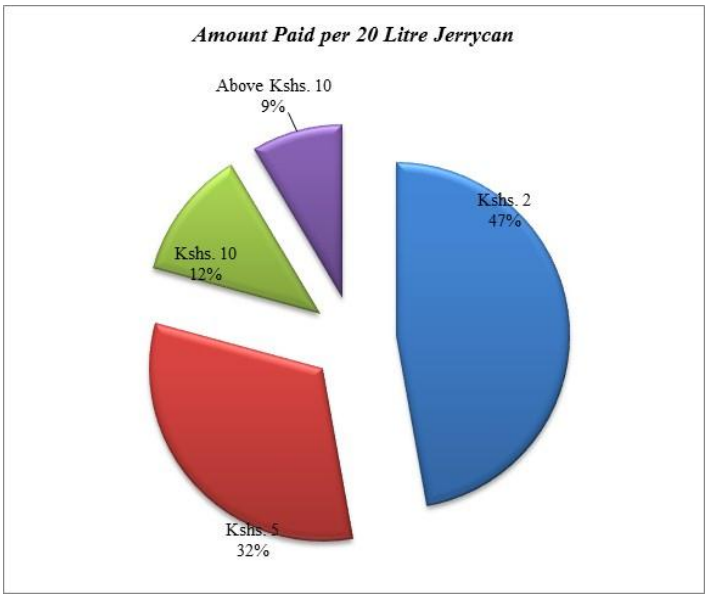


Figure 3-13: Cost of a 20 litre jerry can of Water

Source: Survey data.

The water quality is generally good. 56% of the residents view the water quality as good, 36% as fair and 9% as bad.

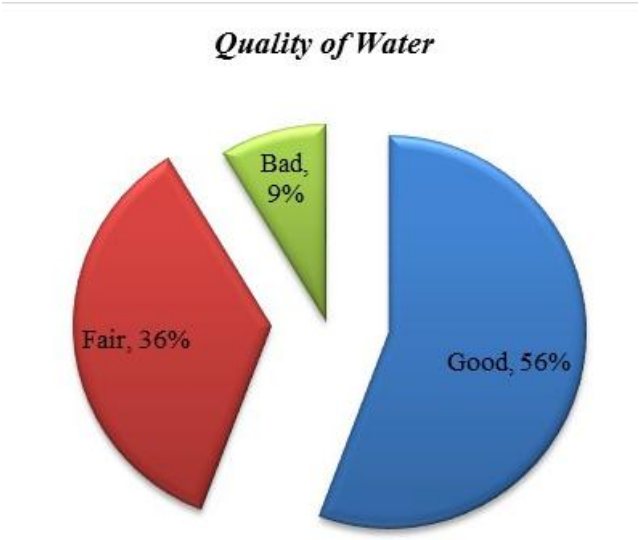


Figure 3-14: General Status of the Water Quality

Source: Survey data.

The opinion of the adequacy of the water supply is almost evenly split between the sample population. With slightly more people stating that the water is inadequate, particularly further away from the centres as shown in the Chart below:

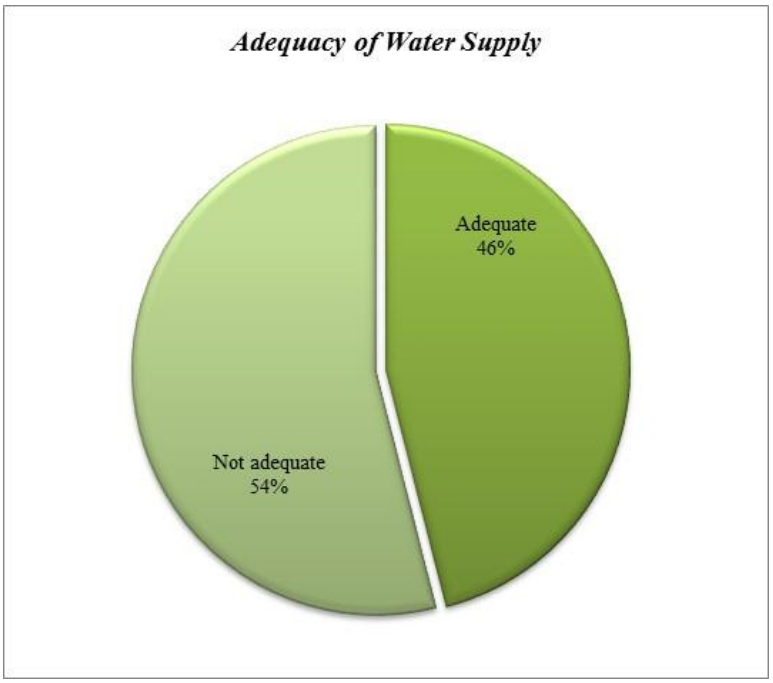


Figure 3-15: Adequacy of the Water Source

Source: Survey data.

The majority of the residents in the area, 84% fetch water every day, 10% of the population fetch water every alternate day of the week and only 6% fetch water weekly.

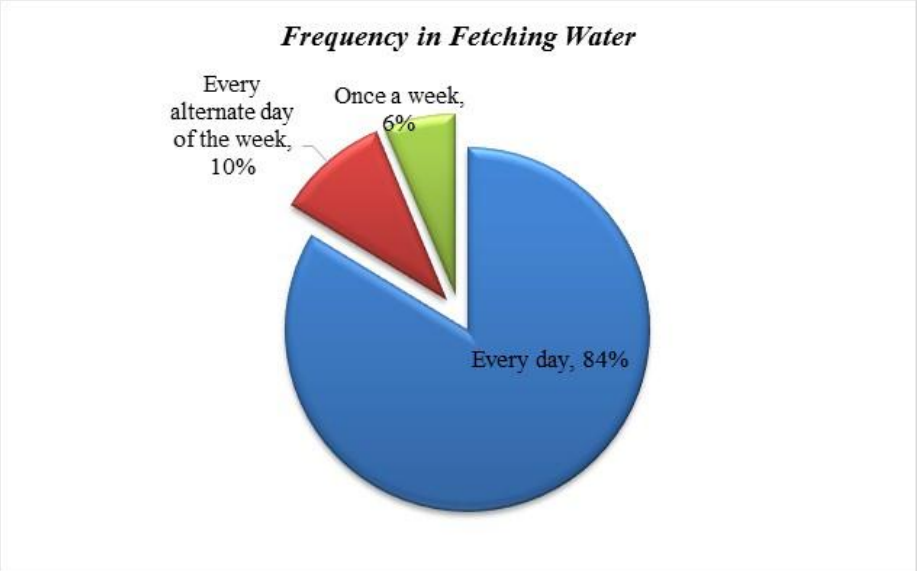


Figure 3-16: Fetching Water Frequency

Source: Survey data.

36% of the population walks for less than 0.2 km to the water sources; 41% walks for 0.2-1 km, 14% walks for 1-2km while 9% walk for more than 2 km to the water source as shown in the figure below.

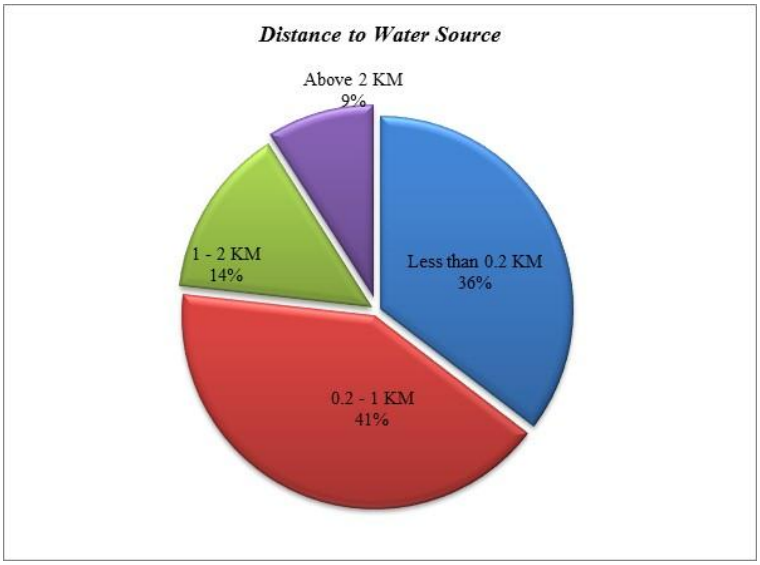


Figure 3-17: Distance to Water Source

Source: Survey data.

The common mode of transporting water is by carrying on the head 68%, use of hand driven carts/wheelbarrow 11%, use of pack animals (donkeys,) 3%, use of bodaboda (bicycle, motorbike) 13% and use of animal drawn carts 6%.

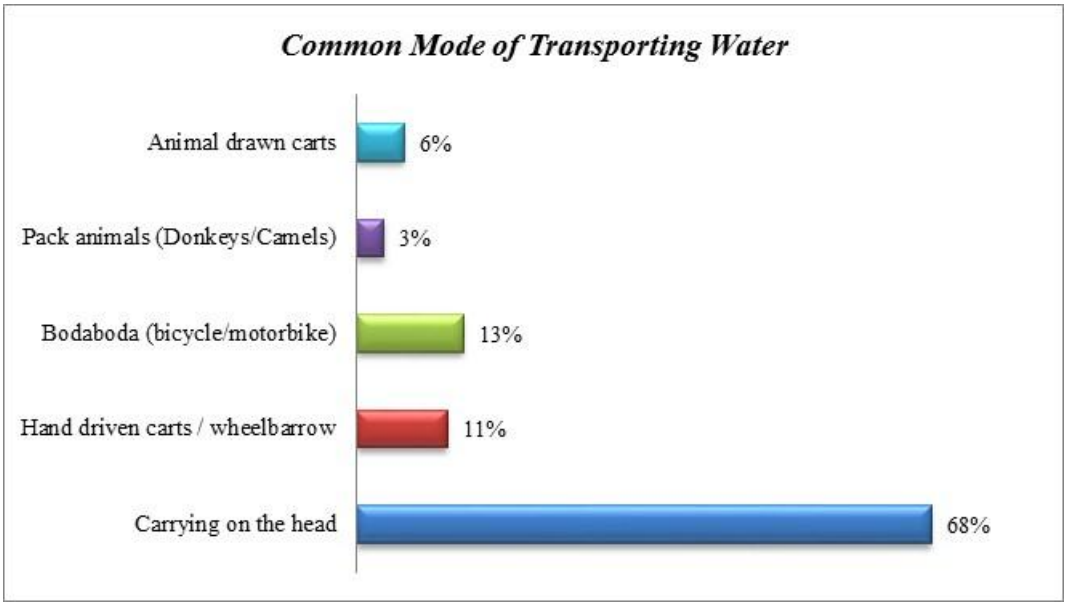


Figure 3-18: Common Modes of Transporting Water

Source: Survey data.

The common challenges faced in transporting water include loss of time 61%, physical fatigue due to long distances travelled to get to the water sources 35% as shown in the figure below.

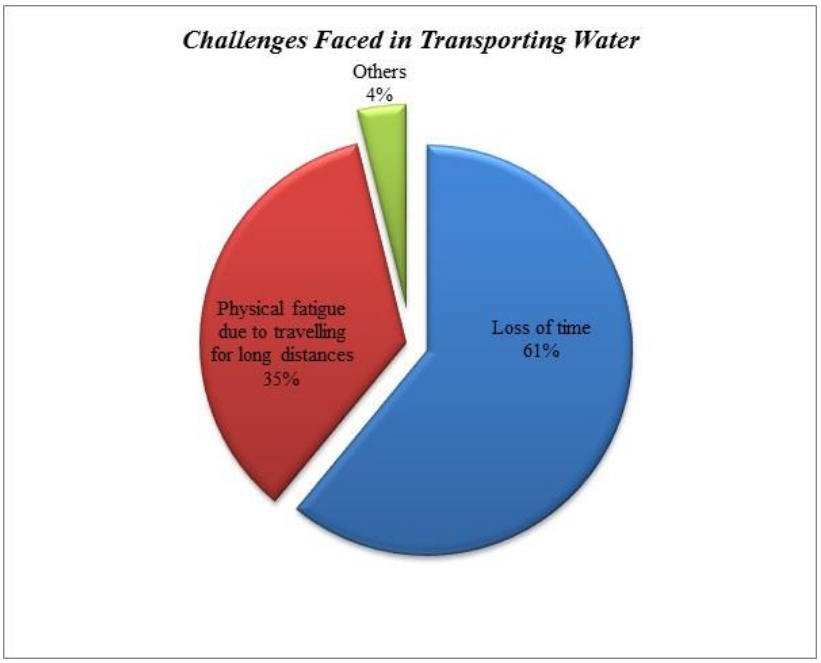


Figure 3-19: Common Modes of Transporting Water

Source: Survey data.

3.1.3 Sanitation

The methods used by the population to dispose refuse are by burning, bury/use compost pit, recycling, dumping in open areas, and collection by the county council as shown in the chart below.

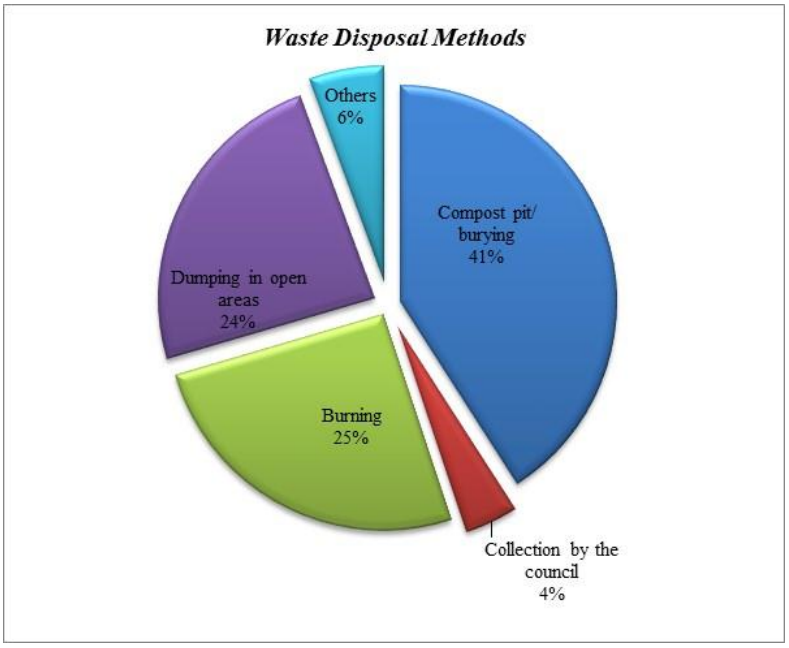


Figure 3-20: Common Waste Disposal Methods

Source: Survey data.

Majority of the Households in the project area (62%) have toilets, the rest of the population, particularly away from the towns and centres do not have toilets. Within the 62% of the households with toilets, majority make use of pit latrines as shown in the figures below:

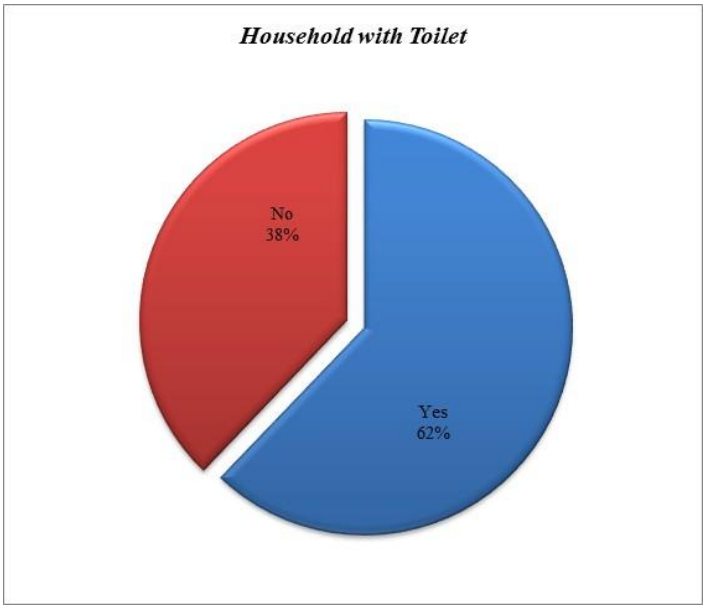


Figure 3-21: Households with Toilets

Source: Survey data.

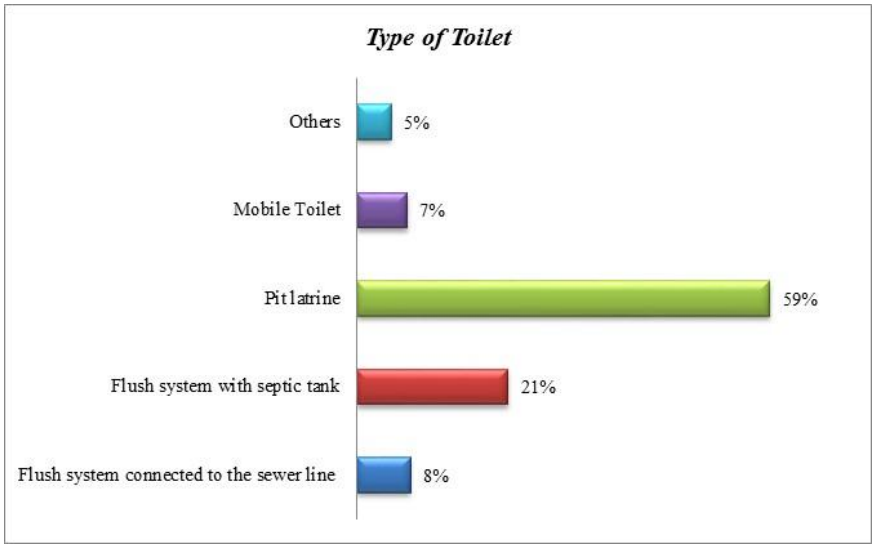


Figure 3-22: Type of Toilets used

Source: Survey data.

3.1.4 Environmental Situation

The environmental concerns in the area include water shortage, mosquitoes and malaria spread, deforestation, drought amongst others as shown in the chart below.

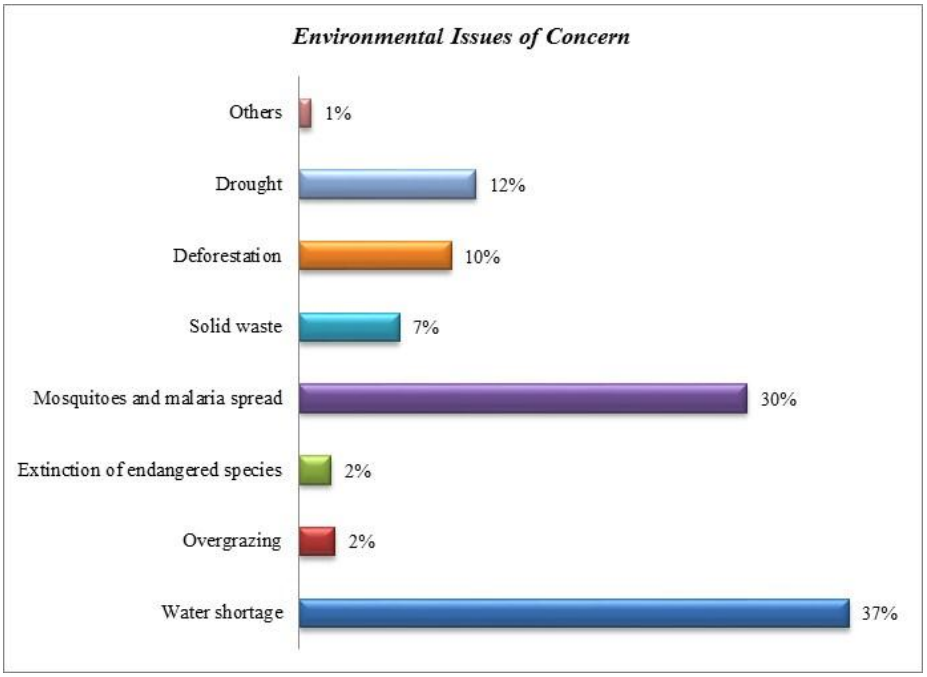


Figure 3-23: Environmental Issues of Concern

Source: Survey data.

There are a number of environmental conservation initiatives in the area such as tree planting, educating the public on environmental conservation, clearing of mosquito breeding sites, and collection of solid wastes, that are carried out by various institutions as shown in the figures below:

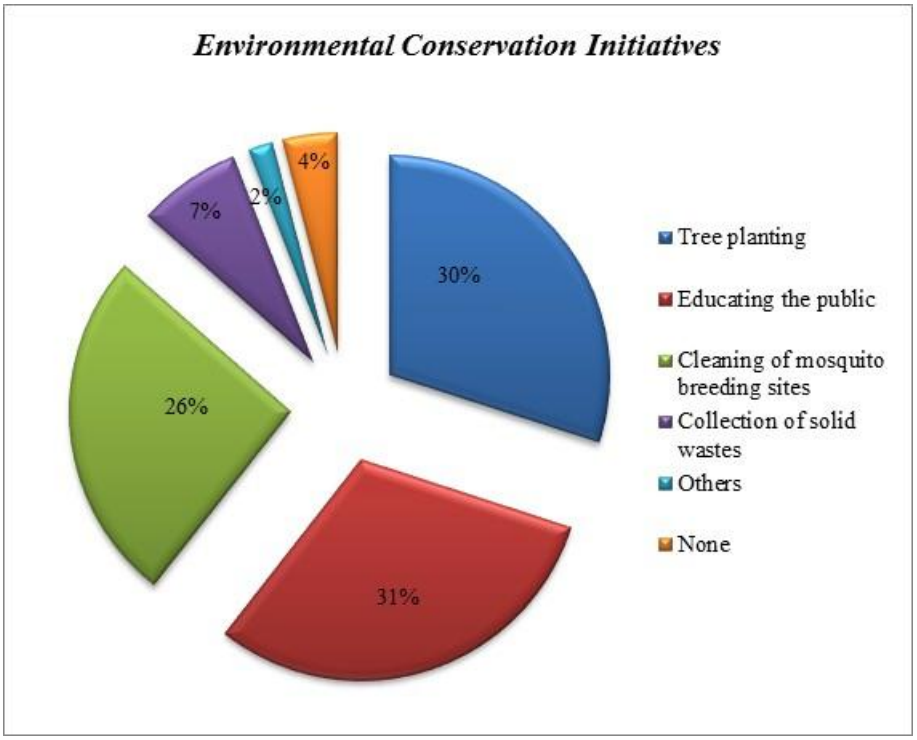


Figure 3-24: Environmental Conservation Initiatives

Source: Survey data.

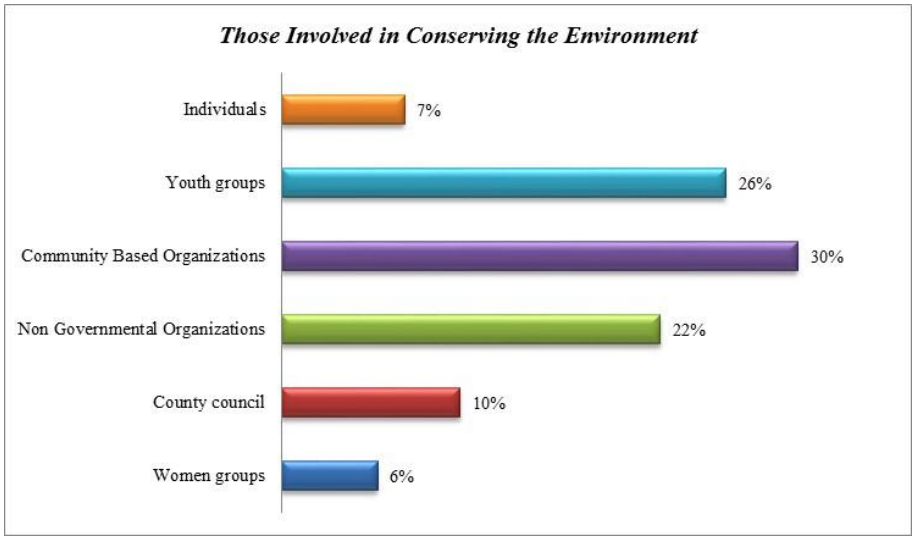


Figure 3-25: Implementers of Environmental Conservation Initiative

Source: Survey data.

95% of the population feels that the project will help conserve the environment through the improvement of the hygiene and hence the improvement of the quality of life of the beneficiaries of the project.

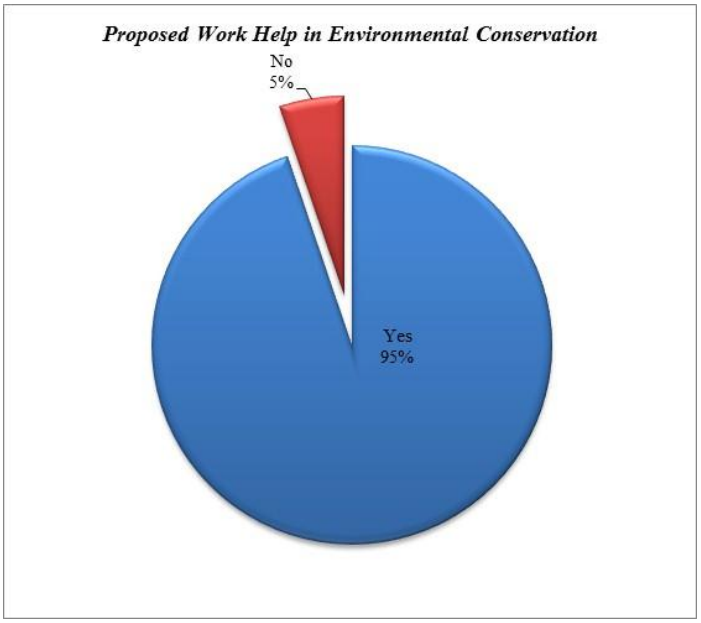


Figure 3-26: Will the Water Supply Project help in conserving the Environment

Source: Survey data.

3.1.5 Health Status

The prevalent diseases in the area are malaria, diarrhea, skin rashes and eye problems, which is an indication of the poor water and sanitation in the area. The disease prevalence is shown in the chart below:

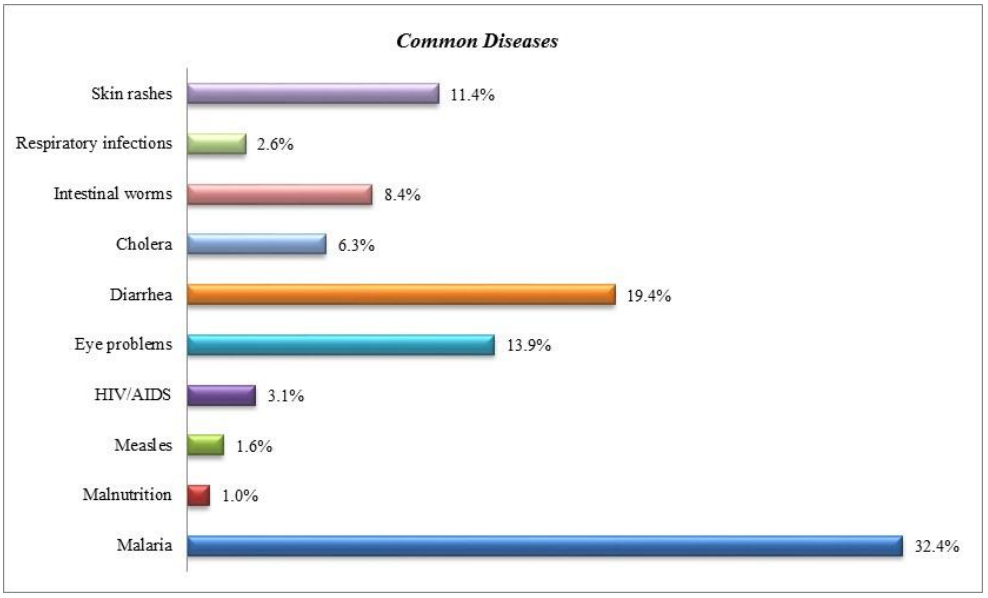


Figure 3-27: Prevalence of Diseases in the Area

Source: Survey data.

Most of the respondents when sick seek medical attention from a health centre, visit a traditional doctor or pray.

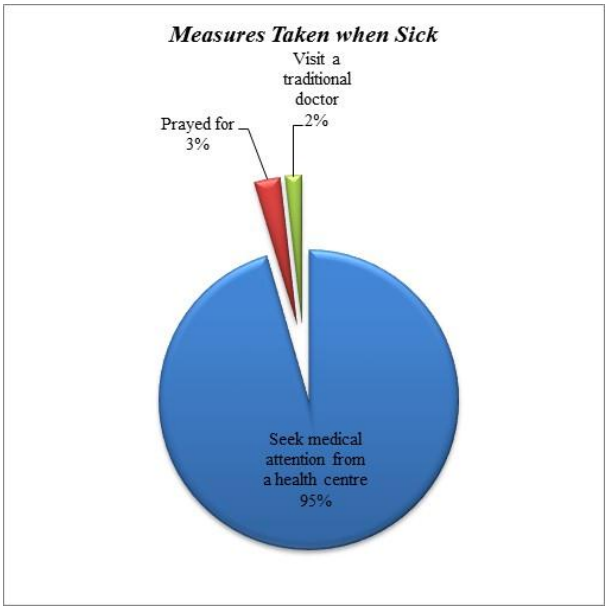


Figure 3-28: Type of Treatment

Source: Survey data.

The health facilities sought by the local population are mainly government health centres and hospitals followed by private institutions. The other health institutions visited by the population are shown in the chart below.

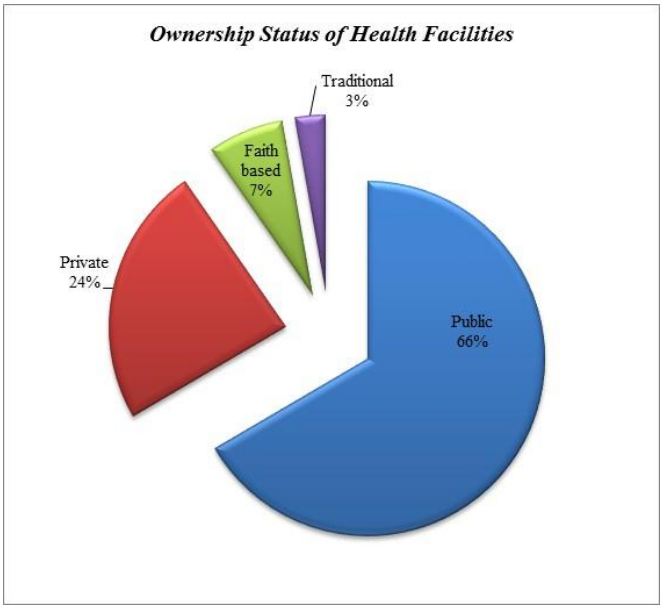


Figure 3-29: Ownership Status of the Health Facilities.

Source: Survey data.

Majority of the health centres are not located far away from the population with about 77% travelling less than 1 Km and 1-3 Km to access health facilities. The distances travelled by the population are shown in the chart below:

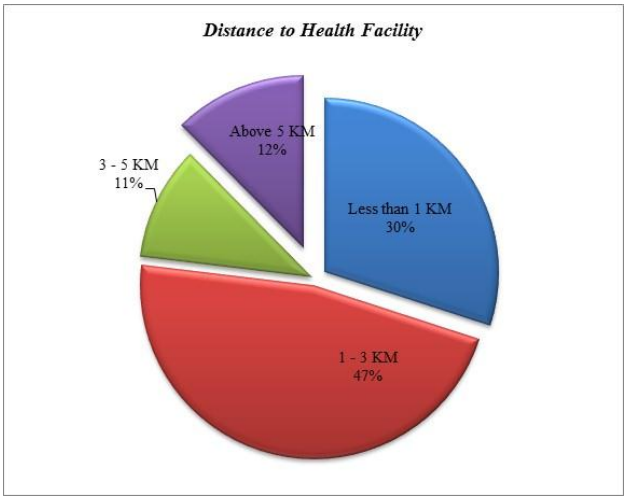


Figure 3-30: Distance to the Health Facilities.

Source: Survey data.

The level of HIV/AIDS awareness is high. 94% of the population is aware of HIV/AIDS.

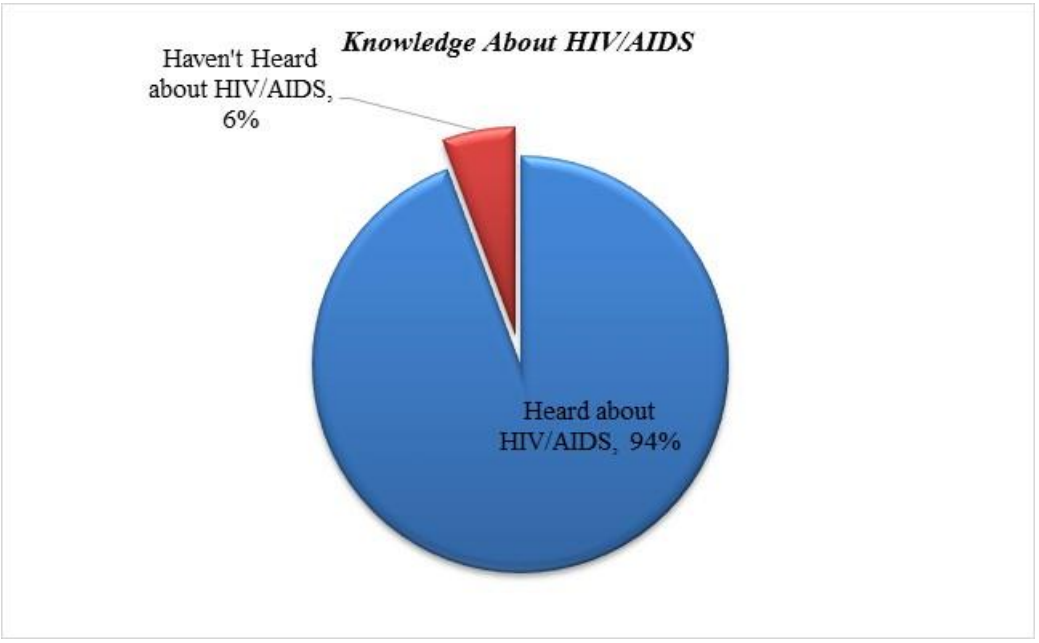


Figure 3-31: Level of Awareness on HIV/AIDS

Source: Survey data.

Information about HIV/AIDS is mainly received from the media, health workers/clinic, relative/friend, and religious leaders as shown in the chart below.

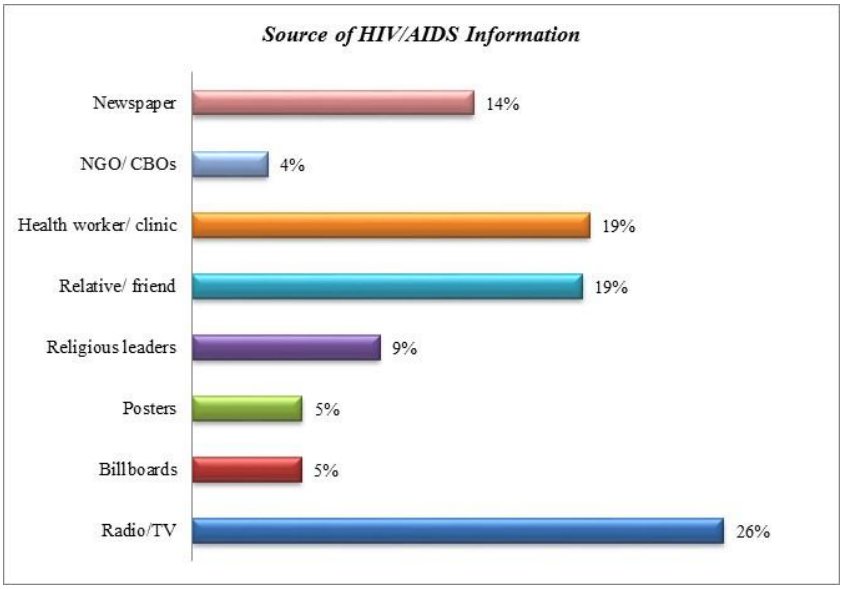


Figure 3-32: Source of information on HIV/AIDS

Source: Survey data.

11% of the respondents are apparently affected by HIV/AIDS.

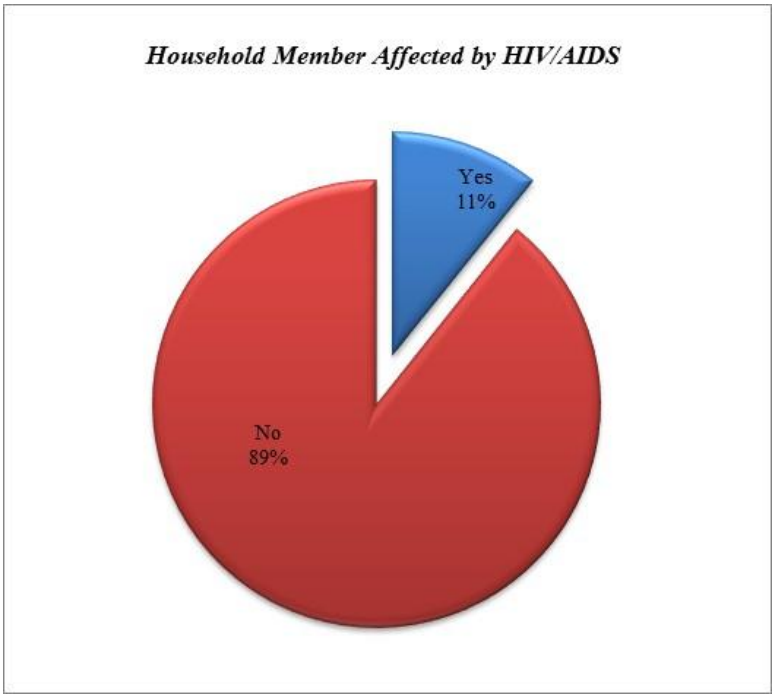


Figure 3-33: Household Members affected by HIV/AIDS

Source: Survey data.

90% of the respondents feel that HIV/AIDS can be prevented while 3% says it cannot be prevented, the rest of the population does not know about the prevention of HIV/AIDS.

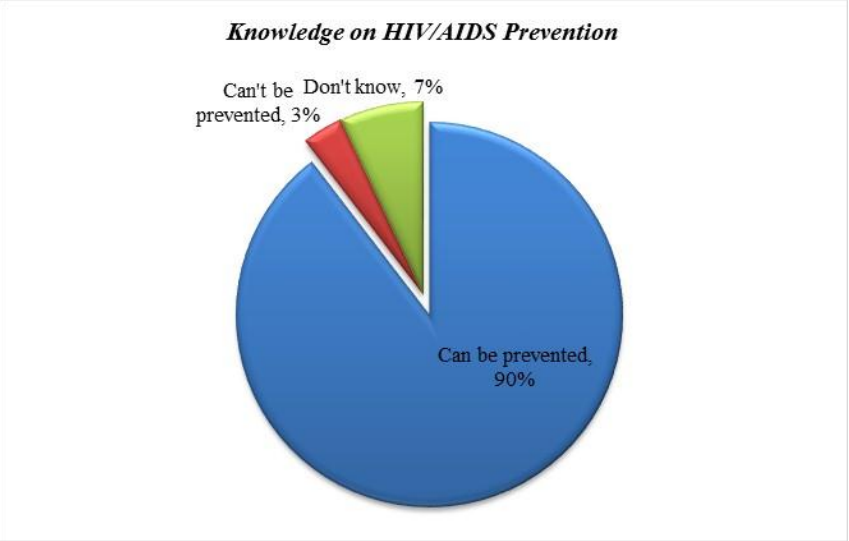


Figure 3-34: Knowledge on whether HIV/AIDS can be prevented

Source: Survey data.

93% of the respondents know where to go for voluntary counselling and testing for HIV/AIDS.

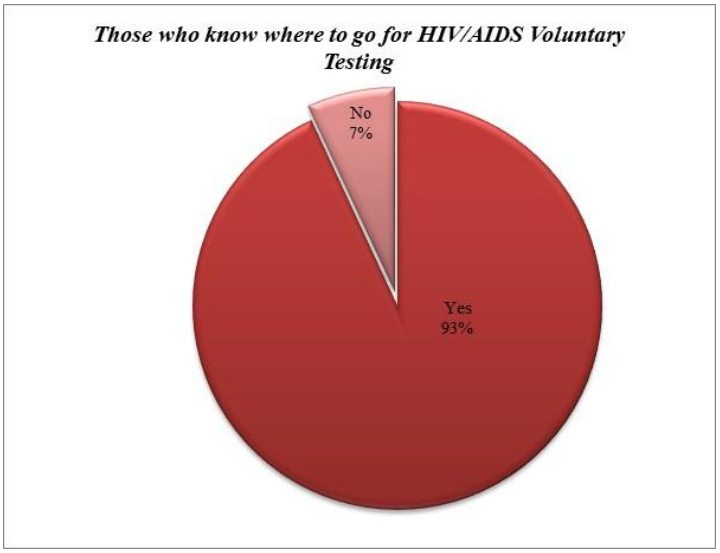


Figure 3-35: Respondents who know where to go to for Voluntary HIV/AIDS Testing

Source: Survey data.

3.1.6 Knowledge and Opinion of the Proposed Project

Majority of the population (77%) are aware of the project to increase water supply to Kilifi, Malindi, Gongoni and Mombasa areas, as shown in the figure below:

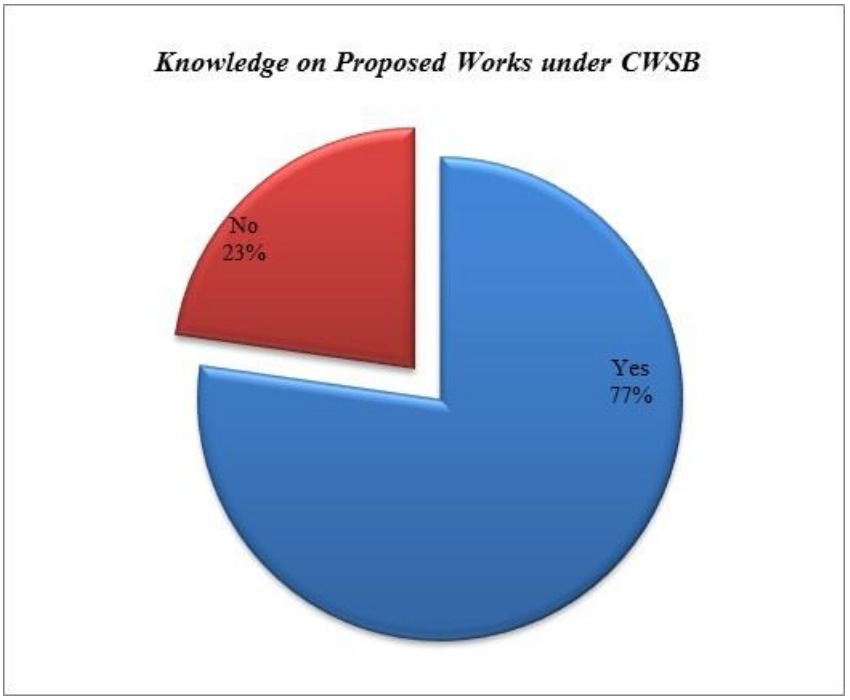


Figure 3-36: Knowledge on the Proposed Project

Source: Survey data.

Based on the knowledge on the project, 77% of the population believe that the project will positively benefit people, the other 23% believe that the project will have adverse effects which are highlighted in the charts below:

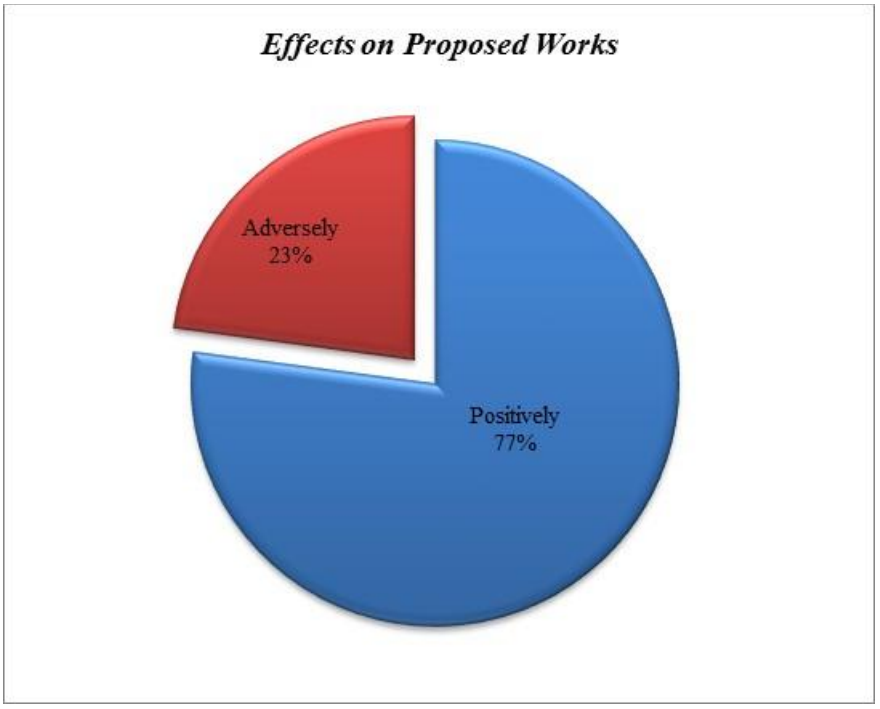


Figure 3-37: Effects of the Proposed Project

Source: Survey data.

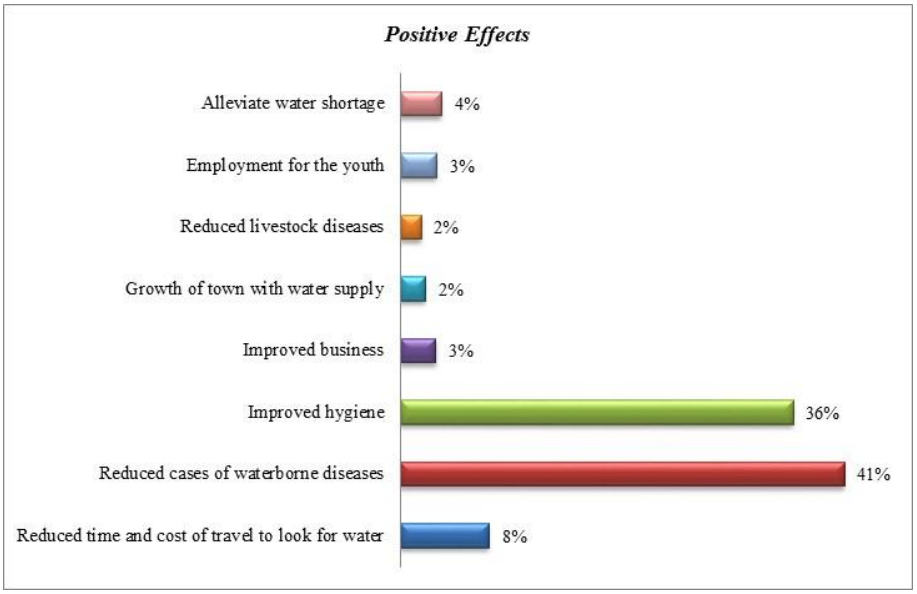


Figure 3-38: Positive Effects of the Project

Source: Survey data.

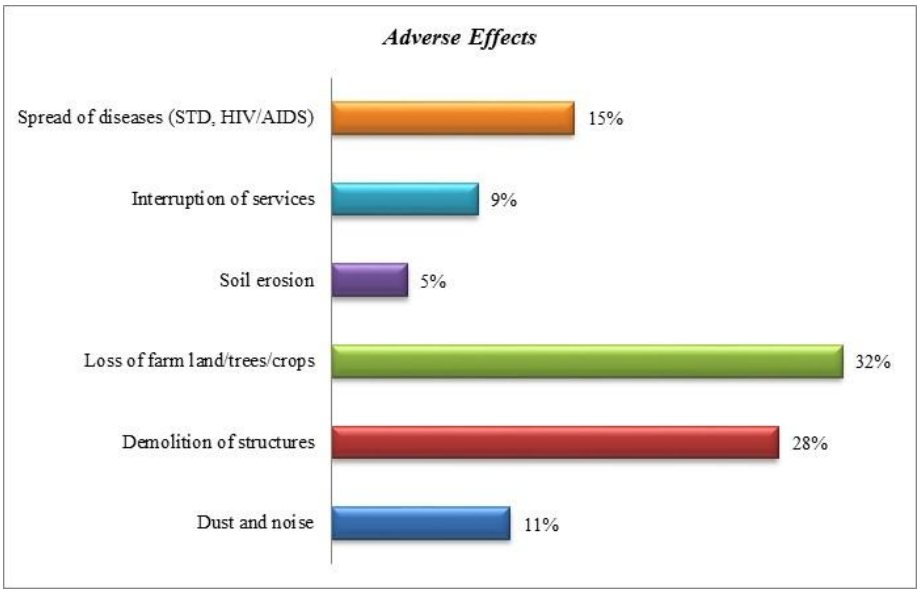


Figure 3-39: Adverse Effects of the Proposed Project

Source: Survey data.

The following suggestions were made in order to mitigate the adverse impacts of the project.

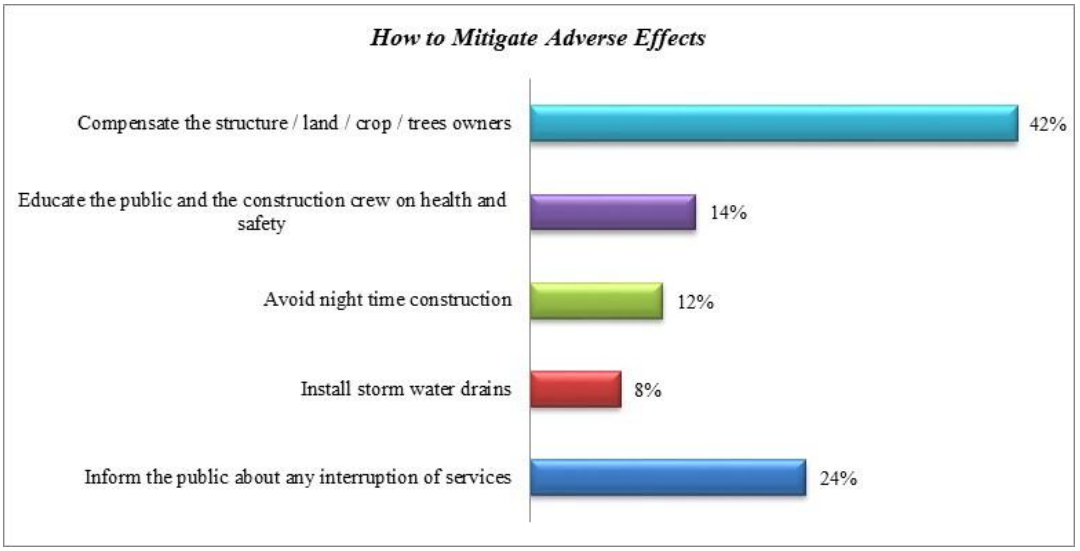


Figure 3-40: Mitigation Measures for the Adverse Impacts

Source: Survey data.

NOTE: For all cases where the percentages add to more than 100, it means that the question put to the respondent could attract more than one answer.

3.2 PHYSIOGRAPHIC AND ENVIRONMENTAL CONDITIONS

3.2.1 Location

The project site is located along the Sabaki River in Lango Baya in Kilifi County at the co-ordinates summarized in the table below:

Table 3-1: Co-ordinates of proposed boreholes

Borehole	X Co-ordinates	Y Co-ordinates
Borehole 9	587879	9655786
Borehole 10	587983	9655761
Borehole 11	588095	9655732

3.2.2 Climate

The pattern of rainfall in the project area is bimodal. The long rains fall from April to June, with a peak in May. The short rains, on the other hand, fall from October to December. The average annual rainfall ranges from 400 mm in the hinterland to 1,200mm at the coastal belt.

3.2.3 Topography

The project area is located within the Coastal region of the Country in particular the foot plateau, characterized by undulating terrain and altitudes between 60 and 135 masl.

The area slopes downwards towards the Indian Ocean.

The project area is also located 50m from the Sabaki River, from where it gets its recharge.

3.2.4 Geology

The area around the Baricho waterworks is situated in Triassic to Lower Jurassic rocks, forming an undulated topography. The Mesozoic sediments belong to the Mazeras formation, consisting of sandstone, siltstones, grits and conglomerates. The Mazeras Formation is overlain unconformably by the Jurassic Kambe Formation, which consists basically of lime-stone. The limestone crops out some 2 km east of the waterworks, where the Sabaki valley becomes narrower. Across the Baricho area, striking from south to north, the Lango-Baya fault separates the Mazeras sandstones to the west from Kambe limestone to the east.

Lower sea levels in the Pleistocene led to the incision of a deep and straight, almost east-west trending valley. The rising sea levels during Holocene caused the infilling of this valley with clastic sediments of 50m or more in the axis of the valley. This elongated quaternary structure is referred to in the literature as paleochannel as shown in the figure below.

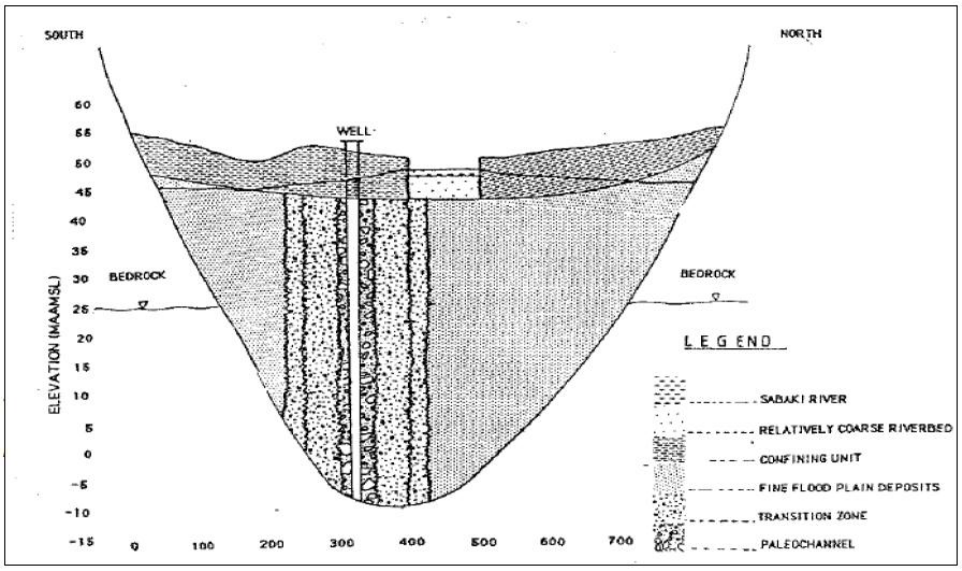


Figure 3-41: Cross-section through the paleochannel near Baricho well field

3.2.5 Hydrogeology

The quaternary paleochannel is filled with coarse sediments that have a substantial groundwater potential. This aquifer is termed as Sabaki Aquifer or Baricho Aquifer. Public water supply of the Coastal Region basically relies on water from this aquifer.

According to different seismic and resistivity sounding surveys performed in the past, the alluvial Baricho Aquifer (paleochannel) extends over 50km west of the Baricho waterworks. The geographical position of the channel axis in the project area is shown in the figure below.

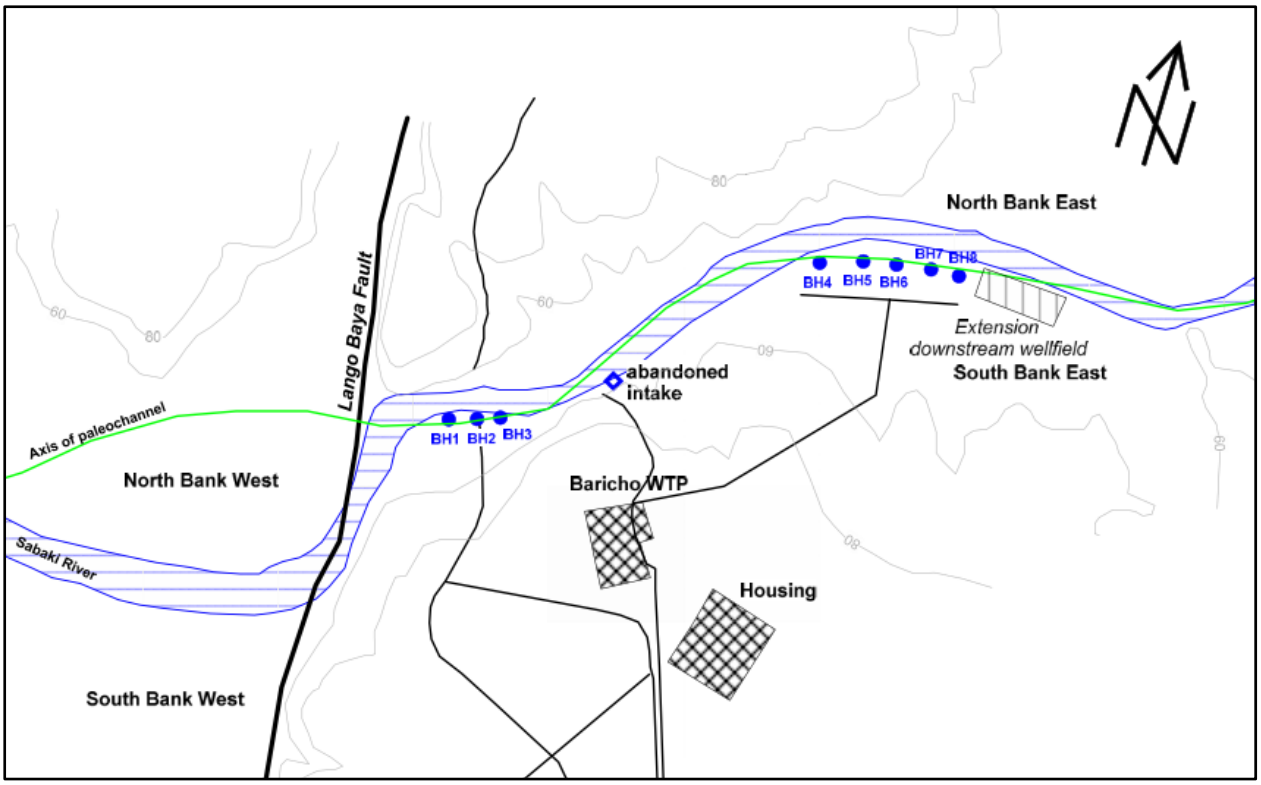


Figure 3-42: Paleochannel and Baricho well field

The aquifer is composed of sands, sandstone, grits and gravels, all intercalated with silts and clay. It is hydraulically connected to the Sabaki River, which is also responsible for almost the complete recharge of the aquifer. Water levels in the aquifer are generally controlled by water levels in the river. The Sabaki River is the second largest permanent river that flows into the Indian Ocean within the country, with a flow range of 200m^3/s in the rainy seasons to 50m^3/s during the dry seasons. The water from the river directly recharges the aquifer throughout the year, and is more than enough to maintain the withdrawal of the existing and proposed well quantities. Various hydrogeological models have been carried out over the years including one carried out by H.P Gauff Consulting Engineers and Fichtner Water and Transportation GmbH, have carried out analysis of the recharge of the aquifer showing that the impacts up to a quantity of 132,000m^3/day will not have a negative impact on the interaction between the aquifer and the river. The only scenario that will be dire is if the Athi River permanently dries up, a situation which is not foreseen.

The Baricho Aquifer is semi-confined to confined, with saturated thicknesses of 50 m or more. The vertical hydraulic conductivities are in the order of 1-5 x 10^{-3}m/s, indicating a good permeability. Of importance to this project is the fact that the aquifer is comprised of a sand layer confined between two impermeable rocks. This sand layer is trapped between the two rock layers and is where the water percolates to and is stored from the River, as such the water within this layer has its sediment removed. The existing setup ensures that there will be no danger of land subsidence due to abstraction of water from the aquifer.

Transmissivities of the aquifer range from 30 x $10^{-3}m^2$/s to over 100 x $10^{-3}m^2$/s along the axis of the paleochannel.

3.2.6 Flora and Fauna

1) Vegetation

The project area is characterized by brush and thicket characteristic of a lowland dry forest in the coastal region. This vegetation zone is mainly cultivated with cashewnuts, mangoes, coconuts and food crops and is mainly grassland. Agriculture does very well in the area due to its proximity to the Sabaki River. The general flora is shown in the figures below:

	
Crops in the project area	Coconut trees in the project area

2) Fauna

The project area is home to various snake species, millipedes and centipedes and lizards.

3.3 SOCIO ECONOMIC INFRASTRUCTURE

3.3.1 Administration

Kilifi County has 6 Sub-Counties namely:

- Kilifi
- Ganze
- Malindi
- Magarini
- Rabai
- Kaloleni

The project area falls within Malindi Sub County in Lango Baya Sub location.

The table below shows the project affected locations and sub-locations indicating their corresponding populations as per the Kenya Population and Housing Census of 2009.

Table 3-2: Administrative data as per Kenya Population and Housing Census 2009 data

Location	**Sub-location**	**Area Km^2**	**Population**
Lango Baya	Lango Baya	141	8,349

3.3.2 Health Facilities

There are medical facilities under the management of the government, religious organizations and private owners well distributed in Lango Baya. Extreme health cases are referred to the Malindi Sub-County hospital.

3.3.3 Transport and Communication

Transport in Kilifi County is composed of road, Water and air. The major road serving the area is the C103 road linking Malindi to Tsavo National Park. The road is of gravel standards and has little traffic. The figure below shows the C103 road.

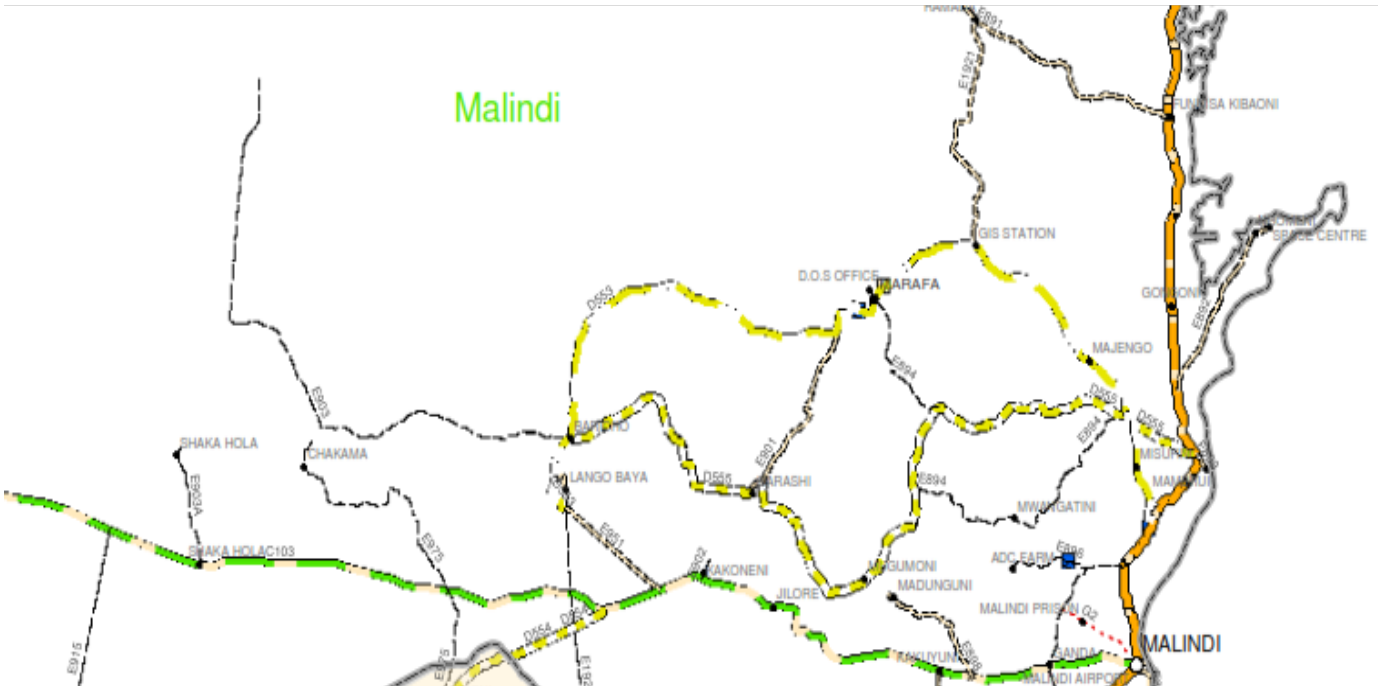


Figure 3-43: Road Network around the Project Area

The mobile network coverage is limited in the project area.

3.3.4 Commerce and Industry

The project area is predominantly agricultural with majority of the population carrying out subsistence farming. Shopping centres are far between. Lango Baya centre has developed as a result of the Baricho works.

Most of the crops grown in the area include, cashew nuts, coconuts, maize, mangoes and cassava. The harvested crops are sold by individual farmers, there are no co-operatives The Figure below shows some of the agricultural activities in the project area.

Figure 3-44: Maize and Coconut farming in the Project Area

3) Trading Centres

The Baricho well field is located within Lango Baya centre, which grew as a result of the water treatment works. Other centres are few and far between.

3.3.5 Land Ownership

The proposed works including the new wells, the new collector and the access roads, will be located adjacent to the downstream wellfield. The proposed new works will require an area of land of 3.63 acres. The land is currently farm land owned by several local farmers.

The land is currently under the Weru Ranch Group, a local group owned and run by the farmers within the project area, with farmers owning their own parcels within the ranch. Over time however some of the members have sold their parcels to other individuals without splitting the titles from the original Weru Ranch Group title. Currently the land is undergoing splitting from the original title with the process of picking and mapping on-going. The affected individuals were identified in the resettlement action plan prepared under a separate report.

4 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 typically referred to as EMCA. EMCA 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. 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 is being undertaken.

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.

4.1 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.

4.2 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:

4.2.1 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:

- 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.

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.

In 2017, NEMA, via press release, announced the scrapping of the 0.1% NEMA license fee for review of EIA report.

4.2.2 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.

The water provided by the water treatment plant should meet the requirements of these regulations. The standard of water is summarized in the table below:

Table 4-1: Water Quality Standards

Parameter	**Guide Value (Max Available)**
pH	6.5 – 8.5
Suspended solids	30 (mg/L)
Nitrate-NO_3	10 (mg/L)
Ammonia –NH_3	0.5 (mg/L)
Nitrite –NO_2	3 (mg/L)
Total Dissolved Solids	1200 (mg/L)
Scientific name (E.coli)	Nil/100 ml
Fluoride	1.5 (mg/L)
Phenols	Nil (mg/L)
Arsenic	0.01 (mg/L)
Cadmium	0.01 (mg/L)
Lead	0.05 (mg/L)
Selenium	0.01 (mg/L)

Parameter	Guide Value (Max Available)
Copper	0.05 (mg/L)
Zinc	1.5 (mg/L)
Alkyl benzyl sulphonates	0.5 (mg/L)
Permanganate value (PV)	1.0 (mg/L)

The water from the wells will have to meet these standards within the treatment works before distribution. The treatment works at Baricho have been designed to meet these standards.

4.2.3 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 phase of the project. During the Construction, the Contractor will have to meet the requirements of the regulations, by providing solid and liquid waste sorting, disposal and transportation using a licensed transporter who will dispose of the solid waste to the designated receptacle.

4.2.4 EMCA (Noise and Excessive Vibration Pollution Control) Regulations, 2009

These Regulations determine the level of noise that will permissible in particular during the construction of pipelines and associated structures, 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 4-2: 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.

4.2.5 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, drills) 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). The Contractor's plant must meet the requirements of these regulations.

4.3 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.

In accordance to Article 152 of the Act, CWSB under whose jurisdiction the project falls, will transition into a Water Works Development Agency. However this transition has not yet occurred, as such the Consultant will still report to the CWSB.

4.4 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 Xll 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.

4.5 THE LAND ACT, NO. 6 OF 2012

Under section 19. (1) The Commission shall make rules and regulations for the sustainable conservation of land based natural resources.

(2) Without limiting what the Commission may prescribe under subsection (1), the rules and regulations may contain;

(a) Measures to protect critical ecosystems and habitats;

(b) Incentives for communities and individuals to invest in income generating natural resource conservation programmes;

(c) Measures to facilitate the access, use and co- management of forests, water and other resources by communities who have customary rights to these recourses;

(d) Procedures for the registration of natural resources in an appropriate register;

(e) Procedures on the involvement of stakeholders in the management and utilization of land-based natural resources; and

(f) Measures to ensure benefit sharing to the affected communities.

4.5.1 Land registration under land act, 2012

Under section 5 (1) of the land act, 2012 there shall be the following forms of land tenure-

(a) Freehold;

(b) Leasehold;

(c) Such forms of partial interest as may be defined under this Act and other law, including but not limited to easements; and

(d) Customary land rights, where consistent with the Constitution.

(2) There shall be equal recognition and enforcement of land rights arising under all tenure systems and non-discrimination in ownership of, and access to land under all tenure systems.

Title to land may be acquired through;

(a) Allocation;

(b) Land adjudication process;

(c) Compulsory acquisition;

(d) Prescription;

(e) Settlement programs;

(f) Transmissions;

(g) Transfers;

(h) long term leases exceeding twenty one years created out of private land; or

(i) Any other manner prescribed in an Act of Parliament.

Under section 8 (a), the Land Commission shall identify public land, prepare and keep a database of all public land, which shall be geo-referenced and authenticated by the statutory body responsible for survey;

(d) May require the land to be used for specified purposes and subject to such conditions, covenants, encumbrances or reservations as are specified in the relevant order or other instrument.

Section 9 (1) states that any land may be converted from one category to another in accordance with the provisions of this Act or any other written law.

(2) Without prejudice to the generality of subsection (1);

(a) Public land may be converted to private land by alienation;

(b) Subject to public needs or in the interest of defense, public safety, public order, public morality, public health, or land use planning, public land may be converted to community land;

(c) Private land may be converted to public land by;

(i) Compulsory acquisition;

(ii) Reversion of leasehold interest to Government after the expiry of a lease; and

(iii) Transfers; or

(iv) Surrender.

(d) Community land may be converted to either private or public land in accordance with the law relating to community land enacted pursuant to Article 63(5) of the Constitution.

(3) Any substantial transaction involving the conversion of public land to private land shall require approval by the National Assembly or county assembly as the case may be.

4.5.2 Way leaves under land act, 2012

Subject to and in accordance with section143 (1) and section 146, the Commission may, create a right of way which shall be known as public right of way.

144.(1) Unless the Commission is proposing on its own motion to create a way leave, an application, for the creation of a way leave , shall be made by any State department, or the county government, or public authority or corporate body, to the Commission.

(2) An application shall be made in the prescribed form and shall be accompanied by any prescribed information or other information that the Commission may, in writing require the applicant to supply and the Commission shall not begin the process of creating a way leave until all prescribed or required information has been submitted to it.

(3) In order to enable a proposed way leave to be created by the Commission of its own motion to comply with the provisions of this section, the Commission shall complete an application form as if it were applying to create a way leave and references to "the applicant" in this Sub-part in relation to an application to create a way leave shall be taken to apply as well to the Commission.

(4) The applicant shall serve a notice on: - (a) all persons occupying land over which the proposed way leave is to be created, including persons occupying land in accordance with customary pastoral rights;

(b) The county government in whose area of jurisdiction land over which the proposed way leave is to be created is located;

(c) All persons in actual occupation of land in an urban and per-urban area over which the proposed way leave is to be created; and

(d) Any other interested person.

(5) The Commission shall publish the application along the route of the proposed way leave calculated to bring the application clearly and in a comprehensible manner to the notice of all persons using land over which the proposed way leave is likely to be created.

A county government, an association, or any group of persons may make an application to the commission for a communal right of way on accordance to section 145 (1).

4.5.3 Land acquisition under land acts 2012

Under section 110 (1) of Land Acts 2012 Land may be acquired compulsorily under this Part if the Commission certifies, in writing, that the land is required for public purposes or in the public interest as related to and necessary for fulfillment of the stated public purpose.

Part 2 of this section states that if, after land has been compulsorily acquired the public purpose or interest justifying the compulsory acquisition fails or ceases, the Commission may offer the original owners or their successors in title pre-emptive rights to re-acquire the land, upon restitution to the acquiring authority the full amount paid as compensation.

Section 111 (1) states that if land is acquired compulsorily under this Act, just compensation shall be paid promptly in full to all persons whose interests in the land have been determined. The commission shall make rules to regulate the assessment of just compensation.

Likewise where land is acquired compulsorily, full compensation shall be paid promptly to all persons affected in accordance to section 113 (1). (2) Subject to Article 40 (2) of the Constitution and section 122 and 128 of this Act, an award-

(a) Shall be final and conclusive evidence of-

- The size of the land to be acquired;
- The value, in the opinion of the Commission, of the land;
- The amount of the compensation payable, whether the persons interested in the land have or have not appeared at the inquiry; and

(b) Shall not be invalidated by reason only of a discrepancy which may thereafter be found to exist between the area specified in the award and the actual area of the land.

Section 124 of the Act allows for the temporary acquisition of land for public purpose or public interest; or for, the possession of the land is necessary in the interests of defense, public safety, public order, public morality, public health, urban planning, or the development or utilization of any property in such manner as to promote the public benefit; for utilization in promotion of the public good for periods not exceeding 5 years. At the expiry of the period, the Commissioner of Land shall vacate the land and undertake to restore the land to the conditions it was before as per section 125. The compensation to be paid under section 120 shall be limited to the damage done to trees, plants, growing crops and permanent improvements on the land,

together with a periodical sum for diminution in the profits of the land and of adjoining land by reason of that use.

148. (1) Subject to the provisions of this section, compensation shall be payable to any person for the use of land, of which the person is in lawful or actual occupation, as a communal right of way and, with respect to a way leave, in addition to any compensation for the use of land for any damage suffered in respect of trees crops and buildings as shall, in cases of private land, be based on the value of the land as determined by a qualified valuer.

(2) Compensation relating to a way leave or communal right of way shall not be paid to a public body unless there is a demonstrable interference of the use of the land by that public body.

(3) Damage caused as a result of the creation of a way leave shall include any preliminary work undertaken in connection with surveying or determining the route of that way leave, and whether the trees, crops or buildings so damaged were included in the route of the way leave as delineated in the order of the Cabinet Secretary.

(4) The duty to pay compensation payable under this section shall lie with the State Department, county government, public authority or corporate body that applied for the public right of way and that duty shall be complied with promptly.

(5) If the person entitled to compensation under this section and the body under a duty to pay that compensation are unable to agree on the amount or method of payment of that compensation or if the person entitled to compensation is dissatisfied with the time taken to pay compensation, to make, negotiate or process an offer of compensation, that person may apply to the Court to determine the amount and method of payment of compensation and the Court in making any award may, make any additional costs and inconvenience incurred by the person entitled to compensation .

(5) The Commission shall make Regulations prescribing the criteria to be applied in the payment of compensation under this section and to give effect to this section.

4.6 THE CONSTITUTION OF KENYA 2010

4.6.1 Environmental obligations and rights

Article 42 states that every person has the right to a clean and healthy environment, which includes the right; (a) to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and

(b) To have obligations relating to the environment fulfilled under Article 70.

Section 43 (d) every person has the right to clean and safe water in adequate quantities;

Under Article 69 (1) The State shall — (a) ensure sustainable exploitation, utilisation, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;

(b) Work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya;

(c) Protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;

(d) Encourage public participation in the management, protection and conservation of the environment;

(e) Protect genetic resources and biological diversity;

(f) Establish systems of environmental impact assessment, environmental audit and monitoring of the environment;

(g) Eliminate processes and activities that are likely to endanger the environment; and

(h) Utilise the environment and natural resources for the benefit of the people of Kenya.

(2) Every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

70. (1) If a person alleges that a right to a clean and healthy environment recognised and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter.

(2) On application under clause (1), the court may make any order, or give any directions, it considers appropriate — (a) to prevent, stop or discontinue any act or omission that is harmful to the environment;

(b) To compel any public officer to take measures to prevent or discontinue any act or omission that is harmful to the environment; or

(c) To provide compensation for any victim of a violation of the right to a clean and healthy environment.

(3) For the purposes of this Article, an applicant does not have to demonstrate that any person has incurred loss or suffered injury.

4.6.2 Classification of land

Under Article 61 (1) all land in Kenya belongs to the people of Kenya collectively as a nation, as communities and as individuals.

(2) Land in Kenya is classified as public, community or private.

62. (1) Public land is (a) land which at the effective date was unalienated government land as defined by an Act of Parliament in force at the effective date;

(b) Land lawfully held, used or occupied by any State organ, except any such land that is occupied by the State organ as lessee under a private lease;

(c) Land transferred to the State by way of sale, reversion or surrender;

(d) Land in respect of which no individual or community ownership can be established by any legal process;

(e) Land in respect of which no heir can be identified by any legal process

(f) All minerals and mineral oils as defined by law;

(g) government forests other than forests to which Article 63 (2)(d) (i) applies, government game reserves, water catchment areas, national parks, government animal sanctuaries, and specially protected areas;

(h) All roads and thoroughfares provided for by an Act of Parliament;

(i) All rivers, lakes and other water bodies as defined by an act of parliament;

(j) The territorial sea, the exclusive economic zone and the sea bed;

(k) The continental shelf;

(l) All land between the high and low water marks;

(m) Any land not classified as private or community land under this Constitution; and

(n) Any other land declared to be public land by an Act of Parliament; (i) in force at the effective date; or (ii) enacted after the effective date.

(4) Public land shall not be disposed of or otherwise used except in terms of an Act of Parliament specifying the nature and terms of that disposal or use.

Section 63 (1) Community land shall vest in and be held by communities identified on the basis of ethnicity, culture or similar community of interest.

(3) Any unregistered community land shall be held in trust by county governments on behalf of the communities for which it is held.

(4) Community land shall not be disposed of or otherwise used except in terms of legislation specifying the nature and extent of the rights of members of each community individually and collectively.

64. Private land consists of; (a) registered land held by any person under any freehold tenure;

(b) Land held by any person under leasehold tenure; and

(c) Any other land declared private land under an Act of Parliament.

4.7 LEGAL FRAMEWORK OF THE GOK IN REGARD TO LAND OWNERSHIP AND TRANSACTIONS

4.7.1 Land Ownership in Kenya

Kenyan law recognises three categories of land in Kenya subsequent to which, basic or radical title vests either in the Government for Government land, registered owners in the case of titles granted by the Government; and in the County councils for both Trust land and registered titles derived from Trust land.

1) Government Owned Land

Land that previously vested in the Regions was relocated to the Government of Kenya in 1964 and this situation continues to this date. Government land includes all un-alienated government land held and occupied by government agencies, territorial sea and sea bed, all public roads whether gazetted or not and land that remained un-adjudicated under the Land Titles Act (Cap.282).

2) Trust Lands

The Kenya Independence Order Council in 1963 provided that all land that was vested in Her Majesty or in the Governor shall be deemed to have vested in the Regions or the Government of Kenya on 12th December 1963. All trust lands are vested in County councils, to hold such land for the benefit of the persons ordinarily resident on that land. Under section 117 of the Constitution, an Act of Parliament may empower a County Council to set apart an area of trust land vested in it for public use and occupation. Thus Local Government Act (Cap. 265) provides for the establishment of local authorities and defines their functions. Local Authorities exist for the purposes of planning for and providing basic social amenities and services including education, health care, roads, sanitation, housing, markets, open spaces, parks etc. The local Authorities as such are vested with authority over trust land for the benefit of their residents. Such land can thus be allocated for occupation as follows:

- For the purposes of prospecting for or the extraction of minerals or mineral oils; or
- By any person or persons who in the opinion of the County council will benefit area residents.

This latter clause is important because it provides for access to land by schemes meant to benefit the public. Transfer of such land either to individuals, institutions or other group is through letters of allotment which must cite the minutes of a full Council meeting which approved the transaction.

3) Private land

Private land is all land with registered title in accordance with any registration statute. Under the National Constitution, all land is vested with the Government and occupants of private land only enjoy usage rights either under lease or freehold arrangements. Section 70 of the Constitution of Kenya recognizes and protects the right to private property including land.

4.7.2 Legal Provision Governing Voluntary Land Transactions in Kenya

Towards safeguarding this unalienable constitutional right, legal provisions on land registration and ownership have been put in place as follows:

1) State-owned land

State owned land is governed by diverse laws depending on the purpose for reservation.

2) The Government Lands Act (Cap.280)

The Act governs the allocation and administration of all Government land both urban and agricultural. State owned land may be allocated free or sold on a commercial basis to individuals or communities by the Minister responsible for land administration. For cases where the state-owned land is being used by the public (for instance as settlements, for farming, for grazing or any other productive activity) the individual or the community would be expected to pay compensation.

3) Forests Act 2005

All state forests in Kenya were gazetted under Cap 383 but are now protected under the Forest Act 2005. The Forest Act allows for several avenues towards accessing and use of forestland:

- Under the Forest Act, a piece of forest land can be de-gazetted and converted to other uses. Forest Act however requires all de-Gazettement of forest land to be discussed and approved by Parliament. All de-gazetted land then reverts to the Commissioner of Lands who then proceeds to allocate in line with the Land Control Act.
- Under the Forest Act 2005, forestland can also be leased for use for other purposes provided that such use does not contradict the purpose for land reservation.
- The same Act also allows for Participatory Management of Forests and thus guarantees communities (under auspices of Community Forest Associations) rights to access and utilize certain forest goods and services including siting of water supply intake works in forest areas. These intake works require that small infrastructure be placed in water courses to allow for abstraction.

4) Wildlife Act Cap 376:

Nature Reserves and National Parks are controlled by the Kenya Wildlife Service under the Wildlife Management and Co-ordination Act of 1976. The common feature with all land reserved for use by wildlife is that its conversion to any other form must be approved by parliament.

5) Museums and National Monuments:

Quite often, sites of historical and cultural importance are gazetted and reserved under the Museums and National Monuments Act. Such land is never available for alternative uses.

6) Riparian Reserves and Water Courses:

All riparian reserves in Kenya governed by the Water Act of 2002 which empowers the Water Resources Management Authority (WRMA) to define, conserve and regulate activity in riparian areas.

7) Road reserves

All road reserves are public land reserved under the Physical Planning Act Cap 286. Road Reserves are unique as public utility lands where all infrastructure lines such as for water supply, power and telecommunication will be found.

8) Trust Lands

Trust land is defined as land held in trust in Part IX of the Constitution and the Trust Land Act (Cap.288). The Trust Lands Act (Cap.285) governs the administration of land as described in section 114 of the Constitution.

9) Private Land:

Transactions in private land in Kenya is regulated under diverse laws namely:

1. Registration of Titles Act (R.T.A):
2. The Land Titles Act (L.T.A): Private land is all land with registered title in accordance with the Land Titles Act (Cap.282).
3. The Registered Land Act (R.L.A) governs registration of title to land, and for regulation of dealings in such land. It provides for private ownership of land by individuals. It should be noted that both individual and corporate persons can hold title under the RLA.
4. The Land Control Act Cap 406: This statute allows for all private land to be adjudicated and registered following which, a title deed is issued to the registered owner. Acquisition of private land is through transfer of the Title Deed either on account of inheritance, purchase or free gift but in all cases, transfers must be registered with the Sub-County Land Registrars following approval by the Land Control Boards

4.7.3 Legal Provision for Involuntary Land Acquisition in Kenya

The Kenyan law has an explicit provision for expropriation of land under any of three categories.

In Kenya, expropriation is provided for in the Constitution under section 75 for private land and sections 117 and 118 for unregistered Trust Land. Section 75(1) provides that the Government can take possession of private land if this is necessary in the interest of town planning among other public interests, or if the development and utilization of the said land is to promote public benefit:

a) The development and utilization of the property will promote public benefit among other things.
b) The necessity for expropriation is great enough to justify any hardship caused to any persons
c) Law for prompt payment of full compensation makes the provision

4.8 THE HIV AND AIDS PREVENTION AND CONTROL ACT

This Act commenced in March of 2009. It 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.

The object and purpose of this Act is to-

(a) Promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS;

(b) Extend to every person suspected or known to be infected with HIV and AIDS full protection of his human rights and civil liberties by-

Prohibiting compulsory HIV testing save as provided in this Act;

Guaranteeing the right to privacy of the individual;

Outlawing discrimination in all its forms and subtleties against persons with or persons perceived or suspected of having HIV and AIDS;

Ensuring the provision of basic health care and social services for persons infected with HIV and AIDS;

(c) Promote utmost safety and universal precautions in practices and procedures that carry the risk of HIV transmission; and

(d) Positively address and seek to eradicate conditions that aggravate the spread of HIV infection.

In this Act, unless the context otherwise requires-

"Acquired Immune Deficiency Syndrome (AIDS)" means a condition characterized by a combination of signs and symptoms, resulting from depletion of the immune system caused by infection with the Human Immuno- Deficiency Virus (HIV);

"anonymous testing" means an HIV testing procedure whereby the person being tested does not reveal his true identity but instead, an identifying number or symbol is used which allows the testing center and the tested person to match the test results with the identifying number or symbol;

"Human Immunodeficiency Virus (HIV)" means the virus which causes AIDS;

"Person with HIV and AIDS" means a person whose HIV test indicates, directly or indirectly, that he is infected with HIV and AIDS;

"Positive", in relation to the result of an HIV test, means a result which shows that the person who is tested is infected with HIV or which shows evidence of such infection;

"Post exposure prophylaxis" means the administration of one or a combination of anti-retroviral drugs after probable exposure to HIV, for the purpose of preventing transmission;

"post-test counseling" refers to the process of providing a person who submitted themselves for an HIV test with risk-reduction information and emotional support at the time the test result is released;

"pre-test counseling" means the process of providing a person, before such person undergoes an HIV test, with information on the biomedical aspects of HIV and AIDS and emotional support with respect to the psychological implications of undergoing an HIV test;

"self-testing" in relation to HIV infection, means a prescribed test or series of tests carried out entirely by a person on self without the involvement of another person, which determine whether a person is infected with HIV;

"Testing center" means a testing center approved by the Minister under section 16;

Part II of the Act stipulates as follows:

4. (1) The Government shall promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS through a comprehensive nationwide educational and information campaign conducted by the Government through its various Ministries, Departments, authorities and other agencies.

(2) The educational and information campaign referred to in subsection (1) shall-

(a) Employ scientifically proven approaches;

(b) Focus on the family as the basic social unit;

(c) Encourage testing of individuals; and

(d) be carried out in schools and other institutions of learning, all prisons, remand homes and other places of confinement, amongst the disciplined forces, at all places of work and in all communities throughout Kenya.

In Part IV - Testing, Screening and Access Health Care Services, it states as follows:-

13. (1) Subject to this Act, no person shall compel another to undergo an HIV test.

(2) Without prejudice to the generality of subsection (1), no person shall compel another to undergo an HIV test as a precondition to, or for continued enjoyment of-

(a) Employment;

(b) Marriage;

(c) Admission into any educational institution;

(d) Entry into or travel out of the country; or

(e) The provision of healthcare, insurance cover or any other service.

(3) Notwithstanding the provisions of subsection (1), a person charged with an offence of a sexual nature under the Sexual Offences Act, 2006 may be compelled to undergo an HIV test.

(4) A person who contravenes any of the provisions of this section commits an offence.

16. (1) No person shall carry out an HIV test except in a testing center approved by the Minister under this section or in the manner specified under paragraph (d) of subsection (4).

(2) No person shall carry out an HIV test unless such person is a healthcare provider approved by the Minister for that purpose.

(3) No person shall provide pre-test or post-test counseling for the purposes of section 17 unless such person is approved by the Minister under this section.

17. (1) Every testing center shall provide pre-test and post-test counseling to a person undergoing an HIV test and any other person likely to be affected by the results of such test.

18. The results of an HIV test shall be confidential and shall only be released-

(a) To the tested person;

(b) In the case of a child, to a parent or legal guardian of such child;

Provided that where any such child consents to an HIV test directly under section 14(1)(b), the results thereof shall be released to the child; or

(c) In the case of a person with a disability which, in the opinion of the medical practitioner undertaking the test, renders him incapable of comprehending such result to-

(i) The guardian of that person;

(ii) A partner of that person;

(iii) A parent of that person; or

(iv) An adult offspring of that person

In Part V – Confidentiality,

(2) No person shall record, collect, transmit or store records, information or forms in respect of HIV tests or related medical assessments of another person otherwise than in accordance with the privacy guidelines prescribed under this section.

22. (1) No person shall disclose any information concerning the result of an HIV test or any related assessments to any other person except-

(a) With the written consent of that person;

(b) If that person has died, with the written consent of that person's partner, personal representative, administrator or executor;

(c) If that person is a child, with the written consent of a parent or legal guardian of that child:

Part VI - Transmission of HIV

24. (1) A person who is and is aware of being infected with HIV or is carrying and is aware of carrying the HIV virus shall-

(a) Take all reasonable measures and precautions to prevent the transmission of HIV to others; and

(b) Inform, in advance, any sexual contact or person with whom needles are shared of that fact.

(2) A person who is and is aware of being infected with HIV or who is carrying and is aware of carrying HIV shall not, knowingly and recklessly, place another person at risk of becoming infected with HIV unless that other person knew that fact and voluntarily accepted the risk of being infected.

(3) A person who contravenes the provisions of subsections (1) or (2) commits an offence and shall be liable upon conviction to a fine not exceeding five hundred thousand shillings or to imprisonment for a term not exceeding seven years, or to both such fine and imprisonment.

(4) A person referred to in subsection (1) or (2) may request any medical practitioner or any person approved by the Minister under section 16 to inform and counsel a sexual contact of the HIV status of that person.

(5) A request under subsection (4) shall be in the prescribed form.

Part VIII - Discriminatory Acts and Policies

31. (1) Subject to subsection (2), no person shall be-

(a) Denied access to any employment for which he is qualified; or

(b) Transferred, denied promotion or have his employment terminated, on the ground only of his actual, perceived or suspected HIV status.

(2) Subsection (1) shall not apply in any case where an employer can prove, on application to the Tribunal that the requirements of the employment in question are that a person be in a particular state of health or medical or clinical condition.

33. (1) A person's freedom of abode, lodging, or travel, within or outside

Kenya shall not be denied or restricted on the grounds only of the person's actual, perceived or suspected HIV status.

(2) No person shall be quarantined, placed in isolation, refused lawful entry or deported from Kenya on the grounds only of the person's actual, perceived or suspected HIV status.

34. No person shall be denied the right to seek an elective or other public office on the grounds only of the person's actual, perceived or suspected HIV status.

35. (1) Subject to this Act, no person shall be compelled to undergo a HIV test or to disclose his HIV status for the purpose only of gaining access to any credit or loan services, medical, accident or life insurance or the extension or continuation of any such services.

(2) Notwithstanding the provisions of subsection (1), an insurer, re-insurer or health maintenance organization shall, in the case of life and healthcare service insurance cover, devise a reasonable limit of cover for which a proposer shall not be required to disclose his or her HIV status.

(3) Where a proposer seeks a cover exceeding the no test limit prescribed under subsection (2) the insurer, reinsurer or health maintenance organization may, subject to this Act, require the proposer to undergo an HIV test.

4.9 NATIONAL LEGAL PROVISIONS ON GENDER

Gender issues in the country are institutionalized through

The current newly enacted Constitution

Vision 2030 Flagship projects

The Presidential Directive of 2006 on 30% women's' appointments to all positions of leadership employment and promotions

MTPs handbook has gender outcome indicators

The National Gender Policy 2000

Sessional Paper No.2 of 2006

Gender Department in the Ministry for Gender Children and Social Development.

The National Commission on Gender and Development enacted through an Act of Parliament in 2003 is mandated to Monitor Government Implementation of its Commitments to Women's Rights and Gender issues

Employment Act, No. 11 of 2007: the Act prohibits discrimination in access to employment and in employment security on the basis of sex, among others

Guarantees equality of opportunity in employment

Provides for equal pay for work of equal value

Prohibits sexual harassment which the law defines to include use of language, whether written or spoken, of a sexual nature

A National Framework on Gender-based Violence. The government through the National Commission on Gender and Development has developed a National Framework on Gender Based Violence (February 2009) to form that basis of investigation of instances of sexual violence and strengthen coordination of responses to stem the vice

Launch of same on 09.11.2009 by Minister for Gender, children and social development

The Sexual Offences Bill

FGM Policy being developed

4.9.1 National Gender and Development Policy (2000)

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).

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.

The Policy's concerns cover the following critical areas

i) The Economy;-To enable men and women to have equal access to economic and employment opportunities.
ii) Poverty and Sustainable Livelihoods; - To remove obstacles to women's access to and control over productive assets, wealth and economic opportunities, shelter, safe drinking water, and promote measures for conserving the environment.
iii) Law; - To guarantee Kenyan men and women equality before the law, as provided for in the Constitution and under the obligations of the Kenyan State in international law.
iv) Political Participation and Decision- Making; - To enhance gender parity in political participation and decision - making
v) Education and Training; - To enhance and sustain measures to eliminate gender disparities in access, retention, transition and performance in education for both boys and girls
vi) Health and Population; - To achieve the highest attainable standard of health for both men and women through addressing gender inequalities pertaining to access and use of basic health services and facilities at an affordable cost.
vii) The Media; - To increase the participation of women in the media and communications sector and promote gender sensitive portrayal of both men and women in the media
viii) Policy Implementation Framework and Resource Mobilisation- empowering both men and women to be equal partners in development- It focuses on the elimination of existing disparities between the two genders. It also advocates for an affirmative action to address gender disparities.

4.9.2 The New Constitution of August 2010 on Gender

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 marginalised 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.

(2) The Commission consists of—

(a) The Speaker of the National Assembly, as chairperson;

(b) A vice-chairperson elected by the Commission from the members appointed under paragraph (c);

(c) Seven members appointed by Parliament from among its members of whom—

(i) 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—

(i) Men and women;

(ii) The members of all ethnic groups; and

(iii) Persons with disabilities.

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

(a) All State organs in both levels of government; and

(b) All State corporations

(3) Parliament shall enact legislation to give full effect to this Article.

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).

4.9.3 The Sexual Offences Act (NO 3 of 2006)

Relevant Sections include:-

24- Sexual offences relating to position of authority and persons in position of trust.

25- Sexual relationship which pre-date position of authority or trust.

26- Deliberate transmission of HIV or any other life threatening sexually transmitted disease.

4.10 THE OCCUPATIONAL HEALTH AND SAFETY ACT, 2007

This is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. The Act has the following functions among others:

Secures safety and health for people legally in all workplaces by minimization of exposure of workers to hazards (gases, fumes & vapours, energies, dangerous machinery/equipment, temperatures, and biological agents) at their workplaces.

Prevents employment of children in workplaces where their safety and health is at risk.

Encourages entrepreneurs to set achievable safety targets for their enterprises.

Promotes reporting of work-place accidents, dangerous occurrences and ill health with a view to finding out their causes and preventing of similar occurrences in future.

Promotes creation of a safety culture at workplaces through education and training in occupational safety and health.

Failure to comply with the OSHA, 2007 attracts penalties of up to KES 300,000 or 3 months jail term or both or penalties of KES 1,000,000 or 12 months jail term or both for cases where death occurs and is in consequence of the employer

4.11 THE COUNTY GOVERNMENTS ACT, 2012

This is an act of Parliament to give effect to Chapter Eleven of the Constitution; to provide for county governments powers, functions and responsibilities to deliver services and for connected purposes

According to section 103 the objectives of county planning shall be to;

(g) Protect the historical and cultural heritage, artefacts and sites within the county; and

(h) Make reservations for public security and other critical national infrastructure and other utilities and services;

(i) work towards the achievement and maintenance of a tree cover of at least ten per cent of the land area of Kenya as provided in Article 69 of the Constitution; and

(j) Develop the human resource capacity of the county.

Under section 104, (1) A county government shall plan for the county and no public funds shall be appropriated outside a planning framework developed by the county executive committee and approved by the county assembly.

(2) The county planning framework shall integrate economic, physical, social, environmental and spatial planning.

(3) The county government shall designate county departments, cities and urban areas, sub-counties and Wards as planning authorities of the county.

(4) To promote public participation, non-state actors shall be incorporated in the planning processes by all authorities.

Under section 111, (1) For each city and municipality there shall be; the

(a) City or municipal land use plans;

(b) City or municipal building and zoning plans;

(c) City or urban area building and zoning plans;

(d) Location of recreational areas and public facilities.

(2) A city or municipal plans shall be the instrument for development facilitation and development control within the respective city or municipality.

(3)A city or municipal plan shall, within a particular city or municipality, provide for;

(a) Functions and principles of land use and building plans;

(b) Location of various types of infrastructure within the city or municipality;

(c) Development control in the city or municipality within the national housing and building code framework.

(4) City or municipal land use and building plans shall be binding on all public entities and private citizens operating within the particular city or municipality.

(5) City or municipal land use and building plans shall be the regulatory instruments for guiding and facilitating development within the particular city or municipality.

(6) Each city or municipal land use and building plan shall be reviewed every five years and the revisions approved by the respective county assemblies.

Under section 115, (1) Public participation in the county planning processes shall be mandatory and be facilitated through;

(b) Provision to the public of clear and unambiguous information on any matter under consideration in the planning process, including;

(i) clear strategic environmental assessments;

(ii) Clear environmental impact assessment reports;

(iii) Expected development outcomes; and

(iv) Development options and their cost implications.

(2) Each county assembly shall develop laws and regulations giving effect to the requirement for effective citizen participation in development planning and performance management within the county and such laws and guidelines shall adhere to minimum national requirements.

This Act identifies the importance on the county government of Kilifi of this project.

4.11.1 The Physical Planning Act (CAP 286) 2010

Under the Physical Planning Act, physical development activities are supposed to be carried out according to the physical plans. The Act provides for the preparation and implementation of physical development plans and for related purposes. It gives provisions for the development of local physical development plan for guiding and coordinating development of infrastructure facilities and services within the area of authority of County, municipal and town council and for specific control of the use and development of land.

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 latter 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 industrial location, dumping site, sewerage treatment, quarries 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".

The site layout plan appended to this report shows the route of the entire project route. The proponent shall secure all mandatory approvals and permits as required by the law.

4.11.2 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 Xll 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.

The Act places responsibility for protection of water supplies from any pollution dangerous to health on the local authorities. The Act empowers the Minister for Health to make rules and impose on local authorities and others, the duty of enforcing such rules.

4.12 NATIONAL POLICY WITH DISTRICT DEVELOPMENT LINKAGES

The consultant takes full cognisance of the various policy papers that have relevance to development in the national space and give them relevance to this particular water infrastructure development activity. Examples of such policy derivations are:

i) National Poverty Eradication Plan 1999-2015
ii) Vision 2030
iii) Private sector development strategy 2006-2010:

4.12.1 National Poverty Eradication Plan (NPEP) 1999-2015

The NPEP has the objective of reducing the incidence of poverty in both rural and urban areas by 50% by the year 2015, as well as strengthening the capabilities of the poor and vulnerable groups to earn income. It also aims to narrow gender and geographical disparities and create a healthy, better-educated and more productive population. This plan has been prepared in line with the goals and commitments of the World Summit for the Social Development (WSSD) of 1995. The plan focuses on the four WSSD themes of the poverty eradication; reduction of unemployment; social integration of the disadvantaged people and the creation of an enabling economic, political, and cultural environment. This plan is to be implemented by the Poverty Eradication Commission (PEC) formed in collaboration with Government Ministries, community based organizations and private sector.

4.12.2 Vision 2030

Vision 2030 is a Government development strategy that is aimed at steering Kenya to a middle income country by the year 2030. It is based on the 3 pillars of political, social and economic advancement and it aims to transform the economy to newly industrialized status by 2030 and achieve sustainable growth. Environmental considerations of development are contained within the social and economic pillar. On poverty reduction, the vision aims at creating opportunities for the poor by making institutions stronger.

4.12.3 Private sector development strategy 2006-2010

The strategy focuses on improving Kenya's business environment, institutional transformation, trade expansion, improved productivity and support to entrepreneurship and indigenous enterprise development. One of the key factors for the improvement of productivity is the adoption of modern, appropriate technologies.

4.12.4 Kenya National HIV/AIDS Strategic Plan, KNASP 2005/06-2009/10

The plan is linked with the National Development Plan and the National Poverty Eradication Plan 1999 – 2015. The overarching theme is Social Change to reduce HIV/AIDS and Poverty. The goal of the KNASP 2005/06-2009/10 is to reduce the spread of HIV, improve the quality of life of those infected and affected and mitigate the socio-economic impact of the epidemic at individual, community, sector and national levels. The priority areas for KNASP 2005/06-2009/10 are three-fold:

Priority Area 1: Prevention of new infections

The objective of this priority area is to reduce the number of new HIV infections among both vulnerable groups and the general population

Priority Area 2: Improve the quality of life of people infected and affected by HIV/AIDS

The objective of this priority area is to improve the treatment and care, protection of rights and access to effective services for infected and affected people by HIV/AIDS in Kenya.

Priority Area 3: Mitigation of socio-economic impact

The objective of this priority area is to adapt existing programs and develop innovative responses to reduce the impact of the epidemic on communities, social services and economic productivity.

4.13 WORLD BANK SAFEGUARD POLICIES

4.13.1 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 improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted.

4.13.2 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).

4.13.3 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.

4.13.4 Operational Policy (OP) 4.10 - Indigenous Peoples

This policy contributes to the Bank's mission of poverty reduction and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies, and cultures of Indigenous Peoples. For all projects that are proposed for Bank financing and affect Indigenous peoples the Bank requires the borrower to engage in a process of free, prior, and informed consultation. The provide financing only where free, prior, and informed consultation results in broad community support to the project by the affected Indigenous Peoples. Such Bank-financed projects include measures to (a) avoid potentially adverse effects on the Indigenous Peoples' communities; or (b) when avoidance is not feasible, minimize, mitigate, or compensate for such effects. Bank-financed projects are also designed to ensure that the Indigenous Peoples receive social and economic benefits that are culturally appropriate and gender and inter-generationally inclusive.

4.13.5 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.

Some materials may be discovered during project implementation for which the use of "chance find" procedures will be employed as presented in the ESMMP.

4.13.6 Operational Policy (Op)/Bank Procedure (Bp) 7.50: Projects International Waterways

Waterways may affect the relations between the World Bank and its borrowers, and between riparian states. Therefore, the Bank attaches great importance to the riparian making appropriate agreements or arrangements for the entire waterway, or parts thereof, and stands ready to assist in this regard.

In the absence of such agreements or arrangements, the Bank requires, as a general rule, that the prospective borrower notifies the other riparian of the project. The Policy lays down detailed procedures for the notification requirement, including the role of the Bank in affecting

the notification, period of reply and the procedures in case there is an objection by one of the riparian to the project.

4.13.7 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 CONSULTATIONS – PERSONS, AGENCIES & PUBLIC

5.1 LEGAL REQUIREMENTS

5.1.1 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.

5.1.2 EIA and Audit Regulations

Section 17 of the Environmental (Impact Assessment and Audit) Regulations 2003 states that an EIA Study should "seek the views of persons who may be affected by the project."

5.2 PERSONS OR AGENCIES CONSULTED

The key issues associated with the drilling of the three new boreholes 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 of cultural property and heritage
- Protection and conservation of biodiversity, including endangered species and sensitive ecosystems in modified, natural and critical habitats, and identification of legally protected areas
- 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
- Impacts on indigenous peoples, and their unique cultural systems and values
- 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 Lango Baya location as indicated by the following consultation registers in tables 5-1.

Table 5-1: Persons met during the ESIA study in planning the Proposed Water Supply Project

No.	Name	Office	Designation	Contacts
1	Eng. Tsuma	CWSB	Engineer in Charge of Baricho Water Treatment Plant	+254721545497
2	Stephen Gunga	Ministry of Interior and Co-ordination of National Government	Assistant Chief Lango Baya Sub-Location	+254729393414
3	James Taari	Ministry of Interior and Co-ordination of National Government	Assistant County Commissioner (ACC) Lango Baya Division	+254720832441 or +254735162324

5.2.1 Overview from the Engineer in charge at Baricho Water Treatment Works on 19/06/2015

The Engineer welcomed the team to the Baricho Treatment works and proceeded to give the team an overview of the project as well as provide a key informant interview on the environmental and social issues affecting the community, what is and can be done to mitigate the issues.

Current Operations in the Treatment Works

The Water Treatment Plant currently provides water to Mombasa, Kilifi, Malindi, Watamu and their environs. However the water supply needs to be augmented as such the proposal for the additional wells. He added that the locals in Lango Baya had water supply from the treatment works, the centres along the pipelines also had off takes for water provision.

Environmental and Social Impact of the Project

The Engineer stated that the major impact of the project would be land take and loss of flora and fauna, since the proposed site for the boreholes was out of the CWSB's land. He added that the land owners would have to be identified to facilitate negotiations.

5.2.2 Overview from the Lango Baya Assistant Chief on 19/07/15

The Assistant Chief welcomed the team to Lango Baya, he then assured the team that he would assist in any way he could to ensure the successful implementation of the project. He further added that he did not foresee any impediments to the project just ensuring open channels of communication between CWSB and the stakeholders was maintained.

5.2.3 Overview from the Assistant County Commissioner Lango Baya Division on 22/10/2015

The ACC invited the team to Lango Baya and stated that he and his team were in full support of the project and were willing to assist in any way they could.

He further added that the project area in particular was mainly farmland and did not anticipate any permanent displacement of PAPs. There would only be the loss of agricultural land, a few structures, some fences and trees and crops.

He also pointed out that the land in question, like most land in the coastal region, had two types of owners. He stated that the land had title deeds, however these titles were under a ranch called Weru Ranch. He added that the land was undergoing adjudication, with the land originally under Weru Ranch, which is still in possession of the title deeds. However the land is now under individual farmers who have not yet gotten the individual titles. He advised the Consultant to consider the land owners without titles.

5.3 PUBLIC CONSULTATIONS

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 various stakeholders. The Consultant held a meeting on 3rd June 2016 at the chief's office in Lango Baya. Minutes, photos and an attendance sheet of the meeting are presented in appendix 12.2. In addition to the public consultation, the Consultant carried out ad hoc interviews of locals. Their views included:

i. Mr. Kazungu Fondo: The respondent was happy that the Client had taken the initiative to talk to the PAPs. He stated that majority of the PAPs in the project area used the land for agricultural purposes, with the farmers preferring to live on higher ground in case of flooding. He added that they would be willing to move elsewhere if compensated to do so.
ii. Mr. Joseph Yaa Yeri: The respondent stated that they were in the know on the expansion of the project and would be willing to move his farmland to another area if he was facilitated to do so.

5.3.1 Findings of the meetings

The Consultant explained the various impacts associated with the project, throughout the project duration (planning, construction, operation and decommissioning), including displacement of PAPs and loss of farmland. Fortunately the Consultant explained, all of the PAPs only owned farmland in the proposed project area, as such there would be no permanent relocation of PAPs due to the loss of a home.

Being a public consultation meeting, feedback from the stakeholders was obtained with majority of the stakeholders approving of the project however requesting that their preference to seek local labor be met before the implementation of the project. In addition, the consultant registered the proposal by the PAPs on the inadequacy of the compensation package for forwarding to CWSB. The meeting was successful, with the public accepting the project.

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6 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 (e.g. drilling of the wells, placement of casings, water tests, etc.).

In general, successful implementation of the project will have high socio and economic benefits to the people and will contribute to the health and wellbeing. Overall, expected negative impacts are related to the borehole drilling and associated works such as installation of casings, water tests and pumping. 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 drilling and construction works are limited to short working sections, and that works are carried out rapidly and efficiently. Table 6.1 presents a characterisation of expected impacts.

Table 6-1: 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**
Ambient Air Quality	Increased local pollutant emissions and trace constituents such as VOCs Increased GHG emissions such as CH_4 and CO_2		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 groundwater from oil spills during construction	X	X				X	X		
	Surface water pollution from construction wastes	X	X				X	X		
Noise and vibrations	Increase of noise and vibration levels due to construction activities		X	X		X			X	
Health & Safety	General construction related health and safety risks for workers		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
	Risk of diseases transmissions and snake bites									
Socio-economics	Employment and job creation during construction phases	X		X		X	X	X	X	
solid and liquid waste	generation of both solid and liquid waste at the construction site and camps		X	X		X	X	X	X	
Resettlement issues	loss of livelihood demolition of structures Loss of farm land and trees		X	X				X		X

6.1 IMPACT CATEGORIES

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.

6.2 IMPACTS EMANATING FROM THE PROPOSED BOREHOLES

The impacts are identified at three stages:-

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

6.2.1 Planning Phase Impacts

This will mainly be the acquisition of land for the boreholes, access road and collector. The boreholes will be located on private land and will have to be acquired. The other features that may be affected include:

i. Structures within the required land parcel
ii. Trees and crops within the required land.

Mitigation Measures
Project affected persons to be identified by type of loss through a detailed resettlement action plan. The affected persons to be compensated for loss of houses and ancillary buildings, land, trees, livelihood productivity, and land improvements CWSB to agree with the local community on the form of compensation for loss of land, structures, trees, crops and livelihood. Once the community is fully compensated the contractor may move to site On construction completion, access routes will be reinstated to their pre-project conditions for both people and animals. The mitigation measures for social impacts are to ensure that the affected persons' livelihood is at least maintained after implementation of the project.

6.2.2 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) Soil-Related Impacts

All construction activities have some minor impacts on the soil. However, these are localised and restricted locally to the borehole drill site and trenches for the collector pipes. 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, piling of soil near the borehole sites and trenches, improper replacement of soil to its original position, mixing of layers and compaction thus reducing the ecological function of the soil.

Mitigation Measures
The valuable top soil containing organic material, nutrients as well as seeds and the soil fauna would be excavated separately and piled in an adequate manner for re-use. In cases where it is identified that during drilling there is a danger of increased run-off or erosion, temporary drainage channels or holding ponds can be employed After completion of the boreholes, immediate restoration spreading piled top soil and by sowing adequate grass cover and planting of trees will be followed where vegetation has been removed, therefore the impact is temporary and reversible. Plan emergency response measures in case of accidental oil spills.

2) *Impact on Water Resources*

Potential environmental impacts associated with water resources include sedimentation, foreign material spills, pollution slumping, disturbance to drainage and removal of vegetation. Vegetation and solid waste, if allowed to accumulate in water ways, may cause localised pooling and flooding.

Improper handling of construction wastes and increased waste water generation may cause pollution of the existing water sources, the Sabaki River in particular.

Mitigation Measures
• Construction materials and other debris (mud from the drill, grout, etc.) shall be prevented from entering the River. • Proper handling of waste from the site through placement of bins and proper sanitation facilities • Ensure protection of the riverine ecosystem by proper handling of cement during grout filling.

3) *Social - 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, e.g. plumbers, pipe fitters, 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, farmers will also benefit from higher income levels as they sell their products. New businesses will grow such as food vending to construction workers

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

Mitigation Measures
• Unskilled construction and skilled (if available) labour to be hired from the local population as far as possible to minimise on influx of foreigners into the community. • Use of manual labour during site clearance and trenching 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.

4) *Air Quality*

Construction activities of bush clearing, materials delivery, borehole drilling 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 slightly especially during delivery of raw materials. Vehicular traffic emissions will bring about air pollution by increasing the fossil fuel emissions into the atmosphere.

Mitigation Measures

- Use protective clothing like helmets and dust masks by construction crew.
- All the vehicles and construction machinery should be operated in compliance with relevant vehicle emission standards and with proper maintenance to minimize air pollution.

5) Construction Noise and vibration

Noise and vibration generated during construction by heavy construction machinery, such as drilling rigs 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.

Mitigation Measures

- 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 schools.
- Good maintenance and proper operation of construction machinery to minimise noise generation.

6) Biodiversity and Conservation Impacts

Removal of vegetation as well as trees will lead to loss of plants and animal habitats. The bio-diversity affected includes insects such as butterflies and worms, small mammals, reptiles and birds. Water contamination with will cause high toxicity to plants and animals living in watercourses.

Mitigation Measures

- Re-plant the indigenous vegetation as much as practical once work is completed.
- Spare the vegetation that must not necessarily be removed.
- Sensitise workers and enable them to properly handle hazardous spillages or wastes.

7) Public Health, Safety & HIV & AIDS Impacts

Construction staff and the general public will be exposed to safety hazards arising from construction activities.

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

Construction activities of bush clearing, materials delivery, borehole drilling 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.

The Lango Baya area is home to various species of snakes, which may put the workers at risk due to continuous interaction during the construction period.

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.

In migration of people from different regions may lead to behavioural influences which may increase the spread of diseases such as HIV/AIDS. Improper handling of solid wastes produced during and civil works such as spoil from excavations, scrap metal, mortar, paper, masonry chips and left over food stuff present a public nuisance due to littering or smells from rotting.

Improved clean water supply to the Mombasa, Malindi Kilifi, Malindi and Gongoni, will lead to improved public health and quality of life through reduced risk of waterborne and water-related diseases; and increased public satisfaction.

Mitigation Measures
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. Use of dust masks while working in dusty environment Provide workers with appropriate personal protective equipment (PPE). Provide first aid facilities in case of accidents 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. 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. Work to minimize or altogether eliminate mosquito breeding sites. Provide appropriate human and solid waste disposal facilities All these activities are in accordance with the Occupational Health and Safety Act of 2007

8) Gender Empowerment Impacts

There is need to promote gender equality in all aspects of economic development and more so in construction. Women roles in construction are mainly confined to supply of unskilled labour and vending of foodstuffs to the construction workers. Where available skilled women should be used.

The increase in the distribution of water to the inhabitants will immediately transform their ways of life, especially for women who are the first concerned when it comes to water supplies. Women who are the main economic players will have more time to spend on other economic activities.

Mitigation Measures
Ensure non-discrimination of job opportunities on the basis of gender

6.2.3 Impacts during Operation & Maintenance

During the operation of the constructed water supply project no substantial negative environmental and social impacts and risks are anticipated.

1) Socio - economic potential positive or beneficial impacts

Numerous socio-economic potential positive or beneficial impacts from successful implementation of the project will include:

- Better access to safe drinking water leading to improved standard of living; and changes in exposure to both communicable and non-communicable diseases;
- Improvements in domestic hygiene and a reduction in health risks that were associated with poor water quality or inadequate access to services, as a result of improvements in drinking water quality and its availability;
- The project will contribute to increase in local development and employment as the local population are likely to be employed during the construction phase and after construction due to water related investments;
- Sanitation will also be promoted with its attendant improvement in the health of the people such as reduced incidence of water borne diseases.
- The project is expected to contribute to poor communities well-being associated with improved services, stability, and health.
- Employment creation will be the key positive environment impact as operation and maintenance personnel will be required for the rest of the project life. The availability of water and easy access will trigger other developments and businesses.

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

2) Generation of both solid and liquid waste

The establishment of an adequate water distribution system will be mostly beneficial to the local community, however with the provision of water comes the increase in the generation of solid and liquid waste. Majority of the stakeholders within the project areas, use pit latrines. The rest of the population either uses septic tanks or has no sanitation facilities at all. Mombasa is the only town that is sewered, however people still dispose sewage into the ocean.

Water supply will lead to an increase in the generation of solid and liquid waste and hence lead to the pollution of the aquatic ecosystem in the supply areas.

Mitigation measures:
Provide adequate waste disposal facilities. Ensure collection of all solid waste from generation points, safe transportation to a central point where they are sorted out and safely disposed according to type to protect the environmental resources. Put in place adequate and efficient sanitary facilities for handling liquid waste especially waste water to protect the aquatic ecosystem from pollution. Pit latrines can be used in areas where the other services are not available or feasible.

3) Leaks and burst

During the project duration there may be leaks and bursts caused by various reasons such as excessive pressures, among others

Mitigation measures:
A program of leak detection to be put in place to identify aging casings for replacement to avoid major bursts and frequent repairs.

4) Impact on Water Resources

As mentioned earlier the generated solid and liquid waste from the project area will make itself through its natural water courses, including ground water into the rivers and the ocean. Thus the entire water system and as a result the ecological system will be negatively affected.

Mitigation measures:
- Wastewater will be channeled to the sewerage system if available or constructed septic tanks. Pit latrines can be used where sewerage system is not available or where construction of septic tank is not feasible. - All solid waste will be collected from generation points, safely transported to the central place where it is sorted out by type and then safely disposed according to type.

6.2.4 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.

7 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.

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 7-1: Cost Estimates for Environmental Mitigation

S/No.	Item description	Unit	Quantity	Unit Price (K.Shs.)	Item Cost (K.Shs.)
1	Emergency measures in case of accidental oil spill	LS	1	200,000.00	200,000.00
2	On completion of construction works, reinstatement of ground for vegetation regeneration	Ha	1.5	100,000.00	150,000.00
3	Provide waste collection bins at strategic points and ensure that all solid wastes are transported to a place of safe disposal	No.	50	2000	100,000.00
4	Provide Personal Protective Equipment (PPE) to the construction crew – helmets, overalls, gum boots, earplugs and dust masks.	set	500	3000	1,500,000.00
5	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	5	100,000.00	500,000.00
6	In collaboration with the Ministry of Health provide VCT centres	No.	1	100,000.00	100,000.00
7	Provide condom dispensers at appropriate locations	LS	1	100,000.00	100,000.00

S/No.	Item description	Unit	Quantity	Unit Price (K.Shs.)	Item Cost (K.Shs.)
8	Spraying Mosquito breeding sites	LS	1	100,000.00	100,000.00
9	Provide signage at construction site	LS	1	50,000.00	50,000.00
10	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	300,000.00	300,000.00
11	Environmental supervision, monitoring, and evaluation over a period of 10 calendar month	Months	10	200,000.00	2,000,000.00
12	Provisional sum to be spent as directed by the Engineer on miscellaneous environmental issues like sampling and testing	LS	1	300,000.00	300,000.00
	TOTAL				**5,400,000.00**

8 ENVIRONMENTAL AND SOCIAL MITIGATION AND MANAGEMENT PLAN (ESMMP)

By design, the potential positive impacts of the project can readily be optimised while the potential negative environmental and social impacts are mostly restricted to the planning and construction period. 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.

8.1 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.
- Ensure that social services provide education on appropriate hygienic conditions and water conservation, taking into consideration gender particular roles and responsibilities.
- Carrying out periodic assessment of the borehole, its pump and other components to initiate immediate rehabilitation whenever problems are identified to reduce system leakage and losses.

8.2 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 borehole drilling period and associated works.
- Avoid hampering drainage of surface water and plan for restoration measures after construction.
- Construction activities should be scheduled appropriately to reduce high noise levels particularly at night from noisy activities.
- Avoid areas sensitive to erosion.
- Avoid establishing the access road along steep slopes
- At the end of construction works, level off the soils and facilitate vegetation regeneration.
- Prevention of work place injuries during construction is taken care of by the contractors, e.g. by means of signs, signals, fencing, etc.
- Carry out specific Environmental Assessment and preparation of a hazardous material management plan for handling such materials that will be identified during the construction stage of the Project.
- Employ occupational Safety and Health measures as required by law.

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 8-1: The Proposed Environmental and Social Mitigation and Management Plan (ESMMP)

Environmental / Social Impact	**Mitigation Action Plan**	**Responsibility**
Land Acquisition for borehole and associated works	Identification of affected land and land owners (RAP) and compensation for land at prevailing market rates in the project area	CWSB
Loss of Structures	Identification of affected structures and structure owners (RAP) and compensation for structures at full replacement cost	CWSB
Loss of trees and crops	Identification of affected trees and crops as well as the owners (RAP) and compensation for trees and crops at full replacement cost	CWSB
Loss of livelihoods	Loss of livelihoods to be valued and compensated to ensure that project affected persons (PAPs) continue with their normal lives(or better) as before the project	CWSB
Loss of cultural sites "chance find" included	The affected site to be identified by type, and method of compensation to be determined following local practices.	CWSB
Loss of flora and fauna	Site clearance should be limited to the minimum area required for the execution of the works. The records of the number and tree species cut to be kept. Replanting of indigenous trees after the project is completed. Top soil removed from the borehole should be stockpiled and spread about after completion of work to facilitate regrowth of existing vegetation so as to rehabilitate the ecosystem	Contractor Contractor Supervisor – project Engineer to consult KFS on appropriate replanting seedlings Sub-County Environmental officer
Air pollution	Vehicles and other equipment emissions would be kept to a minimum by servicing and maintaining the equipment to manufacturer's specification. In, addition the contractor to be encouraged to use unleaded and low sulphur content petrol and diesel respectively for all equipment and vehicles	Contractor Supervising Engineer
Noise and Dust	Use protective clothing like helmets and dust masks on construction crew. Avoid night time construction when noise is loudest. Avoid night-time construction using heavy machinery, from 22:00 to 6:00 near residential areas;	Contractor Supervising Engineer

Environmental / Social Impact	**Mitigation Action Plan**	**Responsibility**
	No discretionary use of noisy machinery within 50m of residential areas and other sensitive institutions; Good maintenance and proper operation of construction machinery to minimise noise generation; Installation of temporary sound barriers if necessary.	
Generation of solid and liquid waste	Provide adequate waste disposal facilities. Ensure collection of all solid waste from generation points, safe transportation to a central point where they are sorted out and safely disposed according to type to protect the environmental resources. Put in place adequate and efficient sanitary facilities for handling liquid waste especially waste water to protect the ground water from pollution. Wastewater from residential quarters and offices to be directed to constructed septic tanks for safe handling. Pit latrines can be used in areas where the other services are not available or feasible	Contractor Supervising Engineer
Pollution of water resources	Ensure proper solid and liquid wastes disposal mainly from the construction camps and offices. Ensure proper measures are in place for collection and disposal of spilled oils and lubricants.	Contractor, Supervising Engineer Engineer in charge of Baricho
Health and safety	Provision of Personal Protective Equipment (ear muffs, gloves and helmets) for the construction crew Provide First aid kit and appropriate procedures and safety measures Provide condom dispensers at appropriate locations coupled with awareness campaigns to workers and surrounding communities on HIV/AIDS throughout the construction period	Contractor Supervising Engineer CWSB-Environmental Department

9 ENVIRONMENTAL AND SOCIAL 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 augmentation project. The indicators are selected based on the project and major anticipated impacts.

Table 9-1: Proposed Environmental Monitoring Plan

Area	Environmental Component	Performance Indicators	Monitoring Requirements	Corrective Action
Borehole Sites	Noise	• Number of complaints • Distance from human settlements • Limit of acceptable noise standard issued by NEMA	• Liaise with other stakeholders. • Documentation on complaints about noise	Implement recommendations of ESMP report.
	Air pollution	• Number of complaints on dust nuisance • Distance from human settlements	• Physical inspection • Interview residents including workers • Liaise with other stakeholders	Implement recommendations of ESMP report. Implement recommendations
	Water pollution	• Number of complaints on pollution of water by downstream users • Obstruction of waterways	• Level of complaints • Physical inspection	In case of pollution investigate cause Implement corrective measures
	Occupational Health and Safety	• Healthy and safety awareness among staff • Number of accidents • Number of awareness campaign meetings held • Outpatient attendance register • First aid facilities in place	• Documentation • Interviews with workers and management • Liaise with other stakeholders	Investigate non-compliant issues Implement corrective measures

Area	Environmental Component	Performance Indicators	Monitoring Requirements	Corrective Action
		• Compliance with Occupational Health and Safety Act (OSHA)		
	Solid and liquid wastes	• Presence or absence of scattered litter. • Flow of wastewater on the ground surface • Level of complaints on hygienic conditions and pollution of water sources.	• Physical inspection of site and sanitation facilities • Documentation in grievance register	Implement corrective measures
	Public health and safety	• Prevalence rates of common diseases. • Provision of condoms, contraceptives and mosquito nets. • Conduction of campaign meetings on transmission of diseases like HIV/AIDS and other STDs. • Availability of adequate solid waste bins. • System of safe disposal of both solid and liquid waste in place.	• Physical inspection • Documentation Number of complaints • Interview with residents	Investigate non-compliance and make recommendations Implement recommendations

Area	**Environmental Component**	**Performance Indicators**	**Monitoring Requirements**	**Corrective Action**
		• Availability of first aid facilities. • Outpatient attendance registers. • Compliance with the Health and Safety Act.		
Construction Camp	Solid and liquid wastes	• Presence of scattered litter. • Signs of obstruction of water courses.	• Physical inspection • Number of complaints.	Implement recommendations
	Solid and liquid wastes	• Scattered litter • Signs of obstruction of water ways. • Flow of wastewater on the ground surface. • Provision of sanitary facilities to the construction crews.	• Physical inspection • Number of complaints	Implement recommendations

10 CONCLUSIONS AND RECOMMENDATIONS

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

The implementation of the proposed Water Supply Project has the following benefits:

i) There will be an increased supply of clean water the Mombasa, Malindi, Kilifi and Gongoni areas as well as along the pipeline routes. This will in turn lead to an improvement in the public health of the population due to the reduction of water related ailments.
ii) The water supply to communities through off-takes and pipeline extension will reduce the time required and distance travelled to fetch water. This time so availed can be used in other economic activities thus enhancing the quality of life and living standards in the project areas.
iii) The negative environmental impacts identified are mostly confined to the construction phase of the project. Mitigation measures proposed are adequate and will be monitored and evaluated during project implementation.

The recommendations and issues which will arise from public participation and consultation will be effectively highlighted and incorporated after the said public participation and consultation meetings are held.

The ESIA concludes that the project will have substantial positive environmental benefits. It will supply sufficient potable water to meet projected future demands of domestic and other uses in the project areas.

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.

11 REFERENCES

Republic of Kenya (2004), State of Environment Report, NEMA, Nairobi

Republic of Kenya (2004), District Environment Profile, NEMA, Nairobi

Republic of Kenya, Environmental Management and Coordination Act (EMCA, 1999), Government Printer, Nairobi

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

Republic of Kenya, Water Supply Design Manual (MWI, 2005), 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

12 APPENDICES

12.1 APPENDIX A SURVEY QUESTIONNAIRE

Zamconsult Consulting Engineers

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 Lot 1: Augmentation of Baricho Well Field** 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) 5 – 18yrs..... (3) 19-35yrs..... (4) 36-49yrs.....

(5) 49-65yrs..... (6) Over 65yrs .....

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) 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 how many?

(1) Cow..... (2)Sheep ..... (3)Goats..... (4) Donkeys ..... (5) Others .....

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) .....

Proposed Works Contracts under Coast Water Services Board Page 1

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 Is the water Supply source adequate (Tick)

(1) YES..... (2) NO.....

3.6 How far is this water source in km? .....

(1) Less than 0.2km ..... (2) 0.2 -1km..... (3) 1– 2km ..... (4) Above 2km.....

3.7 What is the ownership status of the water source? (Tick)

(1)Public ..... (2) Faith based ..... (3)Private ..... (4) NGO ..... (5) Other (specify) .....

3.8 Do you pay for water (1) Yes..... (2)No.....

3.9 If yes how much per 20 litre jerrican in Ksh.

(1) Ksh. 2..... (2) Ksh. 5 ..... (3) Ksh. 10..... (4) Above Ksh. 10 .....

3.10 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) .....

3.11 What challenges do you face in transporting water

(1) Loss of time ..... (2) Physical fatigue due to travelling for long distances .....

(3) Others (specify) .....

3.12 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) .....

3.13 Does the household have a toilet?

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

3.14 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) .....

(5)Any other (Specify) .....

3.15 Are you aware of the proposed Works under Coast Water Services Board?

(1) YES ..... (2) NO .....

3.16 How will proposed Works under Coast Water Services Board affect the community here? (Tick)

(1) Positively ..... (2) Adversely (negatively).....

3.17 If positively, in what way? (Tick)

(1) Reduced time and cost of travel to look for water.....

(2) Reduced cases of waterborne diseases..... (3) Improved hygiene.....

(4) Improved business ..... (5) Growth of town with water supply .....

(6) Reduced livestock diseases..... (7) Employment for the youth ..... (8)Alleviate water shortages..... (9) Others (please specify) .....

3.18 If negatively, in what ways? (Tick)

(1) Dust and noise ..... (2) Demolition of structures ..... (3) Loss of farm land/trees/crops ..... (4) Soil erosion ..... (5) Interruption of services (water, electricity, transport) ..... (6) Spread of diseases (STD, HIV/AIDS)..... (7) Others (specify) .....

3.19 What do you think should be done to minimize or mitigate these negative impacts?

(1) Inform the public about any interruption of services .....

(2) Install storm water drains ..... (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 .....

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) 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) 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? .....

12.2 PUBLIC CONSULTATION

12.2.1 Minutes of the Public Consultation Meeting Held at Chief's Office-Lango Baya On 3rd June 2016 at 11.00am

1) *Present*
   - Marion Orina - Zamconsult Consulting Engineers (Consultant)
   - Francis Moturi - Zamconsult Consulting Engineers (Consultant)
   - Jonathan Mwamvula – CWSB representative
   - Stephen Gunga – Assistant Chief Lango Baya
   - General Public

2) *Introductions*

The meeting started at 11.00 am and was chaired by the assistant 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 explained the various impacts associated with the project, throughout the project duration (planning, construction, operation and decommissioning), including displacement of PAPs and loss of farmland. Fortunately the Consultant explained, all of the PAPs only owned farmland in the proposed project area, as such there would be no permanent relocation of PAPs due to the loss of a home. The consultant further explained that the contractor would try as much as possible to stick within the acquired space in order to avoid damage to private property and in case anyone's property would be affected in the construction phase, it would be reinstalled immediately by the contractor. She also explained that an ESIA and RAP activities had been carried out in the area to sensitize the public about the expansion of the Baricho Wells project and now the meeting was being conducted so as to disseminate information on the findings of the ESIA and RAP. 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 fails to adhere with the regulations put in place, they could address their complaints to the resident engineer in place 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.

Q1. Daniel Charo Iha, a PAP stated that the project affected persons to be given a priority in case of any job opportunities associated with the project, before considering other citizens of Lango Baya.

The consultant noted the participant's recommendation and stated that she would forward it to CWSB for implementation.

In addition, the CWSB representative noted that most of the residents of the area were fighting to get jobs but were not keen to keep them pointing out one nearby community project where residents got jobs and were nowhere to be seen after receiving their first pay. The contractor was therefore disappointed by that behaviour making him to consider

outsourcing labour. The CWSB urged those seeking job opportunities in the project should be hardworking and resilient.

Q2. Joseph Kahindi Dzomba, a PAP stated that 3 of his coconuts were not enumerated.

The consultant suggested that the area chief be involved during RAP verification to ascertain the trees were there during the first RAP census.

The area chief added that once the PAPs were compensated, they were not keen to verify if the compensation was done accordingly. He therefore proposed that all individuals with any pending issues to register their complaints with him before the compensation period elapses.

Q3. Charo Iha, a PAP raised several concerns as follows;

i. The proposed land acquired would not be acquired, due to the fact that some pre-construction activities had already negatively affected his parcel of land which was outside of the boundary of the affected land.
ii. Secondly, there were irrigation pipes serving several farms and was damaged during the pre-construction activities, and wanted to know if they would be re-established.

The consultant suggested that they would the notify CWSB to push the contractor to immediately compensate for all the damages incurred as well as move the affected features to a place where they wouldn't interfere with both the construction and the public's way of life.

Q4. Samson Sirya Thoya, a PAP echoed the sentiments of the previous participant adding that the pipe that had been damaged served several farms and affected their source of income. He finally recommended that the locals should be allowed to get access to the river through the proposed fence instead of having to go round to the edge of the fence.

The consultant stated that she would the notify CWSB to push the contractor to compensate immediately all the affected developments before being allowed to carry out the construction activities. The consultant added that they supported the recommendation noting that perhaps the acquired land should have paths at intervals to provide access to the river.

Q5. Thomas Karisa, a PAP observed that the edges of the land taken by coast water was at the same level as his land hence was concerned that his trees and crops shall be affected through flooding and also inquired if the outlet would affect any land.

The consultant stated that she would notify CWSB to instruct the contractor to stay within the boundaries of the site and if in any case they cannot stay there they should compensate as soon as such issues develop. Also, that the contractor shall stay within the acquired land. In addition, the consultant noted that the design of modern projects such as the Baricho Wells catered for drainage hence no incidences of flooding are anticipated.

Q6. Benslason Konde, a PAP suggested that the contractor should use the locals to get a job in the masonry section, and observed that Bi. Silas/Rehema Thoya was old and did not understand the RAP process and as such was being passed by events.

The consultant noted the issue and recommended the issue to be forwarded to the chief, coast water services board and the representative of the PAP all to be involved to ensure that the PAP gets compensated.

The chief added that he his office was always open and would personally look into ensuring that the PAP got compensated.

Q7. Samson Sirya observed that some chambers in the wash-out allowed water to flow resulting into pools and hence affecting the land next to them by making them unconducive for farming.
He also observed that the people were not involved in formulating the compensation formula hence the PAPs are not fully content with the proposed rates.

The CWSB representative noted that the new design catered for all the washout water by directing it to the river. The consultant added by supporting the PAPs recommendation that a drainage system to be constructed to cater for the washout water. In case of any further developments about the issue, the consultant suggested that the residents contact the resident engineer for the issue to be forwarded to CWSB.

Concerning the rates used, the Consultant explained that the rates had been calculated based on the type of crop/tree, its age and a rate from the ministry of agriculture used. She added that the PAPs would receive a disturbance allowance to cater for the loss of revenue from the trees/crops

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 taken into account. The meeting ended at 11.55 am with a word of prayer.

12.2.2 List of Attendance

PUBLIC CONSULTATION ATTENDANCE LIST					
BARICHO 3RD JUNE					
No.	**Name**	**Designation**	**Village**	**Location**	**Phone Number**
1	JONATHAN KAINGO	FARMER	MAMBO SASA	LANGO BAYA	0725321868
2	JAJI CHARO		MAMBO SASA	LANGO BAYA	0708258348
3	DANIEL CHARO IHA	FARMER	LANGO BAYA	LANGO BAYA	0700509619
4	JOSEPH KAHINDI	FARMER	LANGO BAYA	LANGO BAYA	0718891064
5	ONESMUS L. MASHA	FARMER	LANGO BAYA	LANGO BAYA	0717487150
6	HASSAN KAHINDI	FARMER	LANGO BAYA	LANGO BAYA	0710183567
7	SAMSON SIRYA THOYA	FARMER	LANGO BAYA	LANGO BAYA	0713472152
8	DANSON GUNGA CHEA	FARMER	KENYALOMA	LANGO BAYA	0718840599
9	ANDERSON KITHI THOYA	FARMER	KENYALOMA	LANGO BAYA	0700494195
10	BENSLUSONE KONDE TUVA	FARMER	MGANDINI	LANGO BAYA	0728463491
11	KAZUNGU BALOZI MSANZU	FARMER	MAMBO SASA	LANGO BAYA	0727124896
12	KAZUNGO FONDO MWANGURANI	FARMER	MAMBO SASA	LANGO BAYA	
13	CHARO IHA MDZOMBA	FARMER	KENYALOMA	LANGO BAYA	
14	THOMAS KARISA IHA	FARMER	KENYALOMA	LANGO BAYA	0721917403
15	HILLARY MSANZU NDORO	FARMER	KENYALOMA	LANGO BAYA	0715908588
16	THOYA CHEA MSANZU	FARMER	KENYALOMA	LANGO BAYA	0717192717
17	JOSEPH YAA YERI	V.E/FARMER	KENYALOMA	LANGO BAYA	0729164540
18	REHEMA KITSAO SAID	FARMER	MIRIUINI	LANGO BAYA	0714831515
19	CHEA MSANZU	FARMER	KENYALOMA	LANGO BAYA	0705039008
20	JONATHAN MWAVULA	CWSB MANAGER	LANGO BAYA	LANGO BAYA	0721517294

PUBLIC CONSULTATION ATTENDANCE LIST

PROJECT ~~KAKUYUNI~~ BARICHO WELLS
VENUE Assistant Chief's Office - Lango Baya.
DATE 03/06/2016.

No.	Name	Designation	Village	Location	Phone No.	Signature
1	JONATHAN KAINGU	FARMER	MAMBO SASA	LANGO BAYA	0725321868	
2	JOJI CHARO	IHA	MAMBASASA	LANGO BAYA	078258348	
3	DANIEL CHARO IHA	FAMER	LANGOBAYA	LANGOBAYA	0700509619	
4	JOSEPH KAHINDI	FARMER	LANGOBAYA	LANGOBAYA	0718889064	
5	Onesmus L masha	MALE	LANGOBAYA	LANGOBAYA	0717487150	
6	HASSAN KAHINDI	FAMER	LanGoBAYA	LANGOBAYA	0710183567	
7	SAMSON SIRYA THOYA	FARMER.	LANGOBAYA	LANGOBAYA	0713072152	
8	DANSON GUNGA CHEA	FARMER.	KENTALOMA	LANGOBAYA	0718840399	
9	ANDERSON KITIHI THOYA	FARMER	KENYALOMA	LANGOBAYA	0700494195	
10	BENSUSONO KONDE TUVA	FARMER	MGANDINI	LANGOBAYA	0728463491	
11	KAZUNGU BALOZI MSANZU	FARMER	MAMBO SASA	Langobaya	0727124896	
12	KAZUNGU ~~FONDO~~ MWANGIRANI	FAMER	MAMBO SASA	Lango Baya	N/A	
13	CHARO IHA MBZOMBA	FARMER	KENYA LOMA	Langobaya	,	
14	THOMAS KAMSA IHA	FARMER	KENYALOMA	LANGOBAYA	0721917403	
15	HILLARY MSANZU NDORO	FARMER	KENYALOMA	LANGO BAYA	0713908588	
16	THOYA CHEA MSANZU	FARMER	KENYALOMA	LANGO BAYA	0717192717	
17	JOSEPH YAA YERE	V.ELDER / FAMER	K.ENYA LOMA	LANGOBAYA	0729164540	
18	REHEMA KITSAO SAND	FARMER	MIKUNUNI	LANGOBAYA	0744831515	
19	CHEA MSANZU	FARMER	KENYALOMA	LANGOBAYA	0705039208	
20	JONATHAN MWAVULA	CCOSB MANAGER	LANGOBAYA	LANGOBAYA	0721517294	
21						
22						
23						
24						

Figure 12-1: Baricho Attendance Scan

12.2.3 Public Consultation Minutes Photos

Figure 12-2: The Consultant's Presentation during the Meeting

Figure 12-3: Stakeholder Feedback during Meeting

Figure 12-4: Stakeholder Feedback during Meeting

Figure 12-5: Stakeholder Feedback during Meeting

Figure 12-6: Stakeholder Feedback during Meeting

Figure 12-7: Stakeholders showing their support of the Project